Name _____

Mathematics Teacher: _____

1.   A   B   C   D

2.   A   B   C   D

3.   A   B   C   D

4.   A   B   C   D

5.   A   B   C   D

6.   A   B   C   D

7.   A   B   C   D

8.   A   B   C   D

9.   A   B   C   D

10. A   B   C   D

11. A   B   C   D

12. A   B   C   D

13. A   B   C   D

14. A   B   C   D

15. A   B   C   D

16. A   B   C   D

17. A   B   C   D

18. A   B   C   D

19. A   B   C   D

20. A   B   C   D

21. A   B   C   D

22. A   B   C   D

23. A   B   C   D

24. A   B   C   D

25. A   B   C   D

26. A   B   C   D

27. A   B   C   D

28. A   B   C   D

Eastern School District

Mathematics 1201
Common Mathematics Assessment

June 12, 2013

Name:
Mathematics
Teacher:

28 Selected Response   28 marks
13 Constructed Response   42 marks

FINAL

_____
70 Marks

FORMULAE

Surface Area

Cylinder	Cone	Sphere
$2\pi r^2 + 2\pi rh$	$\pi r^2 + \pi rs$	$4\pi r^2$

Volume

Pyramid	Cone	Sphere
$\dfrac{1}{3}Ah$	$\dfrac{1}{3}\pi r^2 h$	$\dfrac{4}{3}\pi r^3$

Conversions

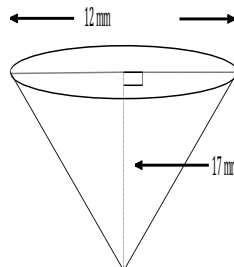| 1 foot = 12 inches	1 yard = 3 feet	1 mile = 1760 yards
1 inch = 2.54 centimetres $\doteq$ 2.5 centimetres		1 mile $\doteq$ 1.6 kilometres

Selected Response:
Circle the appropriate response on the answer sheet or SCANTRON.

1. Which is the best referent for one centimetre?

    (A) distance from the floor to a door knob
    (B) length of a five-dollar bill
    (C) thickness of a dime
    (D) width of a paper clip

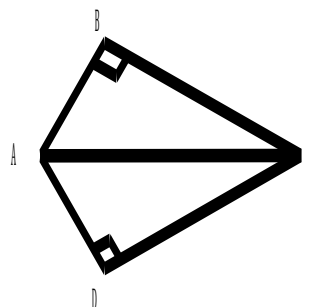2. What is the slant height of a cone with diameter 12 mm and height 17 mm ?

    (A) 16 mm

    (B) 17 mm

    (C) 18 mm

    (D) 21 mm

3. What is 19.75 yards in yards, feet, and inches?

    (A) 19 yards, 2 feet, 6 inches
    (B) 19 yards, 2 feet, 3 inches
    (C) 19 yards, 2 feet
    (D) 19 yards, 9 inches

4. What is the *adjacent* side to $\angle DAC$?

    (A) AD
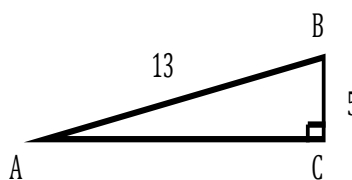
    (B) BA

    (C) CA

    (D) DC

5. What is the measure of $\angle A$, to the nearest degree, if $\tan A = 0.8725$?

    (A) 34°
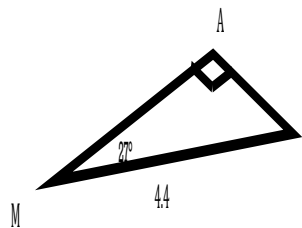   (B) 41°
    (C) 49°
    (D) 61°

6. Which ratio represents $\sin B$?

    (A) $\dfrac{5}{13}$

    (B) $\dfrac{12}{13}$

    (C) $\dfrac{13}{12}$

    (D) $\dfrac{13}{5}$

7. What is the length of side MA to the nearest tenth?

    (A) 2.0
    (B) 2.2
    (C) 3.9
    (D) 4.9

8. Simplify: $\sqrt[3]{108}$

    (A) $3\sqrt[3]{4}$
    (B) $27\sqrt[3]{4}$
    (C) $6\sqrt[3]{3}$
    (D) $36\sqrt[3]{3}$

9. Which statement is true about 3600?

    (A) It is a perfect cube.
    (B) Its only factors are 360 and 10.
    (C) Its square root is an irrational number.
    (D) Its prime factorization is $2^4 \cdot 3^2 \cdot 5^2$.

10. What is $\sqrt[3]{5^2}$ expressed as a power?

    (A) $5^{-\frac{3}{2}}$
    (B) $5^{-\frac{2}{3}}$
    (C) $5^{\frac{2}{3}}$
    (D) $5^{\frac{3}{2}}$

11. A student did not receive full marks for her solution to the question below. In which
     step did she make the **first** error?

     Simplify: $\dfrac{(a^{-2}b^7)^{-5}}{(a^2b^{-3})^3}$ *Solution:*   *Step 1:* $\dfrac{a^{-7}b^2}{a^5b^0}$
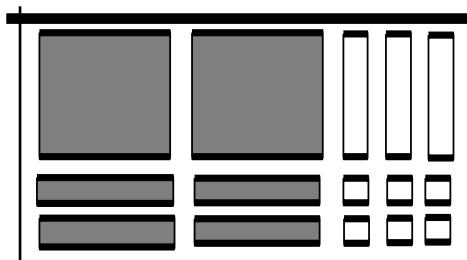
     Step 2: $a^{-7-5}\,b^{2-0}$

     Step 3: $a^{-12}b^2$

     Step 4: $\dfrac{b^2}{-a^{12}}$

    (A) 1
    (B) 2
    (C) 3
    (D) 4

12.   Which binomial product is modelled?

Note: ☐ = negative   ▨ = positive

   (A) $(-2x + 3)(-x + 2)$
   (B) $(-2x + 3)(x + 2)$
   (C) $(2x - 3)(x + 2)$
   (D) $(2x - 3)(x - 2)$

13.   Expand and simplify: $(a - 3b)(2a - b)$

   (A) $2a^2 + 3b^2$
   (B) $3a - 4b$
   (C) $2a^2 - 7ab + 3b^2$
   (D) $3a^2 - 6ab - 4b^2$

14.   What is the greatest common factor of $16x^2y^3$, $8x^3y^2$, and $-24x^3y^3$?

   (A) $4x^2y^2$
   (B) $4x^3y^3$
   (C) $8x^2y^2$
   (D) $8x^3y^3$

15.   Factor completely: $x^2 - 6x + 5$

   (A) $(x - 1)(x - 5)$
   (B) $(x - 2)(x - 3)$
   (C) $(x - 1)(x + 5)$
   (D) $(x + 6)(x - 1)$

16.   Factor completely: $4x^2 - 36$

   (A) $2(2x^2 - 18)$
   (B) $4(x^2 - 9)$
   (C) $(2x - 6)(2x + 6)$
   (D) $4(x - 3)(x + 3)$

17.   What is the missing value if the given polynomial is a perfect square trinomial?

        $25x^2 + [\ ?\ ] + 16$

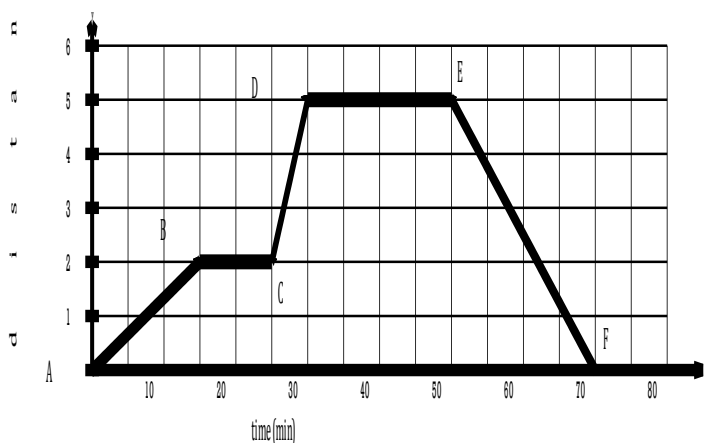   (A) $9x$
   (B) $18x$
   (C) $20x$
   (D) $40x$

18. If the amount of gas remaining in your gas tank is affected by the distance travelled, what is the dependent variable?

(A) the amount of gas in your tank
(B) the amount of time
(C) the cost of gas
(D) the distance travelled

19. Which set of ordered pairs represents a function?

(A) $\{(-3,-8)\,,\ (-1,-7)\,,\ (-2,-6)\,,\ (-1,-5)\}$
(B) $\{(-8,0)\,,\ (-6,5)\,,\ (4,-1)\,,\ (7,0)\}$
(C) $\{(4,1)\,,\ (4,2)\,,\ (3,4)\,,\ (4,4)\}$
(D) $\{(2,5)\,,\ (3,8)\,,\ (4,11)\,,\ (2,1)\}$

20. The graph describes Mackenzie's activity during a bike ride. What does segment EF represent?

(A) Mackenzie stops at a friend's house.
(B) Mackenzie rides downhill.
(C) Mackenzie leaves home.
(D) Mackenzie returns home.

21. What is the domain of the function shown?

(A) $\{x\,|-3 < x \le 3\,,\ x \in \mathbb{R}\}$

(B) $\{x\,|-3 \le x \le 3\,,\ x \in \mathbb{R}\}$

(C) $\{y\,|\,0 \le y \le 3\,,\ y \in \mathbb{R}\}$
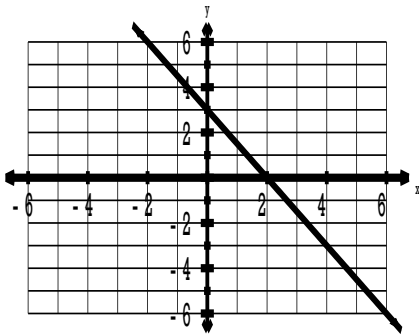
(D) $\{y\,|-3 < y \le 0\,,\ y \in \mathbb{R}\}$

22. What is the rate of change in the given table?

(A) $\dfrac{1}{5}$

(B) $\dfrac{1}{2}$

(C) 2

(D) 5

d	C(d)
0	75
10	77
20	79
30	81
40	83

23.   What is the equation of the line graphed?

(A) $y = -\frac{3}{2}x + 2$

(B) $y = -\frac{3}{2}x + 3$

(C) $y = -\frac{2}{3}x + 2$

(D) $y = -\frac{2}{3}x + 3$

24.   What is the slope of a line **perpendicular** to $y = -\frac{1}{7}x + 5$?

(A) -7

(B) $-\frac{1}{7}$

(C) $\frac{1}{7}$

(D) 7

25.   What is the equation of the line, in slope-point form, that has slope $\frac{4}{5}$, and passes through the point $(9, -1)$?

(A) $y - 1 = \frac{4}{5}(x + 9)$

(B) $y - 1 = \frac{5}{4}(x + 9)$

(C) $y + 1 = \frac{4}{5}(x - 9)$

(D) $y + 1 = \frac{5}{4}(x - 9)$

26.   What is the expression for the slope between points (a, b) and (c, d)?

(A) $\dfrac{a - b}{c - d}$

(B) $\dfrac{a - c}{b - d}$

(C) $\dfrac{c - d}{a - b}$

(D) $\dfrac{d - b}{c - a}$

27. Which system models the given situation?

> *A collection of nickels (n) and dimes (d) contains four times as many dimes as nickels. The total value of the collection is $20.25.*

(A) $\begin{cases} d = 4n \\ 0.05d + 0.10n = 20.25 \end{cases}$

(B) $\begin{cases} d = 4n \\ 0.10d + 0.05n = 20.25 \end{cases}$

(C) $\begin{cases} n = 4d \\ 0.05n + 0.10d = 20.25 \end{cases}$

(D) $\begin{cases} n = 4d \\ 0.10n + 0.05d = 20.25 \end{cases}$

28. How many solutions does the given system have?

$$y = \frac{4}{6}x + 8$$

$$y = \frac{2}{3}x - 4$$

(A) none
(B) one
(C) two
(D) infinite

Constructed Response:
Answers to be written on this paper in the space provided. Show all workings.

29. A shed is constructed by using a rectangular prism for the walls with a triangular prism for the roof. Determine the surface area of the garage to the nearest square foot. (Do not include the shed floor.) [4 points]
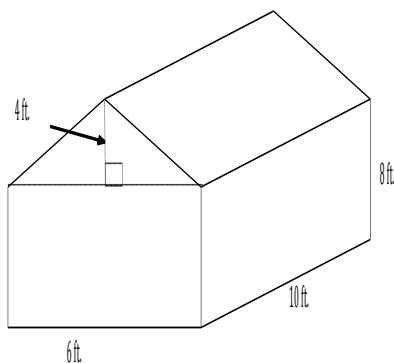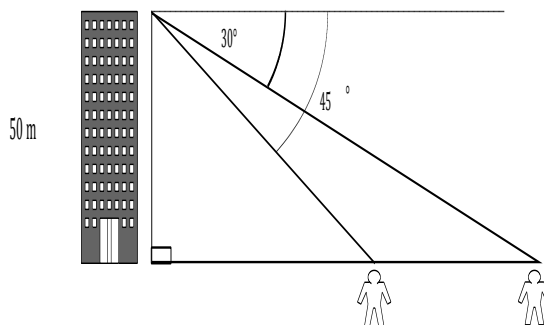
30. A right square pyramid has a volume of $182.4\ cm^3$. Determine the side length of its base to the nearest cm. [2 points]
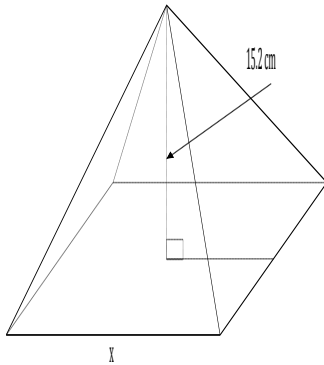
31. From the top of a 50 m building, an observer spots two joggers. The first jogger is at an angle of depression of 45° and the second is at an angle of depression of 30°. How far apart (to the nearest tenth of a metre) are the two joggers? [4 points]


32. A polling organization uses the telephone book to randomly select people for a survey. They choose every 20th person to ask question #1, every 28th person to ask question #2, and every 30th person to ask question #3. In which position in the phone book is the first person to be asked all three questions? [3 points]

33. The area of a square is $121x^4y^2$. What is the expression for the perimeter of the square?

[2 points]

34. Simplify: $\left(\dfrac{-54x^6y}{2x^{-3}y^4}\right)^{\frac{4}{3}}$

[4 points]

35. Expand and simplify: $(2x-5)(x+7)^2$

[3 points]

36. Determine the expression, in simplest form, for the area of the shaded region:

[3 points]

3 x - 2

2 x + 1

x + 4
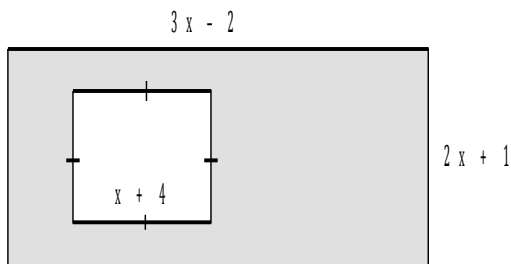
37. Factor completely: $5x^2 - 9x - 18$ [3 points]

38. The cost of printing advertising flyers for a school play is represented by the function   [4 points]
     $C(f) = 0.80f + 10.00$, where C is total cost in dollars and f is the number of flyers.

     a) If $C(f) = 86.00$, determine the value of f. Explain what this situation means.

     b) Does this function represent discrete or continuous data? Explain.

39. Write the equation, in the form $Ax + By + C = 0$, of the line that passes through the   [3 points]
     points $(4, 5)$ and $(-6, 10)$.

40. A trapezoid is defined as a quadrilateral with exactly one pair of parallel sides. Show **[3 points]** that the points $A(-3,-1)$, $B(-2,6)$, $C(2,8)$, and $D(7,4)$ can be joined to form a trapezoid.
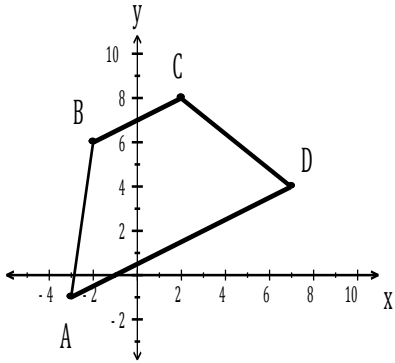
41. Solve: $\begin{cases} \frac{3}{2}x - 2y = -8 \\ 4x + 3y = -13 \end{cases}$ **[4 points]**

Eastern School District

Mathematics 1201
Common Mathematics Assessment

June 12, 2013

Name:
Mathematics
Teacher:

28 Selected Response 28 marks
13 Constructed Response 42 marks

FINAL

_____
70 Marks

FORMULAE

Surface Area

Cylinder	Cone	Sphere
$2\pi r^2 + 2\pi rh$	$\pi r^2 + \pi rs$	$4\pi r^2$

Volume

Pyramid	Cone	Sphere
$\frac{1}{3}Ah$	$\frac{1}{3}\pi r^2 h$	$\frac{4}{3}\pi r^3$

Conversions

1 foot = 12 inches	1 yard = 3 feet	1 mile = 1760 yards
1 inch = 2.54 centimetres $\doteq$ 2.5 centimetres		1 mile $\doteq$ 1.6 kilometres

Selected Response:
Circle the appropriate response on the answer sheet or SCANTRON.

1. Which is the best referent for one centimetre?

    (A) distance from the floor to a door knob
    (B) length of a five-dollar bill
    (C) thickness of a dime
    (D) width of a paper clip

2. What is the slant height of a cone with diameter 12 *mm* and height 17 *mm* ?

    (A) 16 mm
    (B) 17 mm
    (C) 18 mm
    (D) 21 mm

    ← 12 mm →

    ←17 mm

    $6^2 + 17^2 = h^2$

    $325 = h^2$

    $18.0 = h$

3. What is 19.75 yards in yards, feet, and inches?

    (A) 19 yards, 2 feet, 3 inches
    (B) 19 yards, 2 feet, 6 inches
    (C) 19 yards, 2 feet
    (D) 19 yards, 9 inches

    $0.75 \times 3 = 2.25$

    $0.25 \times 12 = 3$

4. What is the *adjacent* side to ∠DAC ?

    (A) AD
    (B) BA
    (C) CA
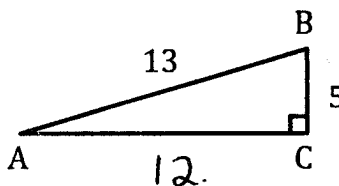   (D) DC

    B

    A   C

    D

5. What is the measure of ∠A , to the nearest degree, if tan A = 0.8725 ?
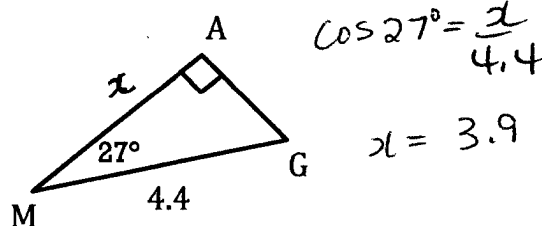
    (A) 34°
    (B) 41°
    (C) 49°
    (D) 61°

6. Which ratio represents sin B ?

    (A) $\dfrac{5}{13}$

    (B) $\dfrac{12}{13}$

    (C) $\dfrac{13}{12}$

    (D) $\dfrac{13}{5}$

    B

    13   5

    A   12   C

7. What is the length of side MA to the nearest tenth?

    (A)   2.0
    (B)   2.2
    (C)   3.9
    (D)   4.9

$\cos 27° = \dfrac{x}{4.4}$

$x = 3.9$

8. Simplify: $\sqrt[3]{108}$

    (A) $3\sqrt[3]{4}$
    (B) $27\sqrt[3]{4}$
    (C) $6\sqrt[3]{3}$
    (D) $36\sqrt[3]{3}$

$\sqrt[3]{27 \cdot 4}$

$= 3\sqrt[3]{4}$

9. Which statement is true about 3600?

    (A)   It is a perfect cube.
    (B)   Its only factors are 360 and 10.
    (C)   Its square root is an irrational number.
    (D)   Its prime factorization is $2^4 \cdot 3^2 \cdot 5^2$.

10. What is $\sqrt[3]{5^2}$ expressed as a power?

    (A) $5^{-\frac{3}{2}}$

    (B) $5^{-\frac{2}{3}}$

    (C) $5^{\frac{2}{3}}$

    (D) $5^{\frac{3}{2}}$

$5^{\frac{2}{3}}$

11. A student did not receive full marks for her solution to the question below. In which step did she make the **first** error?

    Simplify: $\dfrac{(a^{-2}b^7)^{-5}}{(a^2b^{-3})^3}$ Solution: Step 1: $\dfrac{a^{-7}b^2}{a^5b^0}$

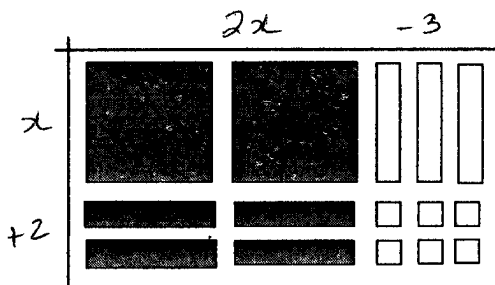   Step 2: $a^{-7-5}b^{2-0}$

                                                               Step 3: $a^{-12}b^2$

                                                               Step 4: $\dfrac{b^2}{-a^{12}}$

    (A)   1
    (B)   2
    (C)   3
    (D)   4

12. Which binomial product is modelled?

Note: ☐ = negative ■ = positive

- (A) $(-2x + 3)(-x + 2)$
- (B) $(-2x + 3)(x + 2)$
- (C) $(2x - 3)(x + 2)$ ⟵ circled
- (D) $(2x - 3)(x - 2)$

13. Expand and simplify: $(a - 3b)(2a - b)$

- (A) $2a^2 + 3b^2$
- (B) $3a - 4b$
- (C) $2a^2 - 7ab + 3b^2$ ⟵ circled
- (D) $3a^2 - 6ab - 4b^2$

$$2a^2 - ab - 6ab + 3b^2$$
$$2a^2 - 7ab + 3b^2$$

14. What is the greatest common factor of $16x^2y^3$, $8x^3y^2$, and $-24x^3y^3$?

- (A) $4x^2y^2$
- (B) $4x^3y^3$
- (C) $8x^2y^2$ ⟵ circled
- (D) $8x^3y^3$

$$8x^2y^2$$

15. Factor completely: $x^2 - 6x + 5$

- (A) $(x - 1)(x - 5)$ ⟵ circled
- (B) $(x - 2)(x - 3)$
- (C) $(x - 1)(x + 5)$
- (D) $(x + 6)(x - 1)$

16. Factor completely: $4x^2 - 36$

- (A) $2(2x^2 - 18)$
- (B) $4(x^2 - 9)$
- (C) $(2x - 6)(2x + 6)$
- (D) $4(x - 3)(x + 3)$ ⟵ circled

$$4(x^2 - 9)$$
$$4(x+3)(x-3)$$

17. What is the missing value if the given polynomial is a perfect square trinomial?

$$25x^2 + [?] + 16$$

$$\overbrace{(5x + 4)(5x + 4)}$$ with $20x$ above and $20x$ below

- (A) $9x$
- (B) $18x$
- (C) $20x$
- (D) $40x$ ⟵ circled

18. If the amount of gas remaining in your gas tank is affected by the distance travelled, what is the dependent variable?

(A)   the amount of gas in your tank
(B)   the amount of time
(C)   the cost of gas
(D)   the distance travelled

19. Which set of ordered pairs represents a function?

(A) $\{(-3,-8)\ ,\ (-1,-7)\ ,\ (-2,-6)\ ,\ (-1,-5)\}$
(B) $\{(-8,0)\ ,\ (-6,5)\ ,\ (4,-1)\ ,\ (7,0)\}$
(C) $\{(4,1)\ ,\ (4,2)\ ,\ (3,4)\ ,\ (4,4)\}$
(D) $\{(2,5)\ ,\ (3,8)\ ,\ (4,11)\ ,\ (2,1)\}$

20. The graph describes Mackenzie's activity during a bike ride. What does segment EF represent?

(A)   Mackenzie stops at a friend's house.
(B)   Mackenzie rides downhill.
(C)   Mackenzie leaves home.
(D)   Mackenzie returns home.

21. What is the domain of the function shown?

(A) $\{x \mid -3 < x \le 3\ ,\ x \in \mathbb{R}\}$

(B) $\{x \mid -3 \le x \le 3\ ,\ x \in \mathbb{R}\}$

(C) $\{y \mid 0 \le y \le 3\ ,\ y \in \mathbb{R}\}$

(D) $\{y \mid -3 < y \le 0\ ,\ y \in \mathbb{R}\}$

22. What is the rate of change in the given table?

(A) $\dfrac{1}{5}$

(B) $\dfrac{1}{2}$

(C)   2

(D)   5

d	C(d)
0	75
10	77
20	79
30	81
40	83

$10\,\langle$ $\rangle +2$

$\dfrac{2}{10} = \dfrac{1}{5}$

23.   What is the equation of the line graphed?

   (A) $y = -\frac{3}{2}x + 2$

   (B) $y = -\frac{3}{2}x + 3$

   (C) $y = -\frac{2}{3}x + 2$

   (D) $y = -\frac{2}{3}x + 3$

24.   What is the slope of a line **perpendicular** to $y = -\frac{1}{7}x + 5$?

   (A) -7

   (B) $-\frac{1}{7}$

   (C) $\frac{1}{7}$

   (D) 7

25.   What is the equation of the line, in slope-point form, that has slope $\frac{4}{5}$, and passes through the point $(9, -1)$?

   (A) $y - 1 = \frac{4}{5}(x + 9)$

   (B) $y - 1 = \frac{5}{4}(x + 9)$

   (C) $y + 1 = \frac{4}{5}(x - 9)$

   (D) $y + 1 = \frac{5}{4}(x - 9)$

26.   What is the expression for the slope between points (a, b) and (c, d)?

   (A) $\frac{a - b}{c - d}$

   (B) $\frac{a - c}{b - d}$

   (C) $\frac{c - d}{a - b}$

   (D) $\frac{d - b}{c - a}$

27. Which system models the given situation?

> A collection of nickels (n) and dimes (d) contains four times as many dimes as nickels. The total value of the collection is $20.25.

(A) $\begin{cases} d = 4n \\ 0.05d + 0.10n = 20.25 \end{cases}$

(B) $\begin{cases} d = 4n \\ 0.10d + 0.05n = 20.25 \end{cases}$

(C) $\begin{cases} n = 4d \\ 0.05n + 0.10d = 20.25 \end{cases}$

(D) $\begin{cases} n = 4d \\ 0.10n + 0.05d = 20.25 \end{cases}$

28. How many solutions does the given system have?

$y = \frac{4}{6}x + 8$ $y = \frac{2}{3}x + 8$

$y = \frac{2}{3}x - 4$ parallel

(A) none
(B) one
(C) two
(D) infinite

Constructed Response:
Answers to be written on this paper in the space provided. Show all workings.

29. A shed is constructed by using a rectangular prism for the walls with a triangular   [4 points]
prism for the roof. Determine the surface area of the shed to the nearest square
foot. (Do not include the shed floor.)
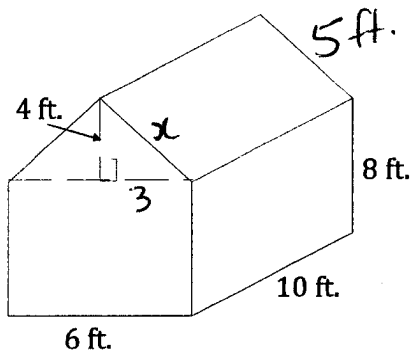
Rectangular
Front = 6 × 8 = 48
Back = 48
① Right = 10 × 8 = 80
Left = 80

Triangular
Front = $\frac{b \times h}{2}$ = $\frac{6 \times 4}{2}$ = 12
Back = 12
Right = 10 × 5 = 50
Left = 50

$3^2 + 4^2 = x^2$
$25 = x^2$ ①
$5 = x$

① SA = $2(48) + 2(80) + 2(12) + 2(50)$ = $380 ft^2$.

30. A right square pyramid has a volume of $182.4\ cm^3$. Determine the side length of its base to the nearest cm. **[2 points]**

$$V = \frac{lwh}{3}$$
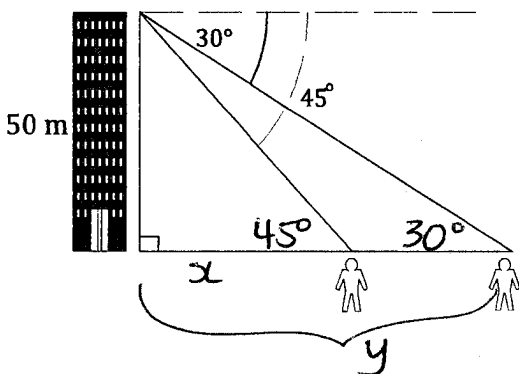
$$182.4 = \frac{x \cdot x \cdot 15.2}{3} \quad \left(\tfrac{1}{2}\right)$$

$$3 \cdot \frac{182.4}{15.2} = x^2 \quad \left(\tfrac{1}{2}\right)$$

$$36 = x^2 \quad \left(\tfrac{1}{2}\right)$$

$$\sqrt{36} = x$$

$$6 = x \quad \left(\tfrac{1}{2}\right)$$

15.2 cm

x

31. From the top of a 50 m building, an observer spots two joggers. The first jogger is at an angle of depression of 45° and the second is at an angle of depression of 30°. How far apart (to the nearest tenth of a metre) are the two joggers? **[4 points]**

30°
45°
50 m
45°   30°
x
y
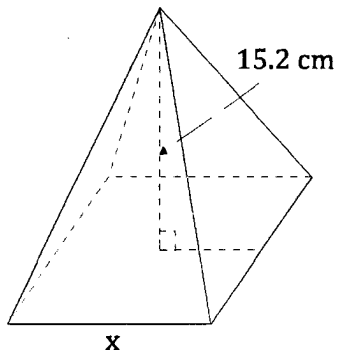
Distance between
joggers is
86.6 - 50   ①
= 36.6 m

$$\tan 45° = \frac{50}{x} \quad ① \qquad\qquad \tan 30° = \frac{50}{y} \quad ①$$

$$x = \frac{50}{\tan 45°} = 50 \quad \left(\tfrac{1}{2}\right) \qquad y = \frac{50}{\tan 30°} = 86.6 \quad \left(\tfrac{1}{2}\right)$$

32. A polling organization uses the telephone book to randomly select people for a survey. They choose every 20th person to ask question #1, every 28th person to ask question #2, and every 30th person to ask question #3. In which position in the phone book is the first person to be asked all three questions? **[3 points]**

LCM :

20
∧
4 · 5
∧ |
2 · 2 · 5
2² · 5

28
∧
4 · 7
∧ |
2 · 2 · 7
2² · 7

30
∧
6 · 5
∧ |
2 · 3 · 5
2 · 3 · 5

②

$$LCM = 2^2 \cdot 5 \cdot 7 \cdot 3 = 420 \quad ①$$

The 420th person is the first one to be asked all 3 questions.

33. The area of a square is $121x^4y^2$. What is the expression for the perimeter of the square? **[2 points]**

$$\text{side} = \sqrt{121x^4y^2} = 11x^2y \quad ①$$

$$\text{Perimeter} = 4(11x^2y) = \boxed{44x^2y} \quad ①$$

34. Simplify: $\left(\dfrac{-54x^6y}{2x^{-3}y^4}\right)^{\frac{4}{3}}$ **[4 points]**

$$① \begin{cases} = (-27x^{6--3}\,y^{1-4})^{\frac{4}{3}} \\ = (-27x^9\,y^{-3})^{\frac{4}{3}} \end{cases}$$

$$① = (-27)^{\frac{4}{3}}\,(x^9)^{\frac{4}{3}}\,(y^{-3})^{\frac{4}{3}}$$

$$① = (\sqrt[3]{-27})^4\,(x^{12})\,(y^{-4})$$

$$\left(\tfrac{1}{2}\right) = (-3)^4\,x^{12}\,y^{-4} = \boxed{\dfrac{81x^{12}}{y^4}} \quad \left(\tfrac{1}{2}\right)$$

35. Expand and simplify: $(2x-5)(x+7)^2$ **[3 points]**

$$\left(\tfrac{1}{2}\right) = (2x-5)(x+7)(x+7)$$

$$\left(\tfrac{1}{2}\right)\begin{cases} = (2x-5)(x^2+7x+7x+49) \\ = (2x-5)(x^2+14x+49) \end{cases}$$

$$\left(1\tfrac{1}{2}\right) = 2x^3 + 28x^2 + 98x - 5x^2 - 70x - 245$$

$$\left(\tfrac{1}{2}\right) = \boxed{2x^3 + 23x^2 + 28x - 245}$$

36. Determine the expression, in simplest form, for the area of the shaded region: **[3 points]**

$3x - 2$

$2x + 1$

$x + 4$
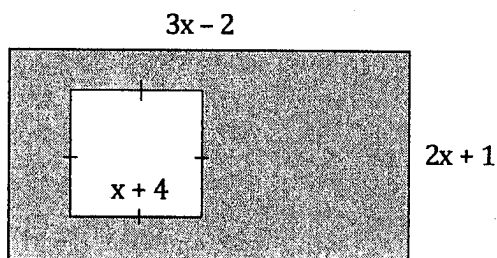
$$\text{Rect. Area} = (3x-2)(2x+1) \overset{\left(\tfrac{1}{2}\right)}{=} 6x^2 + 3x - 4x - 2 \quad ①$$
$$= 6x^2 - x - 2$$

$$\text{Square Area} = (x+4)(x+4) \overset{\left(\tfrac{1}{2}\right)}{=} x^2 + 4x + 4x + 16 \quad ①$$
$$= x^2 + 8x + 16$$

$$\text{Shaded Area} = (6x^2 - x - 2) - (x^2 + 8x + 16) = \boxed{5x^2 - 9x - 18} \quad ①$$

37. Factor completely: $5x^2 - 9x - 18$ ⊕ ⊗   [3 points]

$$\left(5x^2 - 15x\right) + \left(6x - 18\right)$$

$$5x(x-3) + 6(x-3)$$

$$\boxed{(x-3)(5x+6)} \ ②$$

-9   -90

-15, 6   ①

38. The cost of printing advertising flyers for a school play is represented by the function   [4 points]
   $C(f) = 0.80f + 10.00$, where C is total cost in dollars and f is the number of flyers.

   a) If $C(f) = 86.00$, determine the value of f. Explain what this situation means.

   $(\frac{1}{2})$ $86.00 = 0.80f + 10.00$ this means that

   $86.00 - 10.00 = 0.80f$ 95 flyers could be

   $\dfrac{76.00}{0.80} = \dfrac{0.80f}{0.80}$ printed for 86.00.

        ①

   $(\frac{1}{2})$ $95 = f$

   b) Does this function represent discrete or continuous data? Explain.
   ①

   This is discrete data because you
   cannot print "half" of a flyer (... or "part"
   ①   of a flyer.)

39. Write the equation, in the form $Ax + By + C = 0$, of the line that passes through the   [3 points]
   points $(4, 5)$ and $(-6, 10)$.

   $$Slope = \frac{10-5}{-6-4} = \frac{5}{-10} = -\frac{1}{2} \ (\tfrac{1}{2})$$

   $y = -\frac{1}{2}x + b$ $y = -\frac{1}{2}x + 7 \ (\tfrac{1}{2})$

   $5 = -\frac{1}{2}(4) + b \ (\tfrac{1}{2})$ $\frac{1}{2}x + y - 7 = 0 \ (\tfrac{1}{2})$

   $5 = -2 + b$ $2\left(\frac{1}{2}x + y - 7\right) = 0$

   $5 + 2 = b$ $\boxed{x + 2y - 14 = 0} \ (\tfrac{1}{2})$

   $7 = b \ (\tfrac{1}{2})$

40. A trapezoid is defined as a quadrilateral with exactly one pair of parallel sides. Show **[3 points]** that the points $A(-3,-1)$, $B(-2,6)$, $C(2,8)$, and $D(7,4)$ can be joined to form a trapezoid.
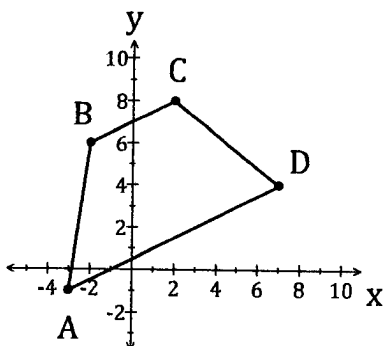
$\left(\frac{1}{2}\right)$ $m_{AB} = \frac{6--1}{-2--3} = \frac{7}{1} = 7$

$\left(\frac{1}{2}\right)$ $m_{BC} = \frac{8-6}{2--2} = \frac{2}{4} = \frac{1}{2}$

$\left(\frac{1}{2}\right)$ $m_{CD} = \frac{4-8}{7-2} = -\frac{4}{5}$

$\left(\frac{1}{2}\right)$ $m_{AD} = \frac{4--1}{7--3} = \frac{5}{10} = \frac{1}{2}$

$BC \parallel AD$ since slopes are the same.

$\left(\frac{1}{2}\right)$ $AB \nparallel CD$ ... different slopes.

$\left(\frac{1}{2}\right)$ $ABCD$ is a trapezoid because it has exactly one pair of parallel sides.

41. Solve: $\begin{cases} \frac{3}{2}x - 2y = -8 \\ 4x + 3y = -13 \end{cases}$ $\longrightarrow$ $2\left(\frac{3}{2}x\right) - 2(2y) = 2(-8)$ $\left(\frac{1}{2}\right)$ **[4 points]**

$3x - 4y = -16$

$3x - 4y = -16 \xrightarrow{\times 3}$ $9x - 12y = -48$ $\left(\frac{1}{2}\right)$

$4x + 3y = -13 \xrightarrow{\times 4}$ $16x + 12y = -52$ $\left(\frac{1}{2}\right)$

$\dfrac{25x}{25} = \dfrac{-100}{25}$ $\left(\frac{1}{2}\right)$

$x = -4$ $\left(\frac{1}{2}\right)$

$4(-4) + 3y = -13$ $\left(\frac{1}{2}\right)$

$-16 + 3y = -13$

$3y = -13 + 16$

$\dfrac{3y}{3} = \dfrac{3}{3}$

$y = 1$ $\left(\frac{1}{2}\right)$

$(-4, 1)$ $\left(\frac{1}{2}\right)$

1201 Common Mathematics Assessment - June 2013
Answer Sheet

Name _____

Mathematics Teacher: _____

1. A   B   C   (D)
2. A   B   (C)   D
3. (A)   B   C   D
4. (A)   B   C   D
5. A   (B)   C   D
6. A   (B)   C   D
7. A   B   (C)   D
8. (A)   B   C   D
9. A   B   C   (D)
10. A   B   (C)   D
11. (A)   B   C   D
12. A   B   (C)   D
13. A   B   (C)   D
14. A   B   (C)   D
15. (A)   B   C   D
16. A   B   C   (D)
17. A   B   C   (D)
18. (A)   B   C   D
19. A   (B)   C   D
20. A   B   C   (D)
21. (A)   B   C   D
22. (A)   B   C   D
23. A   (B)   C   D
24. A   B   C   (D)
25. A   B   (C)   D
26. A   B   C   (D)
27. A   (B)   C   D
28. (A)   B   C   D

Labrador School Board

Mathematics 1201
Final Examination
June 12th, 2012

Student Name: _____

Teacher Name: _____

Total Value: 100 marks   Time: 3 Hours

GENERAL INSTRUCTIONS

1. Candidates are required to do all items.

2. The examination has a total of 23 pages consisting of the following parts:

   Part I: 40 Multiple Choice Items   Value: 40 Marks
   Part II: 17 Constructed Response Questions   Value: 60 Marks

3. **Page 23 is a formulae sheet** to be used for the exam. This page may be removed.

4. Part I should be completed on the bubble sheets provided.

5. Answers to the constructed response questions for Part II are to be placed in the spaces provided.

6. For Part II items, candidates are reminded to show ALL necessary steps and calculations. Partial credit may be awarded for logical work even though you might not arrive at the correct solution. Correct answers without appropriate calculations will not merit full marks.

7. A self powered calculator may be used for calculations and to obtain special values. Graphing calculators are to be reset before the examination begins.

REGULATIONS FOR CANDIDATES

Candidates are expected to be thoroughly familiar with all regulations pertaining to their conduct during examinations. Candidates must comply with all requirements governing the following matters.

- Materials required
- Leaving the room
- Materials not permitted
- Models of calculators permitted

- Use of pen or pencil
- Use of unauthorized means and penalties
- Completion of required information
- Communication during the exam

1. Which is the best referent for 1 yard?

   A) height of a door knob from the floor

   B) length of the ice surface in a hockey arena

   C) length of a screwdriver

   D) width of your thumb

2. A student ran 60 feet. How many yards did the student run?

   A) 5

   B) 20

   C) 180

   D) 720

3. What is the surface area of the regular tetrahedron to the nearest square centimetre if $AB = 5.0$ cm and $CD = 5.8$ cm?

   A) 15

   B) 44

   C) 58

   D) 116
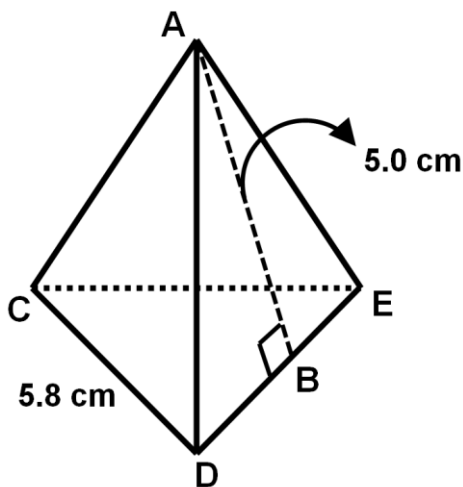
4. Betty has 18 yd. of material that she will cut into strips that must be exactly 15 in. wide. How many strips can Betty make?

   A) 3

   B) 6

   C) 43

   D) 44

5. The volume of a right cone is 14.7 cm³. If diameter $AB = 3.7$ cm, what is the height, h, of the cone to the nearest tenth of a centimetre?

    A) 0.3

    B) 1.0

    C) 1.4

    D) 4.1
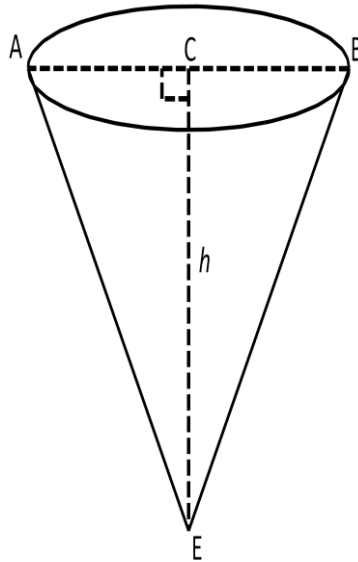
6. A sphere has a surface area of 6.4 m². What is the diameter of the sphere to the nearest tenth of a metre?

    A) 0.5

    B) 0.7

    C) 1.0

    D) 1.4
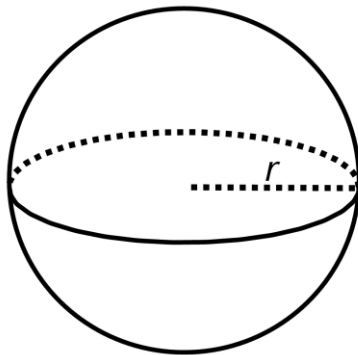
7. Which ratio represents $\cos \angle A$?

    A) $\dfrac{5}{13}$

    B) $\dfrac{5}{12}$

    C) $\dfrac{12}{13}$

    D) $\dfrac{13}{5}$
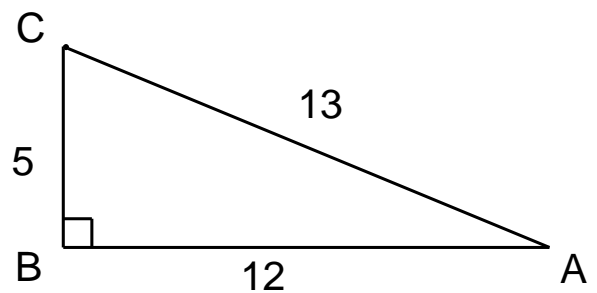
8. What is the measure of $\angle A$ to the nearest tenth of a degree?

    A) 24.2

    B) 26.7

    C) 63.3

    D) 65.8
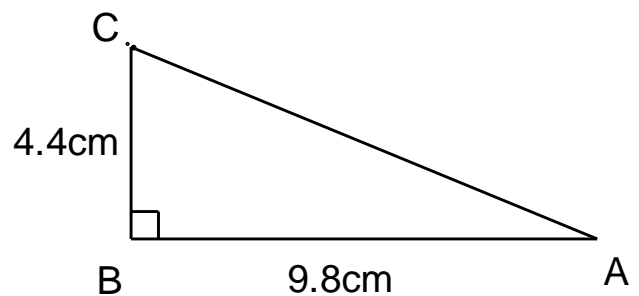
9. A guy wire is attached to a tower at a point that is 6.4 m above the ground. The angle of inclination of the wire is 62°. What is the length of the wire to the nearest tenth of a metre?

A) 3.4

B) 5.7

C) 7.2

D) 13.6
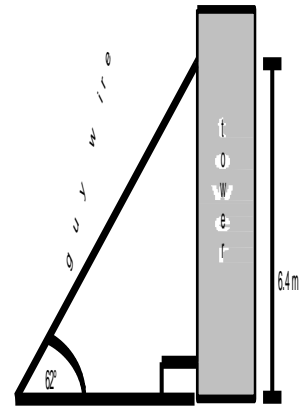
10. Sarah is standing 52 inches from the base of a tree. Using a clinometer, she determines the angle of inclination from her eye level to the top of the tree to be 32°. If her eyes are 60 inches above the ground, what is the height of the tree to the nearest tenth of an inch?

A) 32.5

B) 83.2

C) 92.5

D) 143.2
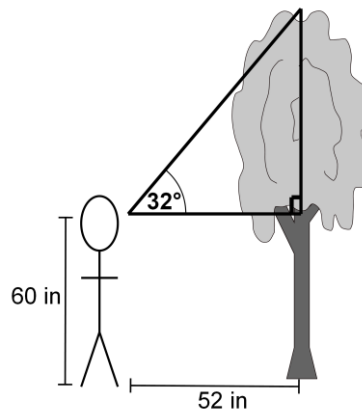
11. What is the greatest common factor of 54, 150 and 180?

A) 6

B) 9

C) 30

D) 54

12. Evaluate: $\sqrt[3]{-64} + \sqrt{\dfrac{1}{4}}$

A) $-3\dfrac{15}{16}$

B) $-3\dfrac{1}{2}$

C) $4\dfrac{1}{16}$

D) $4\dfrac{1}{2}$

13. Which is irrational?

A) $\sqrt[3]{-8}$

B) $-\sqrt{\dfrac{4}{9}}$

C) $\sqrt{2.25}$

D) $\sqrt{14}$

14. Simplify: $\dfrac{x^6 y^9 z^2}{x y^4 z^6}$

A) $x^5 y^5 z^4$

B) $x^6 y^5 z^4$

C) $\dfrac{x^5 y^5}{z^4}$

D) $\dfrac{x^6 y^5}{z^4}$

15. What is $\sqrt[4]{8^3}$ expressed as a power?

A) $8^{\frac{-4}{3}}$

B) $8^{\frac{-3}{4}}$

C) $8^{\frac{3}{4}}$

D) $8^{\frac{4}{3}}$

16. Evaluate: $\left(-\dfrac{8}{27}\right)^{-\frac{2}{3}}$

A) $-\dfrac{9}{4}$

B) $-\dfrac{4}{9}$

C) $\dfrac{4}{9}$

D) $\dfrac{9}{4}$

17. Simplify: $\left(x^{-2}y^4\right)^{-3}$

A) $\dfrac{x^5}{y}$

B) $\dfrac{y}{x^5}$

C) $\dfrac{x^6}{y^{12}}$

D) $\dfrac{y^{12}}{x^6}$

18. Simplify: $\dfrac{\left(a^2 b^{-\frac{1}{2}}\right)\left(a^{\frac{1}{3}}b^3\right)}{\left(ab^2\right)}$

A) $\dfrac{a^{\frac{2}{3}}}{b^3}$

B) $a^{\frac{8}{3}}b^{\frac{9}{2}}$

C) $a^7 b^5$

D) $a^{\frac{4}{3}}b^{\frac{1}{2}}$

19. Which multiplication does the set of algebra tiles represent? (Note: shaded tiles represent positives.)

A) $(2x+2)(2x+2)$

B) $(2x^2+2)(2x^2-2)$

C) $(2x^2+2x)(2x^2+2x)$

D) $(2x+2)(2x-2)$
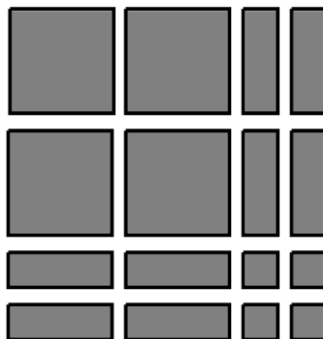
20. Factor completely: $44x+99x^2$

A) $x(44+99x)$

B) $11\left(4x+9x^2\right)$

C) $11x(4+9x)$

D) $22x(2+9x)$

21. Factor: $x^2+9x-36$

    A) $(x+12)(x-3)$

    B) $(x-12)(x+3)$

    C) $(x-2)(x+18)$

    D) $(x-18)(x+2)$

22. Expand and simplify: $(6p+3)(5p-6)$

    A) $30p^2+21p-18$

    B) $30p^2-21p-18$

    C) $30p^2+51p-18$

    D) $30p^2-51p-18$

23. Factor: $16x^2-81y^2$

    A) $(4x-9y)^2$

    B) $(4x+9y)^2$

    C) $(16x+9y)(x-9y)$

    D) $(4x+9y)(4x-9y)$

24. Factor: $4a^2+12a+9$

    A) $(2a-3)(2a+3)$

    B) $(2a+3)(2a+3)$

    C) $(4a-1)(a+9)$

    D) $(4a+1)(a+9)$

25. Which polynomial represents the area of the rectangle?

    A) $8x^2+36xy-20y^2$

    B) $8x^2+22xy-20y^2$

    C) $16x^2+72xy-40y^2$

    D) $8x^2-36xy-20y^2$

    (8 x − 4 y)

    (x + 5 y)
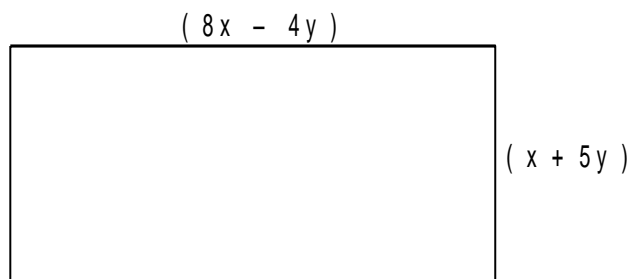
26. Factor completely: $8y^2 - 28y + 12$

    A) $2(4y-2)(y-3)$

    B) $2(4y-3)(y-2)$

    C) $4(2y-1)(y-3)$

    D) $4(2y-3)(y-1)$

27. Which set of ordered pairs represents a function?

    A) $\{(2,5),(3,8),(4,11),(2,-1)\}$

    B) $\{(4,6),(5,-7),(7,9),(8,-10)\}$

    C) $\{(-3,-8),(-1,-6),(-2,5),(-2,7)\}$

    D) $\{(2,0),(4,-1),(4,5),(-8,0)\}$

28. What is the domain of the graphed relation?

    A) $[-5,3]$

    B) $[-5,3)$

    C) $(-5,3]$

    D) $(-5,3)$
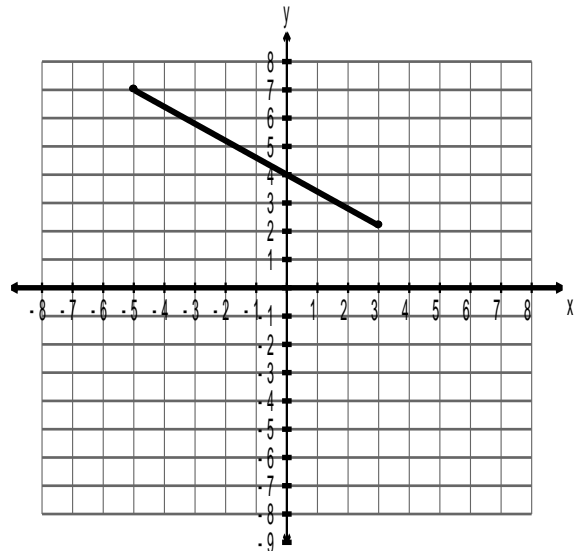
29. The function $C(f) = \dfrac{5}{9}(f-32)$ converts a temperature, f degrees Fahrenheit, to C degrees Celsius. What is the temperature in degrees Fahrenheit if $C(f) = 30°$?

    A) 34

    B) 49

    C) 86

    D) 112

30. For a service call, an electrician charges an initial fee of $65, plus $45 for every 30 minutes worked. What is the rate of change, in dollars per hour, of this linear relation?

   A) 45

   B) 90

   C) 110

   D) 155

31. Which relation does **NOT** represent a function?

   A)
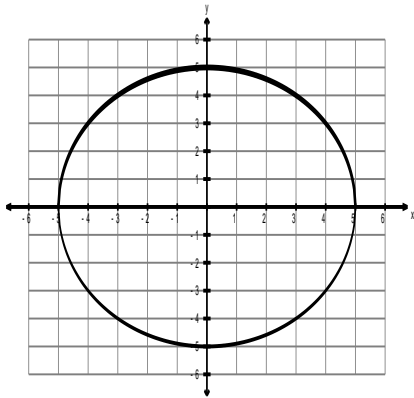
   B)
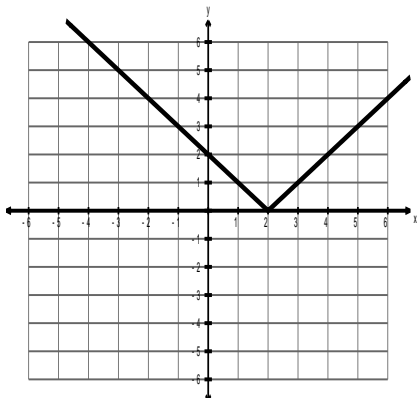
   C)
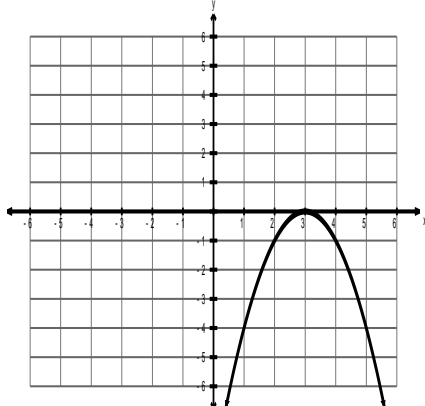
   D)
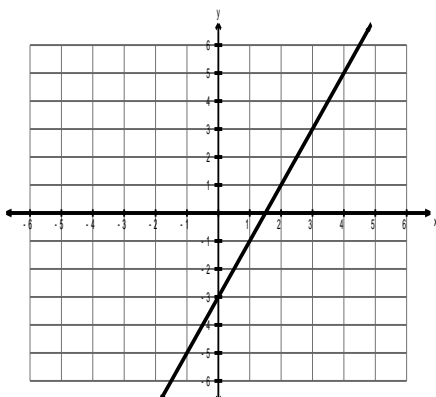
32. What is the equation of the line?

    A) $2x+3y+12=0$

    B) $2x+3y-12=0$

    C) $2x-3y+12=0$

    D) $2x-3y-12=0$
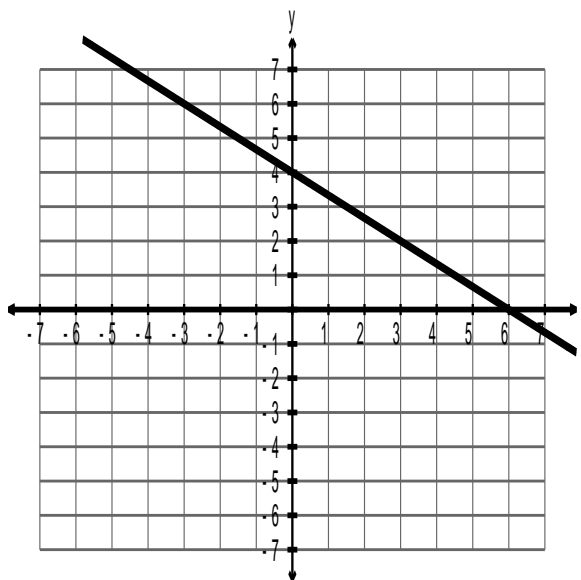
33. What is the slope of a line perpendicular to the given line?

    A) $-\dfrac{5}{3}$

    B) $-\dfrac{3}{5}$

    C) $\dfrac{3}{5}$

    D) $\dfrac{5}{3}$
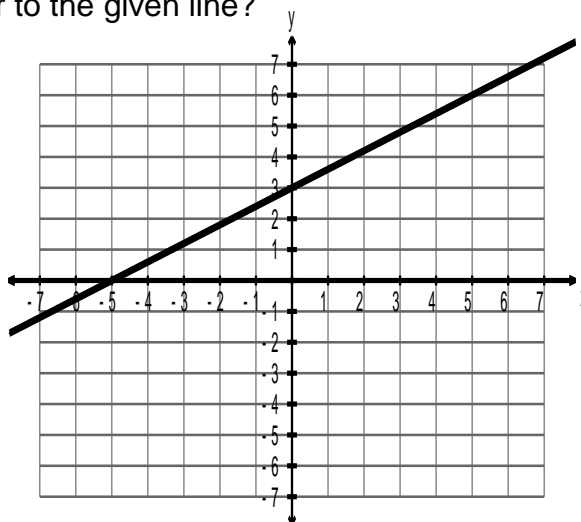
34. A line has slope $\dfrac{1}{2}$ and passes through the point (3, -4). What is its equation in slope-point form?

    A) $y-4=\dfrac{1}{2}(x-3)$

    B) $y-4=\dfrac{1}{2}(x+3)$

    C) $y+4=\dfrac{1}{2}(x-3)$

    D) $y+4=\dfrac{1}{2}(x+3)$

35. What is the slope-intercept form of $-3x+6y+30=0$?

    A) $y=-\dfrac{1}{2}x-5$

    B) $y=-\dfrac{1}{2}x+5$

    C) $y=\dfrac{1}{2}x-5$

    D) $y=\dfrac{1}{2}x+5$

36. Which represents $y = -3$?

A)
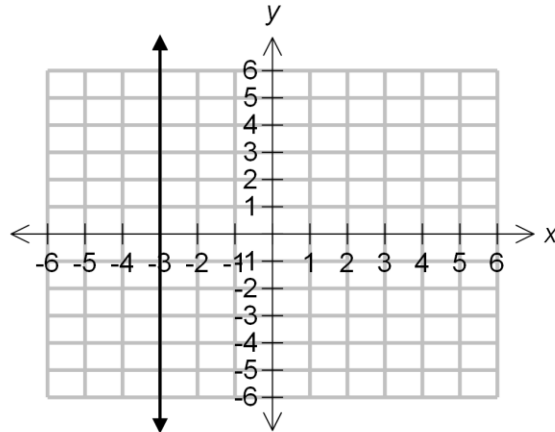
B)
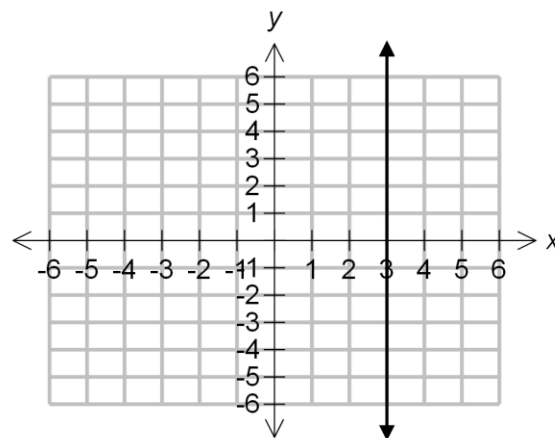
C)
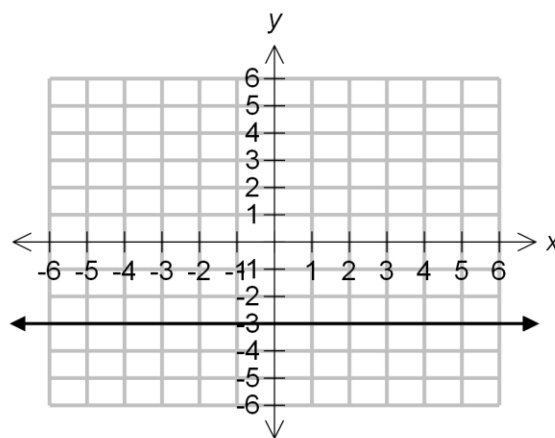
D)
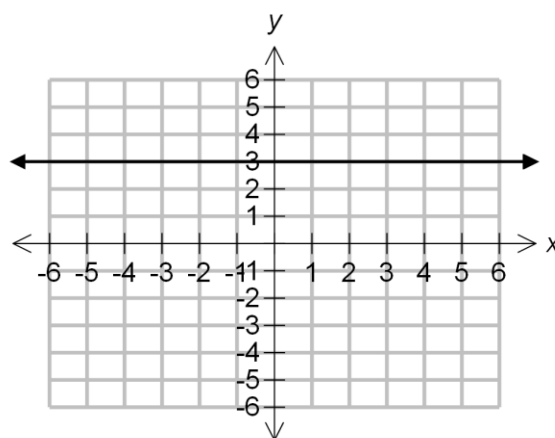
37. Don operates a snow clearing business. He charges $22 for a small driveway (S) and $30 for a large driveway (L). One weekend Don made $326 by clearing 13 driveways. Which linear system models this situation?

A) $\begin{cases} S+\ L=\ 13 \\ 22S+30L=326 \end{cases}$

B) $\begin{cases} S+\ L=\ 13 \\ 30S+22L=326 \end{cases}$

C) $\begin{cases} S+\ L=326 \\ 22S+30L=\ 13 \end{cases}$

D) $\begin{cases} S+\ L=326 \\ 30S+22L=\ 13 \end{cases}$

38. Solve: $\begin{cases} 2x-y=4 \\ x+y=2 \end{cases}$

A) $(-1,3)$

B) $(0,2)$

C) $(2,0)$

D) $(3,-1)$

39. How many solutions does the graphed linear system contain?

A) infinite

B) none

C) one

D) two
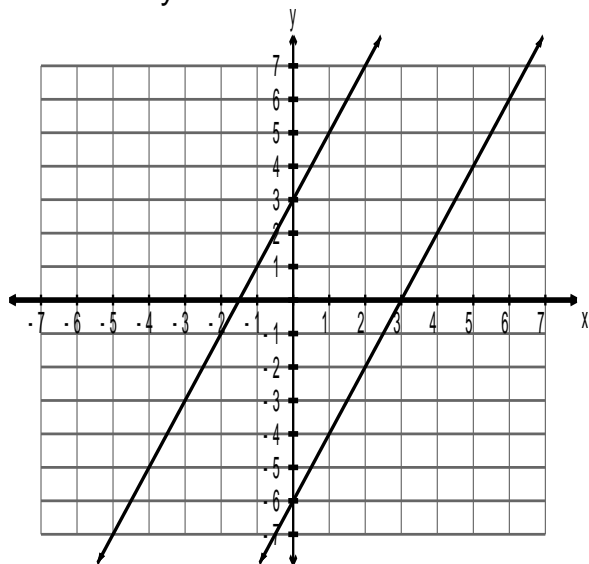
40. Which graph represents the solution to the linear system $\begin{cases} y = -3x - 5 \\ y = 3x + 1 \end{cases}$?
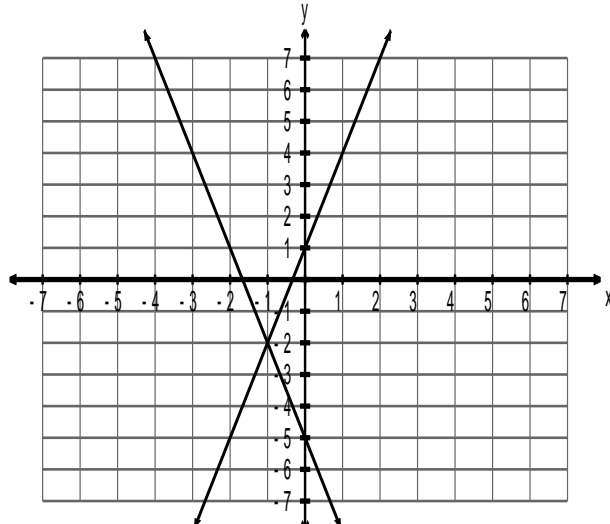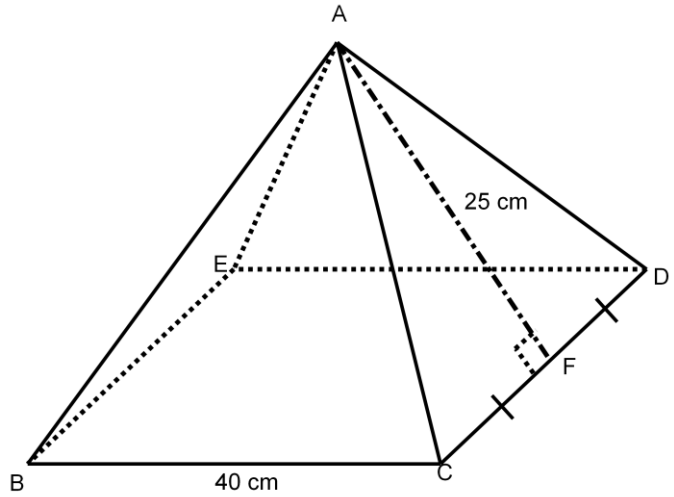
A)
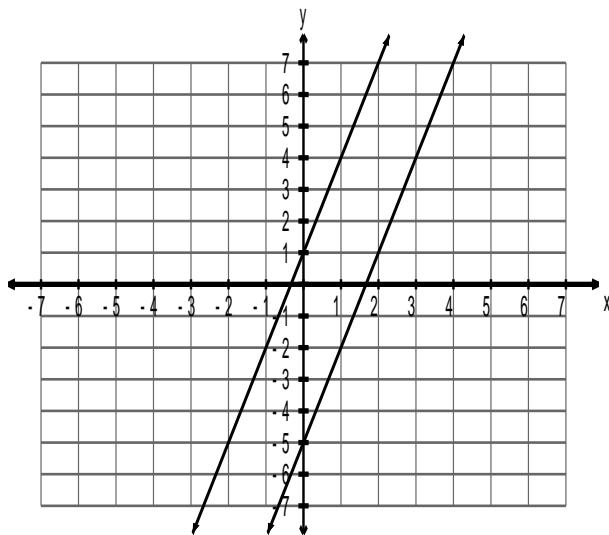
B)
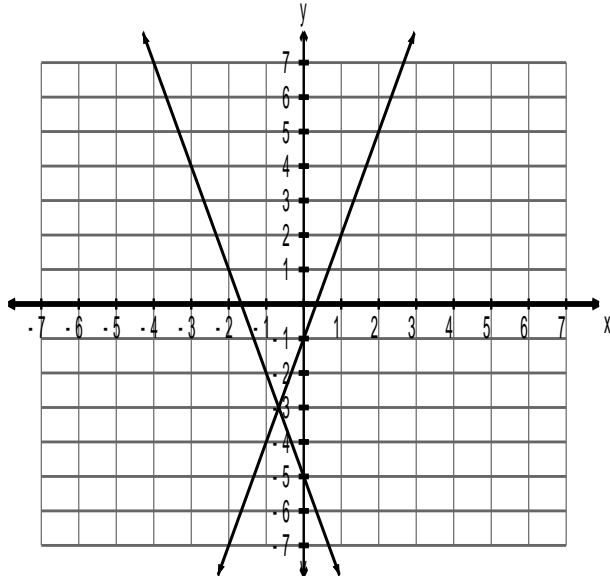
C)
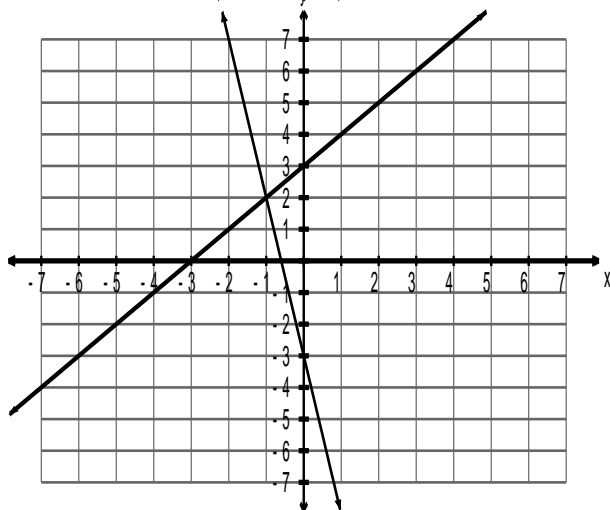
D)

Value

4   41.   The right square pyramid is such that $BC=40$ cm and $AF=25$ cm. Find the volume of the right square pyramid to the nearest cubic centimeter.
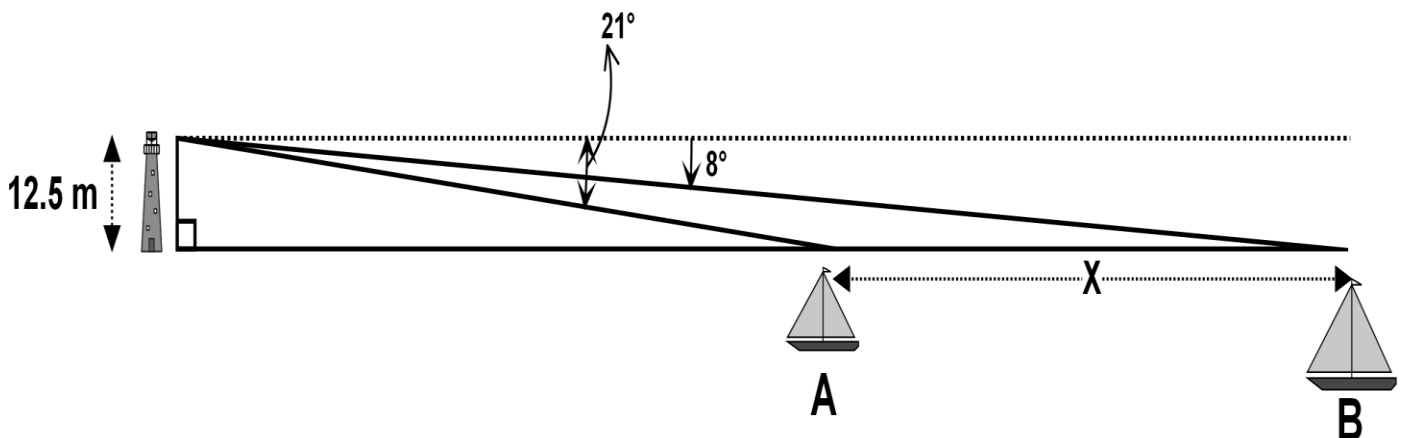
A

25 cm

E

D

F

B   40 cm   C

4   42.   A farmer wishes to paint the exterior of his grain storage facility with dimensions as shown. If a can of paint covers 460 ft², how many cans of paint will the farmer need to purchase? (Note: the bottom of the storage facility is **NOT** to be painted.)

25 ft.

7 ft

60 ft.
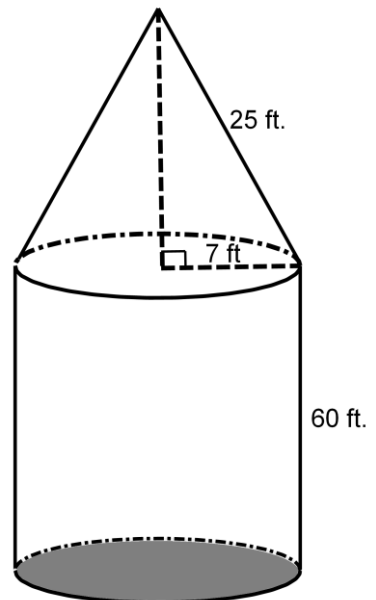
4   43.   Solve ▲ PQR . Give the measures to the nearest tenth.
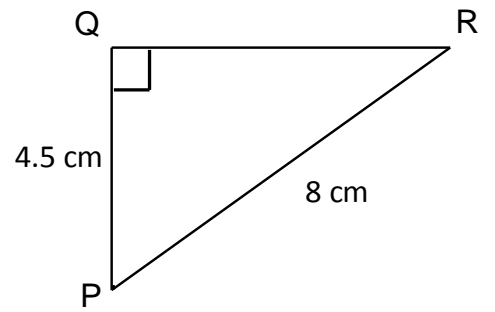
4   44.   A lighthouse keeper spots two sailboats in distress.   Sailboat A is observed
            at an angle of depression of 21° and sailboat B at an angle of depression of
            8° . If the lighthouse keeper is 12.5 m above the ground, what is the distance
            x between the two sailboats?

3 45. Shannon's rectangular dining room is 12 ft by 15 ft. There is a square rug that covers one-fourth the area of the floor. Determine the side length of the square rug. Express your answer in mixed radical form.

15

?

Rug

12
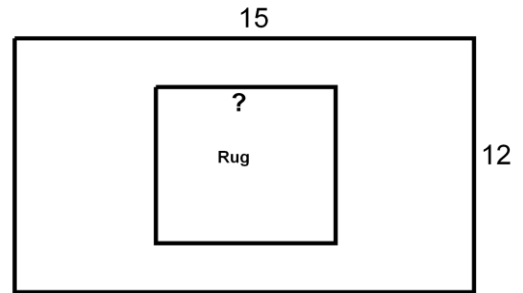
3 46. a) The volume of a sphere is 248.5 cm³. What is the radius?

r
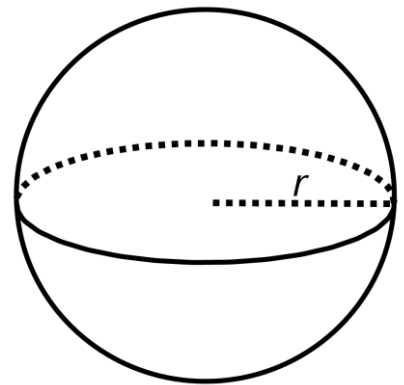
1 b) What is the surface area of the sphere?

47. Stephen completed a math problem and made a mistake. In which step does his error occur? Rewrite Stephen's solution so that it is correct.

$$\frac{\left(x^{\frac{1}{2}}\,y^{-\frac{1}{4}}\right)^4\left(x^0\,y^{-\frac{2}{3}}\right)^{-3}}{\left(x^{\frac{3}{2}}\,y\right)}$$

$$\textit{Step}\ 1\ =\frac{\left(x^{\frac{4}{2}}\,y^{-\frac{4}{4}}\right)\left(x^0\,y^{\frac{6}{3}}\right)}{\left(x^{\frac{3}{2}}\,y\right)}$$

$$\textit{Step}\ 2\ =\frac{\left(x^2\,y^{-1}\right)\left(y^2\right)}{\left(x^{\frac{3}{2}}\,y\right)}$$

$$\textit{Step}\ 3\ =\frac{\left(x^2\,y^{-2}\right)}{\left(x^{\frac{3}{2}}\,y\right)}$$

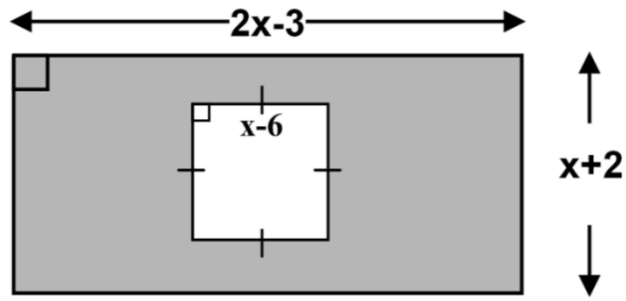$$\textit{Step}\ 4\ =x^{\frac{1}{2}}\,y^{-3}$$

$$\textit{Step}\ 5\ =\frac{x^{\frac{1}{2}}}{y^3}$$

3   48. Expand and simplify: $\left(2x^2+5x-6\right)\left(5x^2-2x+3\right)$

3 49. Factor completely: $6x^3 - 2x^2 - 8x$

3 50. Use an area model (*i.e.* algebra tiles, rectangle diagram) to multiply the binomials $(x+9)(x-4)$.
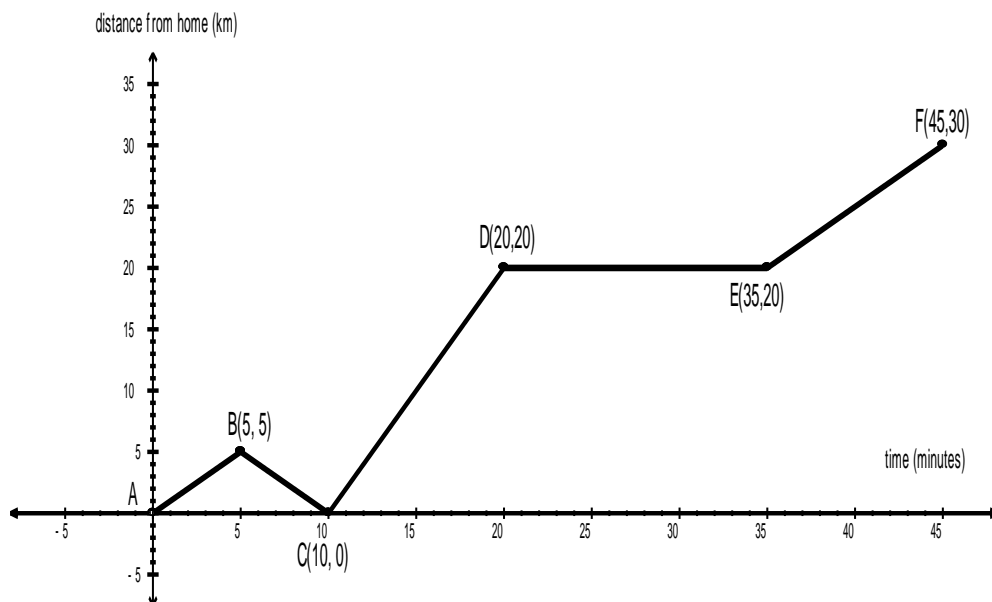
3   51.   A square and a rectangle have dimensions as shown below. Determine the
            expression (in simplest form) that represents the area of the shaded region.

4   52.   A taxi company charges an initial fee of $5 plus $2 for every kilometer driven.
            Illustrate this relationship using each of the four methods requested in the
            table below. (Note: d is the distance travelled in km and C is the cost in
            dollars).

4   53.   The graph shows Brent leaving home at point A and travelling by truck to a friend's cabin located at point F.


a) What was his maximum rate of change (*i.e.* speed)?

b) Brent forgot his compass and had to turn around and go back home. How far was he from home when he had to go back?

c) Brent stopped to repair a flat tire. How long was he stopped?

d) How many kilometres did Brent put on the truck from the time he left home (at point A) until he arrived at the cabin?

4   54   A line passes through the points (8, -1) and (6, 2). Determine the equation of the line in general form (*i.e. Ax + By + C = 0*).

4   55.   Determine the equation of the line in slope-intercept form (i.e. $y = mx + b$) that passes through (6, -2) and is parallel to the line $4x - 3y + 12 = 0$.

3   56.   Solve this system of equations by graphing.

$$\begin{cases} 8x + 5y = 5 \\ 5y - 2x = -45 \end{cases}$$
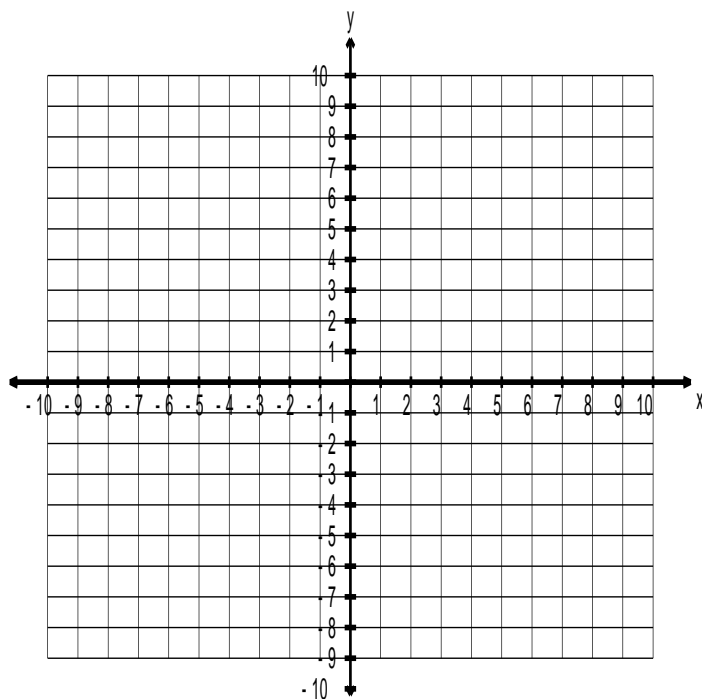
3   57.   Solve this system of equations using substitution or elimination.

$$\begin{cases} -x + 7y = 35 \\ 12x + 14y = -28 \end{cases}$$

Math 1201 Formulae Sheet

(This sheet may be removed from the exam paper.)

Measurement

Imperial		Imperial to SI Units
1 ft. = 12 in.		1 in. = 2.54 cm $\doteq$ 2.5 cm
1 yd. = 3 ft.		1 mi. $\doteq$ 1.6 km
1 mi. = 1760 yd.		

Surface Area and Volume

Surface Area	Volume
Cylinder $A = 2\pi r^2 + 2\pi rh$	Pyramid $V = \dfrac{1}{3}[l \times w \times h]$
Cone $A = \pi r^2 + \pi rs$	Cone $V = \dfrac{1}{3}[\pi r^2 h]$
Sphere $A = 4\pi r^2$	Sphere $V = \dfrac{4}{3}\pi r^3$

Labrador School Board

Mathematics 1201
Final Examination
June 2012

ANSWER KEY

Total Value: 100 marks   Time: 3 Hours

GENERAL INSTRUCTIONS

1. Candidates are required to do all items.

2. The examination has a total of 23 pages consisting of the following parts:

   Part I: 40 Multiple Choice Items   Value: 40%
   Part II: 17 Constructed Response Questions   Value: 60%

3. **Page 22 is a formulae sheet** to be used for the exam. This page may be removed.

4. Part I should be completed on the answer sheet provided on **Page 23** of the exam. This page may be removed.

5. Answers to the constructed response questions for part II are to be placed in this paper in the spaces provided.

6. For PART II items, candidates are reminded to show ALL necessary steps and calculations. Partial credit may be awarded for logical work even though you might not arrive at the correct solution. Correct answers without appropriate calculations will not merit full marks.

7. A self powered calculator may be used for calculations and to obtain special values. Graphing calculators are to be reset before the examination begins.

REGULATIONS FOR CANDIDATES

Candidates are expected to be thoroughly familiar with all regulations pertaining to their conduct during examinations. Candidates must comply with all requirements governing the following matters.

- Materials required
- Leaving the room
- Materials not permitted
- Models of calculators permitted

- Use of pen or pencil
- Use of unauthorized means and penalties
- Completion of required information
- Communication during the exam

PART I
Total Value: 40%

| Item	Level	Outcome(s)	Answer
1.	I	M1.1	A
2.	I	M3.2	B
3.	II	M3.2	C
4.	II	M2.2	C
5.	II	M3.6	D
6.	II	M3.8	D
7.	I	M4.1, M4.2	C
8.	I	M4.1, M4.2, M4.3	A
9.	II	M4.4, M4.5	C
10.	II	M4.5	C
11.	I	AN1.1, AN1.3	A
12.	II	AN1.6, AN1.7	B
13.	I	AN2.2	D
14.	I	AN3.4, AN3.5	C
15.	I	AN3.1, AN3.2	C
16.	II	AN3.1, AN3.2, AN3.4, AN3.5	D
17.	II	AN3.4, AN3.5	C
18.	II	AN3.4, AN3.5	D
19.	I	AN4.2	A
20.	I	AN5.3, AN5.4, AN5.5	C
21.	I	AN4.3, AN4.4, AN5.2, AN5.4	A
22.	I	AN4.4	B
23.	I	AN5.2, AN5.4, AN5.7	D
24.	II	AN4.4	B
25.	II	AN4.4	A
26.	II	AN5.2, AN5.3, AN5.4	C
27.	I	RF2.3	B
28.	I	RF4.2	A
29.	II	RF8.3	C
30.	II	RF5.6	B
31.	I	RF4.5	A
32.	II	RF3.1, RF6.4, RF6.5, RF7.1	B
33.	II	RF3.1, RF3.9	A
34.	I	RF7.3	C
35.	II	RF6.5	C
36.	I	RF3.3, RF6.4, RF7.1	C
37.	II	RF9.1, RF9.2	A
38.	II	RF9.3, RF9.5, RF9.6	C
39.	I	RF6.5, RF6.6, RF9.8	B
40.	I	RF9.3, RF9.4	D

value

4   41.   The right square pyramid is such that $BC = 40$ cm and $AF = 25$ cm. Find the volume of the right square pyramid to the nearest cubic centimeter.

Find perpendicular height:

$$\left. \begin{array}{l} h^2 + 20^2 = 25^2 \\ h^2 + 400 = 625 \\ h^2 = 625 - 400 \\ h^2 = 225 \\ h = 15 \end{array} \right\rangle \ 2\,marks$$

Find Volume:

$$\left. \begin{array}{l} V = \dfrac{1}{3}Bh \\ V = \dfrac{1}{3} \times 40 \times 40 \times 15 \\ V = 8000\,cm^3 \end{array} \right\rangle \ 2\,marks$$
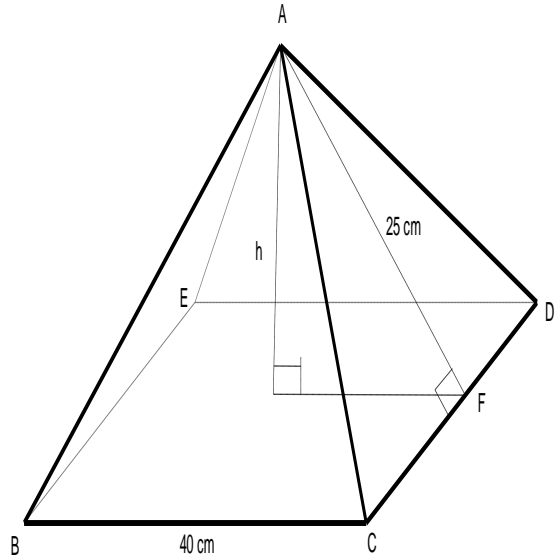
4   42.   A farmer wishes to paint the exterior of his grain storage facility with dimensions as shown. If a can of paint covers 460 ft^2, how many cans of paint will the farmer need to purchase? (Note: the bottom of the storage facility is not to be painted.)

Find Surface Area:

$$\left. \begin{array}{l} S.A. = lateral\,cone + lateral\,cylinder \\ S.A. = \pi rs + 2\pi rh \\ S.A. = \pi(7)(25) + 2\pi(7)(60) \\ S.A. \doteq 549.9 + 2638.9 \\ S.A. \doteq 3188.7\,ft^2 \end{array} \right\rangle \ 3\,marks$$

Determine number of cans:

$$\left. \begin{array}{l} = 3188.7 \div 460 \\ \doteq 6.9 \\ = 7\,cans\,need\,to\,be\,purchased. \end{array} \right\rangle \ 1\,mark$$
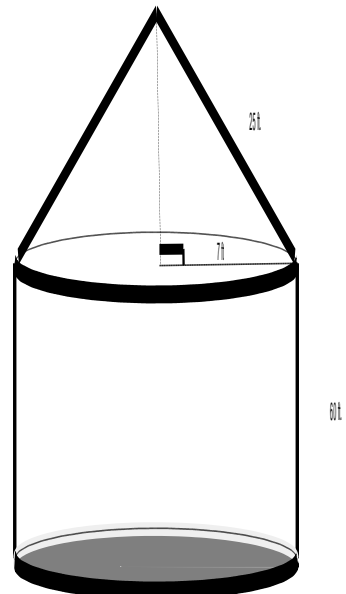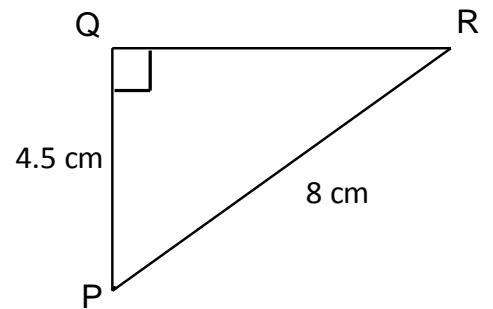
43. Solve triangle $\triangle$ PQR .

Find QR or $\angle Q$ first.

Find QR:

$$\left.\begin{array}{l} a^2+b^2=c^2 \\ 4.5^2+(QR)^2=8^2 \\ 20.25+(QR)^2=64 \\ (QR)^2=64-20.25 \\ (QR)^2=43.75 \\ QR=\sqrt{43.75}\doteq6.6 \end{array}\right\rangle \text{1.5 marks}$$

Find $\angle P$:

$$\left.\begin{array}{l} \cos\angle P=\dfrac{a}{h}=\dfrac{4.5}{8} \\ \angle P=\cos^{-1}\left(\dfrac{4.5}{8}\right) \\ \angle P\doteq56°\,or\,55.8° \end{array}\right\rangle \text{1.5 marks}$$

Find $\angle R$:

$$\left.\begin{array}{l} \angle R\doteq90°-56° \\ \angle R\doteq34° \\ \\ \angle R\doteq90°-55.8° \\ \angle R\doteq34.2° \end{array}\right\rangle \text{1 mark}$$

Measurements (assuming $\angle R=34°$) are:

$\angle P=56°$ $side\,p=6.6\,cm$
$\angle Q=90°$ $side\,q=8\,cm$
$\angle R=34°$ $side\,r=4.5\,cm$

4 44. A lighthouse keeper spots two sailboats in distress. Sailboat A is observed at an angle of depression of $21°$ and sailboat B at an angle of depression of $8°$. If the lighthouse keeper is 12.5 m above the ground, what is the distance (x) between the two sailboats?

Find Distance from lighthouse to sailboat A:

$$\left.\begin{array}{l} \tan 21° = \dfrac{12.5}{y} \\[2mm] y = \dfrac{12.5}{\tan 21°} \\[2mm] y = 32.6 \end{array}\right\rangle 1.5\,marks$$

12.5 m
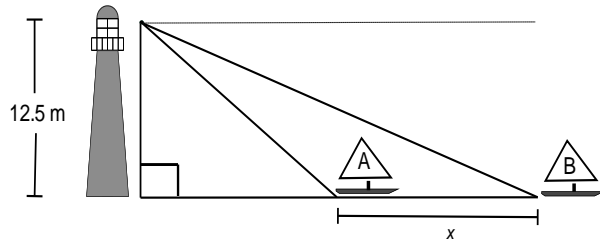
Find Distance from lighthouse to sailboat B:

$$\left.\begin{array}{l} \tan 8° = \dfrac{12.5}{z} \\[2mm] z = \dfrac{12.5}{\tan 8°} \\[2mm] z = 88.9 \end{array}\right\rangle 1.5\,marks$$

Find Distance Between Both Sailboats :

$$\left.\begin{array}{l} x = z - y \\ x = 88.9 - 32.6 \\ x = 56.3\,m \;\; is\; the\; dis\tan ce\, between\, the\, boats. \end{array}\right\rangle 1\,mark$$
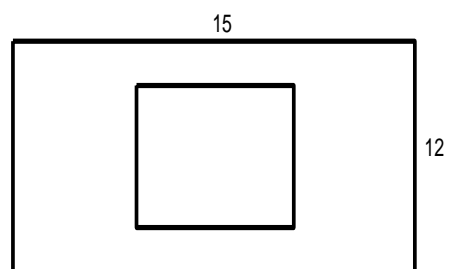
3 45. Shannon's rectangular dining room is 12 ft by 15 ft. There is a square rug that covers one-fourth the area of the floor. Determine the side length of the square rug. Express your answer in mixed radical form.

Find Area of Room:

$$\left| Area\,of\,Room = 12\,ft. \times 15\,ft. = 180\,ft.^2 \right\rangle 0.5\,mark$$

Determine Area of Rug:

$$\left| Area\,of\,Rug = \frac{1}{4} \times 180\,ft.^2 = 45\,ft.^2 \right\rangle 1\,mark$$

15

12

Determine Side Length:

$$\left.\begin{array}{l} Side\,Length = \sqrt{45}\;ft. \\ Side\,Length = \left(\sqrt{9} \times 5\right)ft \end{array}\right\rangle 1\,mark$$

$$\left| Side\,Length = \left(3\sqrt{5}\right)ft \right\rangle 0.5\,mark$$

2   46a. The volume of a sphere is 248.5 cm³. What is the radius correct to the nearest tenth of a centimetre?

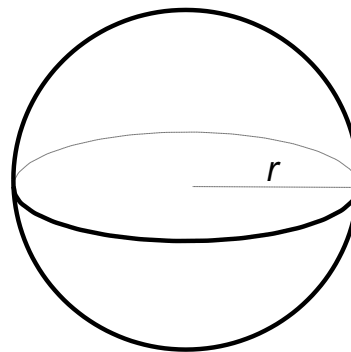Find Volume to Find Radius (*r*):

$$\left. \begin{array}{l} V = \dfrac{4}{3}\pi r^3 \\[2mm] 248.5 = \dfrac{4}{3}\pi r^3 \end{array} \right\rangle \; 0.5\,mark$$

$$\left. \begin{array}{l} 3 \times 248.5 = 4\pi r^3 \\[2mm] \dfrac{745.5}{4\pi} = \dfrac{4\pi r^3}{4\pi} \end{array} \right\rangle \; 1\,mark$$

$$\left. 59.3 = r^3 \right\rangle \; 0.5\,mark$$

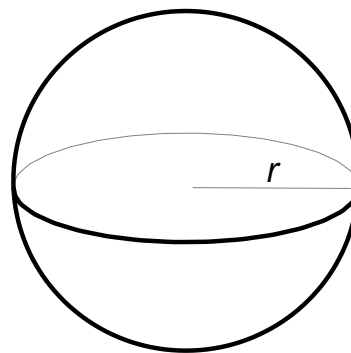$$\left. r = \sqrt[3]{59,3} = 3.9\,cm \right\rangle \; 0.5\,mark$$

1   46b. What is the surface area of the sphere?

Use the radius (*r*) to find Surface Area:

$$\left. \begin{array}{l} S.A. = 4\pi r^2 \\[2mm] S.A. = 4\pi (3.9)^3 \end{array} \right\rangle \; 0.5\,mark$$

$$\left. \begin{array}{l} S.A. = 4\pi (59.3) \\ S.A. = 4(3.14)(59.3) \\ S.A. = 744.8 \end{array} \right\rangle \; 0.5\,mark$$

3   47.   Stephen completed a math problem and made a mistake. In which step does his error occur? Rewrite Stephen's solution so that it is correct.

$\left|Error\ is\ in\ step\ 3\right\rangle$ 1 mark

Rewrite Solution Correcting Error:

$$=\frac{\left(x^{\frac{4}{2}}y^{\frac{-4}{4}}\right)\left(x^0 y^{\frac{6}{3}}\right)}{\left(x^{\frac{3}{2}}y\right)}$$

$$=\frac{\left(x^2 y^{-1}\right)\left(y^2\right)}{\left(x^{\frac{3}{2}}y\right)}$$

$$\left|=\frac{\left(x^2 y^1\right)}{\left(x^{\frac{3}{2}}y\right)}\right\rangle$$ 1 mark

$$\left|=x^{\frac{1}{2}}y^0\right\rangle$$ 0.5 mark

$$\left|=x^{\frac{1}{2}}\right\rangle$$ 0.5 mark

$$\frac{\left(x^{\frac{1}{2}}y^{\frac{-1}{4}}\right)^4 \left(x^0 y^{\frac{-2}{3}}\right)^{-3}}{\left(x^{\frac{3}{2}}y\right)}$$

Step 1 $$=\frac{\left(x^{\frac{4}{2}}y^{\frac{-4}{4}}\right)\left(x^0 y^{\frac{6}{3}}\right)}{\left(x^{\frac{3}{2}}y\right)}$$

Step 2 $$=\frac{\left(x^2 y^{-1}\right)\left(y^2\right)}{\left(x^{\frac{3}{2}}y\right)}$$

Step 3 $$=\frac{\left(x^2 y^{-2}\right)}{\left(x^{\frac{3}{2}}y\right)}$$

Step 4 $$=x^{\frac{1}{2}}y^{-3}$$

Step 5 $$=\frac{x^{\frac{1}{2}}}{y^3}$$

3   48.   Expand and simplify: $\left(2x^2+5x-6\right)\left(5x^2-2x+3\right)$

$$\left|=2x^2\left(5x^2-2x+3\right)+5x\left(5x^2-2x+3\right)-6\left(5x^2-2x+3\right)\right\rangle$$ 1 mark

$$\left|=10x^4-4x^3+6x^2+25x^3-10x^2+15x-30x^2+12x-18\right\rangle$$ 1 mark

$$\left|=10x^4+21x^3-34x^2+33x-18\right\rangle$$ 1 mark

3 49. Factor completely: $6x^3 - 2x^2 - 8x$

By Factoring:

$\big|2x(3x^2 - x - 4)\big\rangle$ 1 *mark*

$\big|2x(3x^2 + 3x - 4x - 4)\big\rangle$ 0.5 *mark*

$\big|2x[3x(x+1) - 4(x+1)\big\rangle$ 0.5 *mark*

$\big|2x(x+1)(3x-4)\big\rangle$ 1 *mark*

Using an Area Model:

$\big|2x(3x^2 - x - 4)\big\rangle$ 1 *mark*

Area Model scores 1 *mark*

	3x	-4
X	$3x^2$	$-4x$
1	$3x$	-4

$\begin{vmatrix} = 2x(3x^2 - x - 4) \\ = 2x(3x-4)(x+1) \end{vmatrix}\Big\rangle$ 1 *mark*

3 50. Use an area model to multiply the binomials $(x+9)(x-4)$.

Area Model Setup is 1 mark.

Completing the model with the four terms (x^2, -4x, 9x and -36) is 1 mark.

Determining the area is 1 mark.

$(x+9)(x-4) = x^2 - 4x + 9x - 36$
$= x^2 + 5x - 36$

	X	-4
X	x^2	$-4x$
9	$9x$	-36

51. Determine an expression, in simplest form, to represent the area of the shaded region.

Find Area of Rectangle:

$$\left. \begin{array}{l} A_R = (2x-3)(x+2) \\ A_R = 2x^2 + 4x - 3x - 6 \\ A_R = 2x^2 + x - 6 \end{array} \right\} 1 \text{ mark}$$
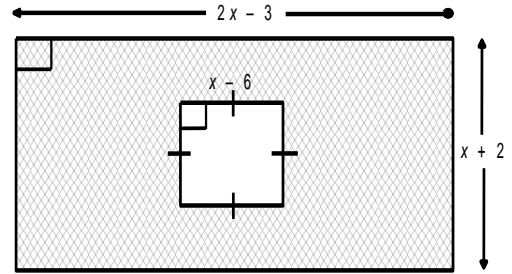
Find Area of Square:

$$\left. \begin{array}{l} A_S = (x-6)(x-6) \\ A_S = x^2 - 6x - 6x + 36 \\ A_S = x^2 - 12x + 36 \end{array} \right\} 1 \text{ mark}$$

Find Shaded Area:

$$\left. \begin{array}{l} A_{Shaded} = A_R - A_S \\ A_{Shaded} = (2x^2 + x - 6) - (x^2 - 12x + 36) \\ A_{Shaded} = 2x^2 + x - 6 - x^2 + 12x - 36) \\ A_{Shaded} = x^2 + 13x - 42 \end{array} \right\} 1 \text{ mark}$$

52. A taxi company charges an initial fee of $5 plus $2 for every kilometer driven. Illustrate this relationship using each of the four methods requested in the table below. (Note: *d* is the distance travelled in km and *C* is the cost in dollars).
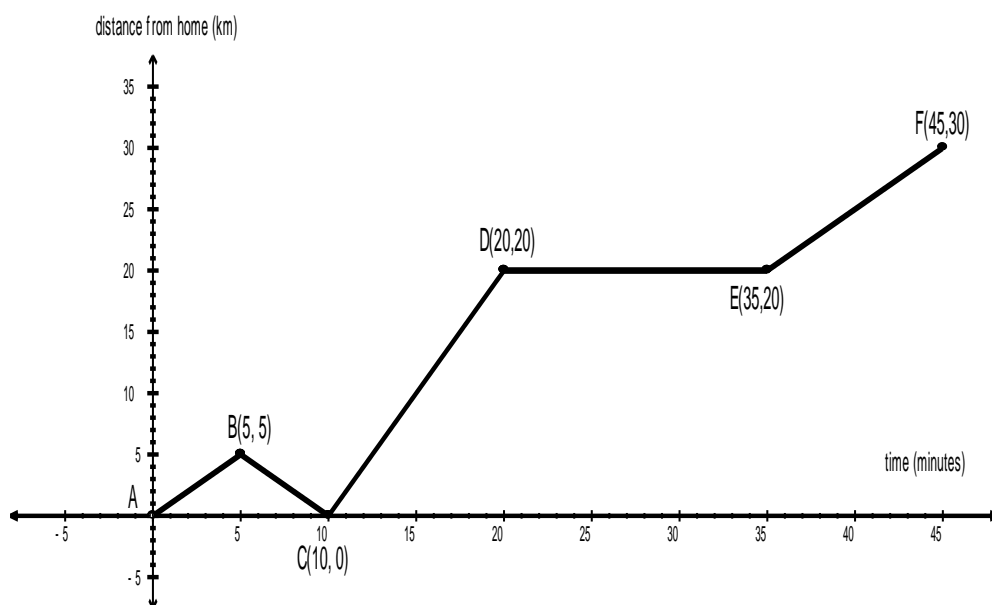
The solution in each box is valued at 1 mark.

4 53. The graph shows Brent leaving home at point A and travelling by truck to a friend's cabin located at point F.

a) What was his maximum rate of change (*i.e.* speed)?

Occurs Between Point C and D.

$$\left| \frac{change\ in\ dist.}{change\ in\ time} = \frac{20\ mi.}{20\ min.} = 1 mi./\min. \right\rangle 1\ mark$$

b) Brent forgot his compass and had to turn around and go back home. How far was he from home when he had to go back?

$\left| 5\ miles \right\rangle 1 mark$

c) Brent stopped to repair a flat tire. How long was he stopped?

$\left| he\ was\ stopped\ for\ 15 min. \right\rangle 1 mark$

d) How many kilometres did Brent put on the truck from the time he left home (**at point A**) until he arrived at the cabin?

$\left| 40\ miles \right\rangle 1 mark$

4   54.   A line passes through the points (8, -1) and (6, 2). Determine the equation of the line in general form (*i.e.* $Ax + By + C = 0$).

Find the Slope of the Line:

$$\left. \begin{array}{l} slope = \dfrac{2-(-1)}{6-8} \\[2mm] slope = \dfrac{3}{-2} \\[2mm] slope = -\dfrac{3}{2} \end{array} \right\rangle \quad 1\,mark$$

Determine the Equation of the Line

$$\left. y = -\dfrac{3}{2}x + b \right\rangle \quad 0.5\,mark$$

Using the point (6, 2):

$$\left. \begin{array}{l} 2 = -\dfrac{3}{2}(6) + b \\[2mm] b = 11 \end{array} \right\rangle \quad 0.5\,mark$$

Write equation of the line:

$$\left. y = -\dfrac{3}{2}x + 11 \right\rangle \quad 0.5\,mark$$

Write equation in general form:

$$\left. 2y = -3x + 22 \right\rangle \quad 0.5\,mark$$

$$\left. 3x + 2y - 22 = 0 \right\rangle \quad 1\,mark$$

4 55. Determine the equation of the line that passes through (6, -2) and is parallel to the line $4x - 3y + 12 = 0$.

$$4x - 3y + 12 = 0$$
$$-3y = -4x - 12 \quad \Big) 1\,mark$$
$$y = \frac{4}{3}x + 4$$

$$m = \frac{4}{3}$$
$$\therefore y = \frac{4}{3}x + b \quad \Big) 1\,mark$$

$$-2 = \frac{4}{3}(6) + b$$
$$-2 = 8 + b \quad \Big) 1\,mark$$
$$b = -10$$

$$\therefore y = -\frac{4}{3}x - 10 \quad \Big) 1\,mark$$

3 56. Solve this system of equations by graphing.

$$\begin{cases} 8x + 5y = 5 \\ 5y - 2x = -45 \end{cases}$$

$$8x + 5y = 5$$
$$5y = -8x + 5 \quad \Big) 0.5\,mark$$
$$y = \frac{-8}{5}x + 1$$

$$5y - 2x = -45$$
$$5y = 2x - 45 \quad \Big) 0.5\,mark$$
$$y = \frac{2}{5}x - 9$$

0.5 mark for each line correctly graphed as shown at the right.

1 mark for clearly stating the solution as (5, -7) or labelling the point on the graph.

57. Solve this system of equations using substitution or elimination.

$$\begin{cases} -x + 7y = 35 \\ 12x + 14y = -28 \end{cases}$$

Using Substitution:

$\left.\begin{array}{l} -x+7y=35 \\ x=7y-35 \end{array}\right\rangle$ 0.5*mark*

$\left.\begin{array}{l} 12x+14y=-28 \\ 12(7y-35)+14y=-28 \\ 84y-420+14y=-28 \\ 98y=392 \\ y=\dfrac{392}{98} \\ y=4 \end{array}\right\rangle$ 1.5*marks*

$\left.\begin{array}{l} x=7(4)-35 \\ x=28-35 \\ x=-7 \end{array}\right\rangle$ 0.5*mark*

$\left|Solution:(-7\,,\,4)\right\rangle$ 0.5*mark*

Using Elimination:

Mult. eq 1 by -2 or 12   0.5 *mark*

$\left|\left.\begin{cases} 2x-14y=-70 \\ 12x+14y=-28 \end{cases}\right\rangle\right.$ 1*mark*

Vertically add equations to find *x*:

$\left.\begin{array}{l} 14x=-98 \\ x=-7 \end{array}\right\rangle$ 1*mark*

Solve for *y*:

$\left.\begin{array}{l} -x+7y=35 \\ -(-7)+7y=35 \\ 7y=28 \\ y=4 \end{array}\right\rangle$ 1*mark*

$\left|Solution:(-7\,,\,4)\right\rangle$ 0.5*mark*

Labrador School Board

Mathematics 1201

Final Examination

June 2013

Student Name: _____

Teacher Name: _____

Total Value: 100 marks   Time: 3 Hours

GENERAL INSTRUCTIONS

1. Candidates are required to do all items.

2. The examination has a total of 22 pages (including this cover) consisting of the following parts:

   Part I: 40 Multiple Choice Items   Value: 40%
   Part II: 18 Constructed Response Questions   Value: 60%

3. **Page 20 is a formulae sheet** to be used for the exam. This page may be removed.

4. Part I should be completed on the answer sheet provided on **Page 21** of the exam. This page may be removed.

5. Answers to the constructed response questions for Part II are to be placed on this paper in the spaces provided.

6. For Part II items, candidates are reminded to show ALL necessary steps and calculations. Partial credit may be awarded for logical work even though you might not arrive at the correct solution. Correct answers without appropriate calculations will not merit full marks.

7. A self powered calculator may be used for calculations and to obtain special values. Graphing calculators are to be reset before the examination begins.

REGULATIONS FOR CANDIDATES

Candidates are expected to be thoroughly familiar with all regulations pertaining to their conduct during examinations. Candidates must comply with all requirements governing the following matters.

- Materials required
- Leaving the room
- Materials not permitted
- Models of calculators permitted

- Use of pen or pencil
- Use of unauthorized means and penalties
- Completion of required information
- Communication during the exam

1. Which is a good referent for 1 inch?

   A) distance from a doorknob to the floor

   B) thickness of a dime

   C) thickness of a hockey puck

   D) width of your hand

2. Which Imperial unit is best for measuring the length of a hockey rink?

   A) kilometres

   B) metres

   C) miles

   D) yards

3. The length of a table is 3 metres. What is the approximate length in inches?

   A) 75

   B) 120

   C) 750

   D) 1200

4. A cone has a diameter of 12.4 cm and a slant height of 9.3 cm. What is the surface area to the nearest cm^2?
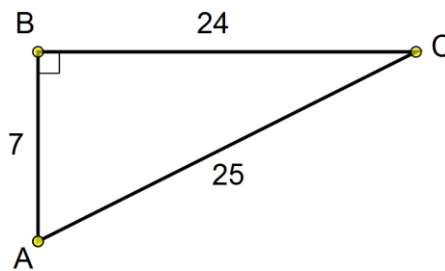
   A) 201

   B) 220

   C) 302

   D) 845
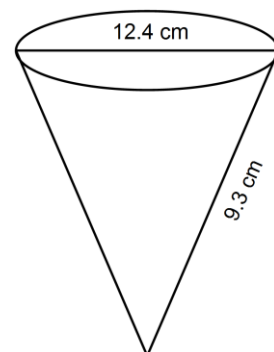
5. A square-based pyramid has side length 3.2 ft. and a height of 4.5 ft. What is the volume to the nearest ft.^{3}?

   A) 5

   B) 15

   C) 19
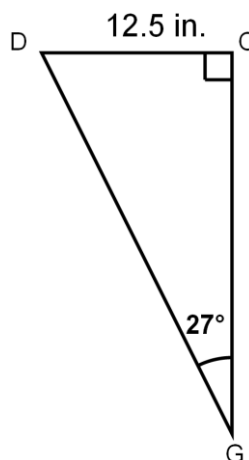
   D) 46
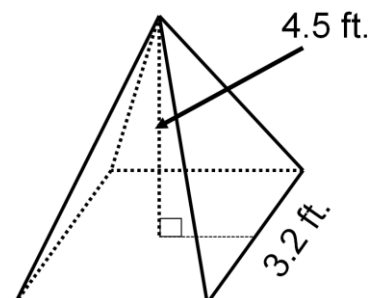
6. Which ratio represents $\tan \angle A$?

A) $\dfrac{7}{25}$

B) $\dfrac{24}{25}$

C) $\dfrac{25}{24}$

D) $\dfrac{24}{7}$
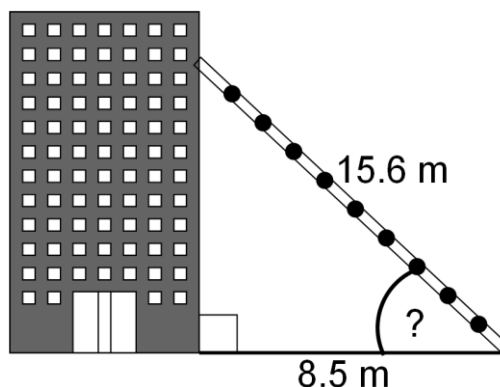
B ——24—— C

7   25

A

7. In $\triangle DOG$, what is the length of the hypotenuse to the nearest tenth of an inch?

A) 5.7

B) 11.1

C) 14.0

D) 27.5

D ——12.5 in.—— O

27°

G

8. A firefighter rests a 15.6 m ladder against a building. The ladder is 8.5 m from the base of the building. What angle does the ladder make with the ground, to the nearest degree?

A) 29°

B) 33°

C) 57°

D) 61°

15.6 m

?

8.5 m

9. A 1.7 m tall forest ranger is 9.5 m from the base of a tree. The angle of inclination from her eye level to the top of the tree is $37°$. What is the approximate height of the tree to the nearest tenth of metre?

A) 7.2

B) 7.4

C) 8.9

D) 9.3

37°

9.5 m

1.7 m
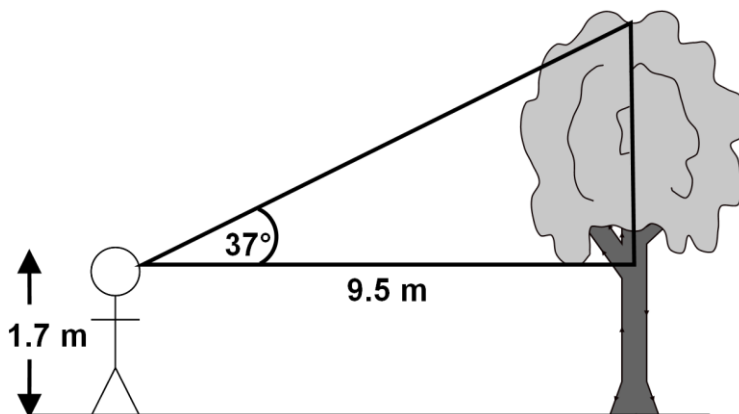
10. What are the prime factors of 120 ?

    A) 2, 3, 5

    B) 2^3, 3, 5

    C) 10, 20, 30, 40, 60, 120

    D) 1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 20, 24, 30, 40, 60, 120

11. What is the exact value of $\sqrt[3]{\dfrac{8}{27}}$?

    A) $\dfrac{2}{9}$

    B) $\dfrac{24}{81}$

    C) $\dfrac{4}{9}$

    D) $\dfrac{2}{3}$

12. Which is irrational?

    A) $\sqrt{0.36}$

    B) $\sqrt{\dfrac{16}{25}}$

    C) $\sqrt[3]{49}$

    D) $\sqrt[3]{64}$

13. What is $6^{-\frac{2}{3}}$ expressed as a radical?

    A) $-\sqrt{6^3}$

    B) $-\sqrt[3]{6^2}$

    C) $\dfrac{1}{\sqrt{6^3}}$

    D) $\dfrac{1}{\sqrt[3]{6^2}}$

14. What is the least common multiple of 252 and 600?

    A) 36

    B) 210

    C) 2100

    D) 12600

15. What is the correct order, from **least** to **greatest**, of these mixed radicals?

$$2\sqrt{3}, \quad 3\sqrt{2}, \quad 2\sqrt[3]{-3}, \quad 3\sqrt[3]{2}$$

A) $2\sqrt[3]{-3}, \quad 2\sqrt{3}, \quad 3\sqrt[3]{2} \quad 3\sqrt{2}$

B) $2\sqrt[3]{-3}, \quad 2\sqrt{3}, \quad 3\sqrt{2} \quad 3\sqrt[3]{2}$

C) $3\sqrt{2}, \quad 3\sqrt[3]{2} \quad 2\sqrt{3} \quad 2\sqrt[3]{-3}$

D) $3\sqrt[3]{2} \quad 3\sqrt{2} \quad 2\sqrt{3} \quad 2\sqrt[3]{-3}$

16. What is $\sqrt{80}$ as a mixed radical in simplest form?

A) $2\sqrt{20}$

B) $4\sqrt{5}$

C) $5\sqrt{4}$

D) $16\sqrt{5}$

17. Simplify: $\dfrac{18x^3 y^2}{6x^4 y}$

A) $\dfrac{3y}{x}$

B) $3xy$
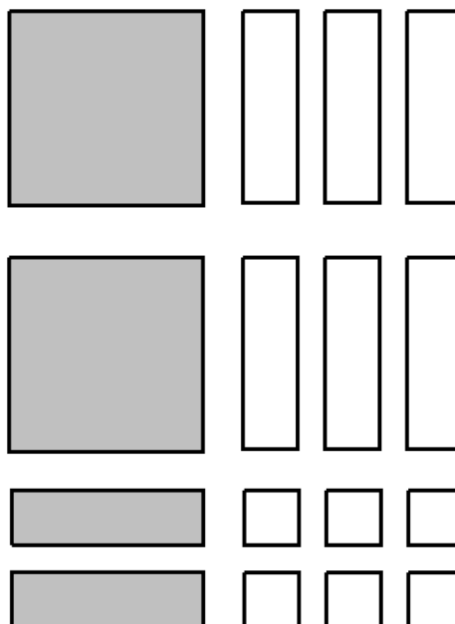
C) $\dfrac{12y}{x}$

D) $12xy$

18. Which multiplication is represented by the algebra tiles? (Note: Shaded tiles are positive.)

A) $(2x^2 + 2)(x^2 - 3)$

B) $(2x - 2)(x + 3)$

C) $(2x^2 - 2)(x^2 + 3)$

D) $(2x + 2)(x - 3)$

19. Factor completely: $24ab^2 - 16a^2b^2$

   A) $ab^2(24 - 16a)$

   B) $4ab(b - 4ab)$

   C) $8(3ab^2 - 2a^2b^2)$

   D) $8ab^2(3 - 2a)$

20. Expand and simplify: $(6x + 7)(5 - x)$

   A) $-6x^2 - 37x + 35$

   B) $-6x^2 - 23x + 35$

   C) $-6x^2 + 23x + 35$

   D) $-6x^2 + 37x + 35$

21. Which model represents $(x + 5)(x - 2)$?

A)

	x	- 2
x	x^2	-2x
+ 5	5x	-10

B)

	x	- 2
x	x^2	2x
+ 5	5x	10

C)

	x	- 2
x	2x	-2x
+ 5	5x	-10

D)

	x	- 2
x	2x	-2x
+ 5	5x	3

22. Which trinomial has $(x - 3)$ as a factor?

    A) $x^2 - 5x - 6$

    B) $x^2 - x - 6$

    C) $x^2 + x - 6$

    D) $x^2 + 5x - 6$

23. Factor: $2a^2 + 11a + 12$

    A) $(2a + 3)(a + 4)$

    B) $(2a + 4)(a + 3)$

    C) $(2a + 6)(a + 4)$

    D) $(2a + 8)(a + 3)$

24. Factor: $25x^2 - 36y^2$

    A) $(5x - 6y)(5x - 6y)$

    B) $(5x - 6y)(5x + 6y)$

    C) $(5x + 6y)(5x + 6y)$

    D) $(6y + 5x)(6y - 5x)$

25. What is $f(2)$ for the function $f(x) = -4x - 9$?

    A) -17

    B) -1

    C) 1

    D) 17

26. Which equation does **NOT** represent a linear relation?

    A) $x = 10$

    B) $4x + 5y = 20$

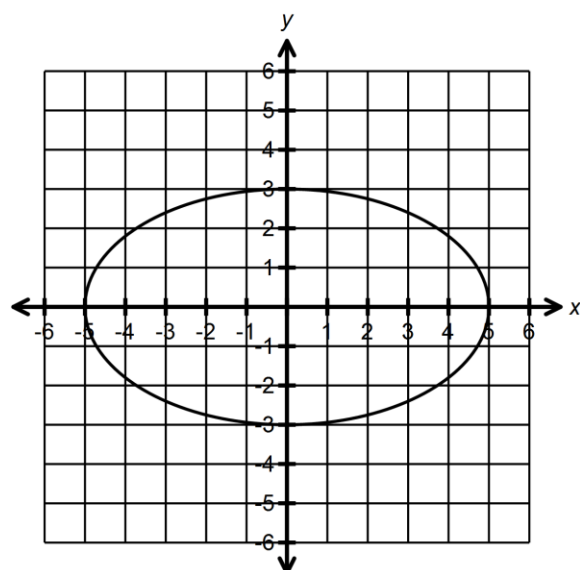   C) $y = -5x + 4$

    D) $y = x^2 + 5$

27. Which arrow diagram represents a function?

i)

Input   Output

-5
-8
3
7
10

ii)

x   y

-4
1
2
3

iii)

x   f(x)

-2
0
2
10
12

iv)

Double a number

3
11
6
22
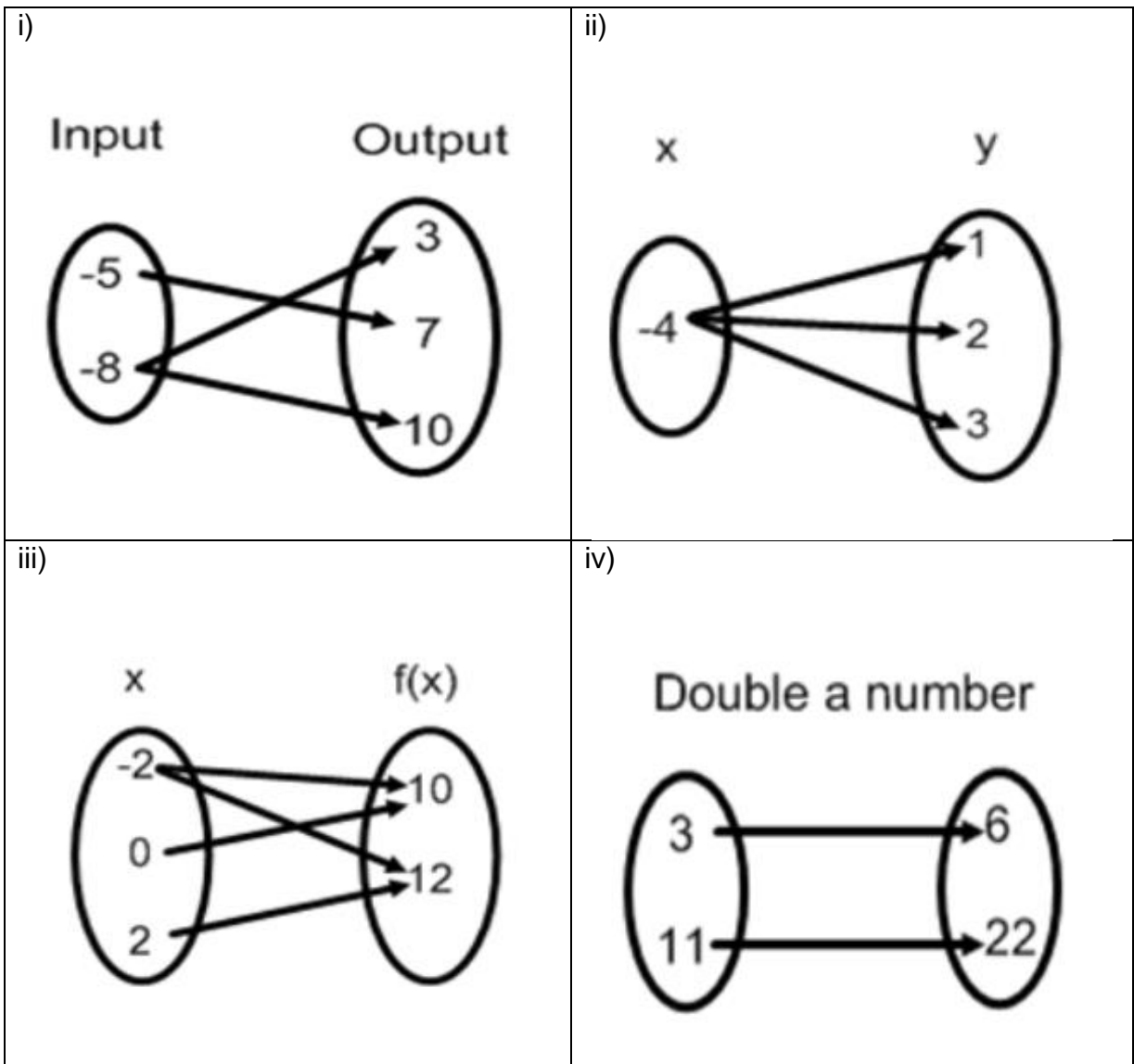
A) i

B) ii

C) iii

D) iv

28. What is the range of the graph?

A) [−5 , 5]

B) (-5, 5)

C) [-3, 3]

D) (-3, 3)

29. Which table of values represents a linear function?

A)

x	0	1	2	3	4
y	2	6	10	14	18

B)

x	0	1	2	3	4
y	4	7	12	19	28

C)

x	0	1	2	3	4
y	4	8	16	32	64

D)

x	0	1	2	3	4
y	25	24	22	19	15

30. Each graph shows distance, d metres, as a function of time, t hours. Which graph has a rate of change of 3 m/h and a vertical intercept of 2 m?

i)

ii)

iii)

iv)
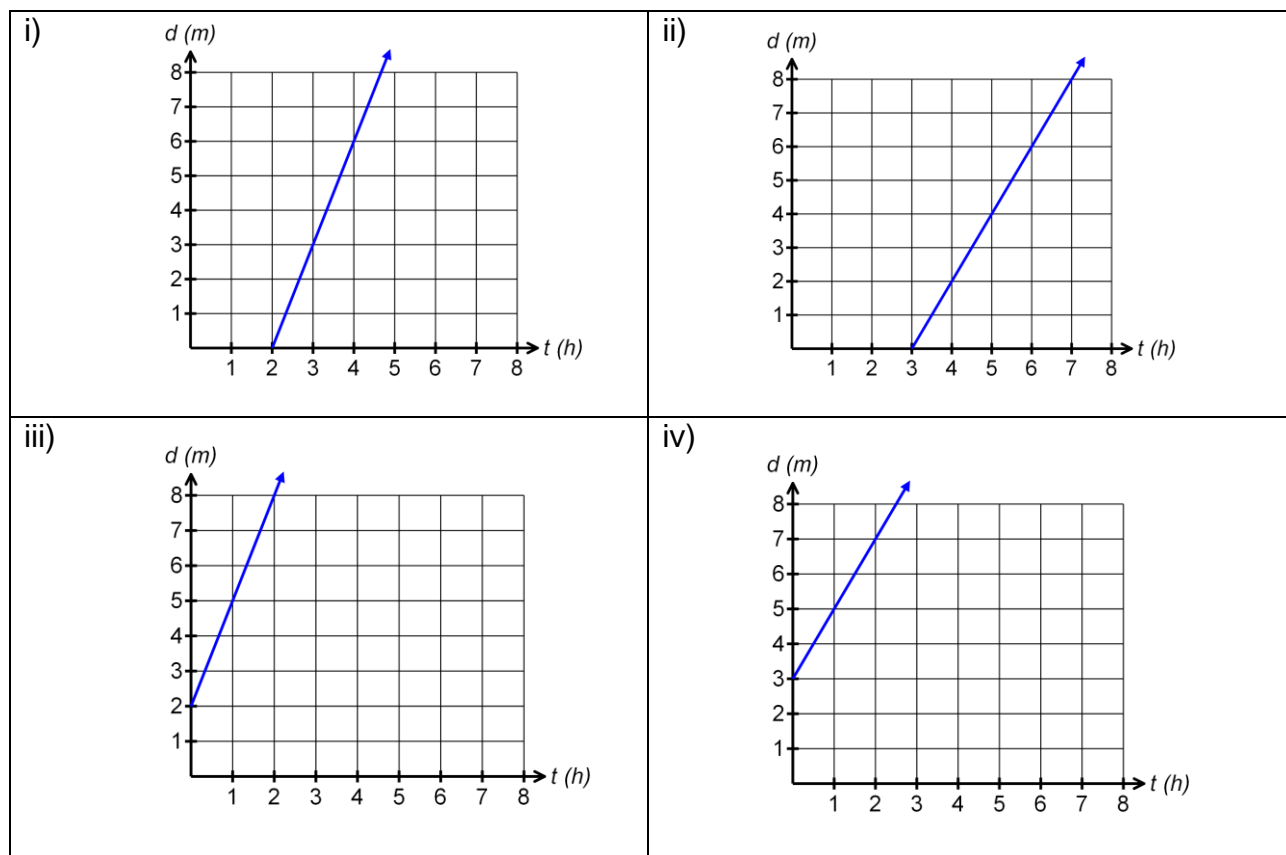
A) i

B) ii

C) iii

D) iv

31. Which line has a positive slope?

   A) A

   B) B

   C) C

   D) D
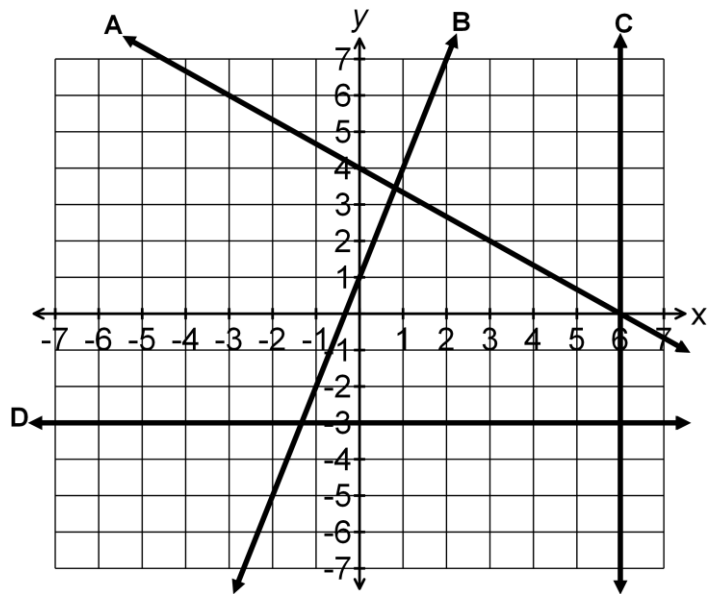
32. What is the slope of the line?
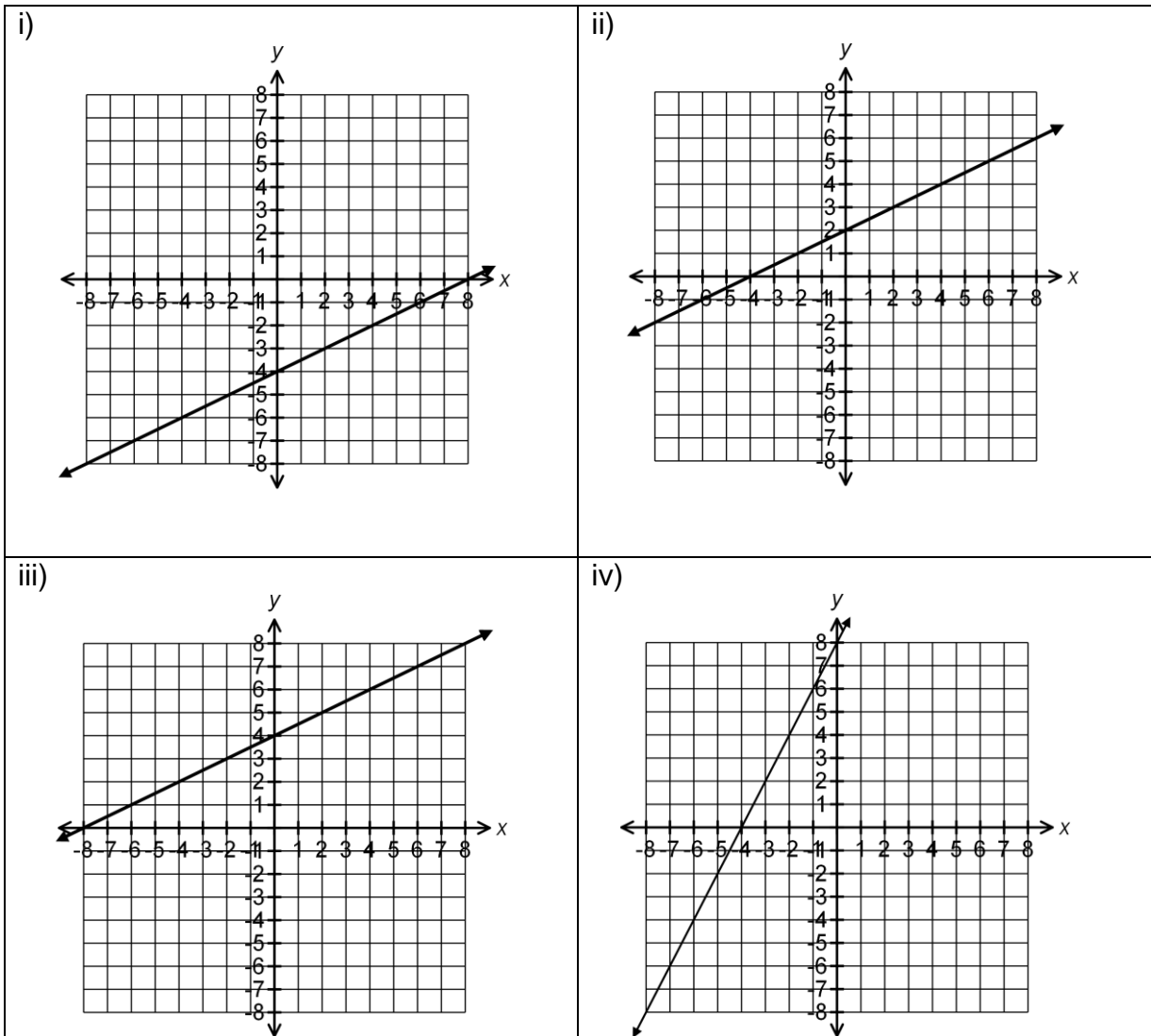
   A) $-\dfrac{5}{2}$

   B) $-\dfrac{2}{5}$

   C) $\dfrac{2}{5}$

   D) $\dfrac{5}{2}$
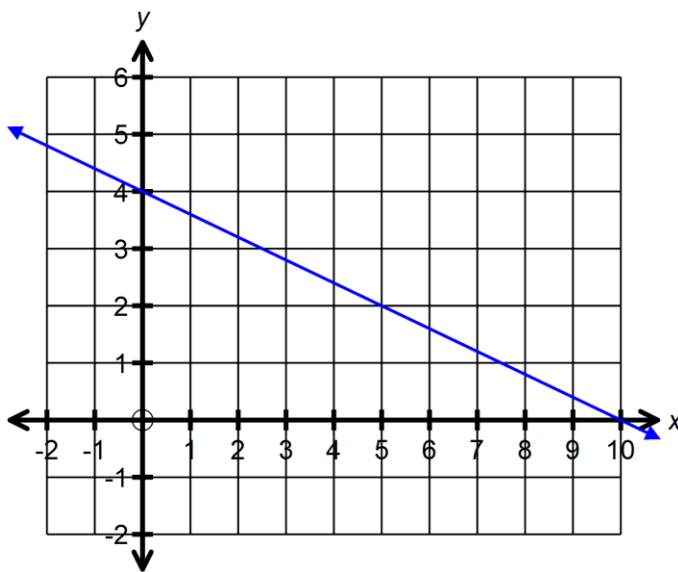
33. A line has a slope of 2 and passes through the point (-2, 5). What is its equation in slope-point form?

   A) $y - 5 = 2(x + 2)$

   B) $y - 5 = 2(x - 2)$

   C) $y + 5 = 2(x + 2)$

   D) $y + 5 = 2(x - 2)$

34. Which graph represents the linear relation $y = \frac{1}{2}x - 4$?

i)

ii)

iii)

iv)

A) i

B) ii

E) iii

D) iv

35. The local ski club offers lessons at a cost of $20 for every 20 minutes of instruction. What is the rate of change per hour?

A) $20

B) $40

C) $60

D) $80

36. What is the general form of $y - 3 = -4(x + 2)$?

A) $-4x + y - 11 = 0$

B) $-x + y - 1 = 0$

C) $4x + y - 5 = 0$

D) $4x + y + 5 = 0$

37. Solve: $\begin{cases} x = 4 \\ 2x + y = 10 \end{cases}$

    A) $(4, -14)$

    B) $(4, -2)$

    C) $(4, 2)$

    D) $(4, 18)$

38. How many solutions exist for the system $\begin{cases} y = \frac{3}{4}x - 3 \\ y = \frac{3}{4}x - 4 \end{cases}$?

    A) infinite

    B) none

    C) one

    D) two

39. Solve: $\begin{cases} y = -2x + 4 \\ y = x - 2 \end{cases}$

    A) $(-4, -2)$

    B) $(-2, -4)$

    C) $(0, 2)$

    D) $(2, 0)$

40. 250 people attended a school concert. Student tickets cost $3 and adult tickets cost $5. The amount collected was $950. Which system models this situation?

    x represents the number of student tickets sold

    y represents the number of adult tickets sold

    A) $\begin{cases} x + y = 250 \\ 3x + 5y = 950 \end{cases}$

    B) $\begin{cases} x + y = 250 \\ 5x + 3y = 950 \end{cases}$

    C) $\begin{cases} x + y = 950 \\ 3x + 5y = 250 \end{cases}$

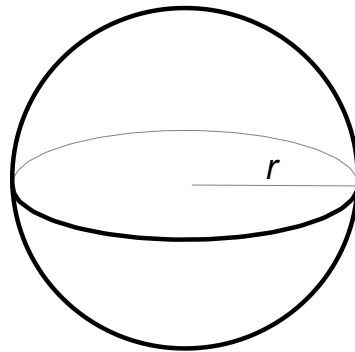   D) $\begin{cases} x + y = 950 \\ 5x + 3y = 250 \end{cases}$

value

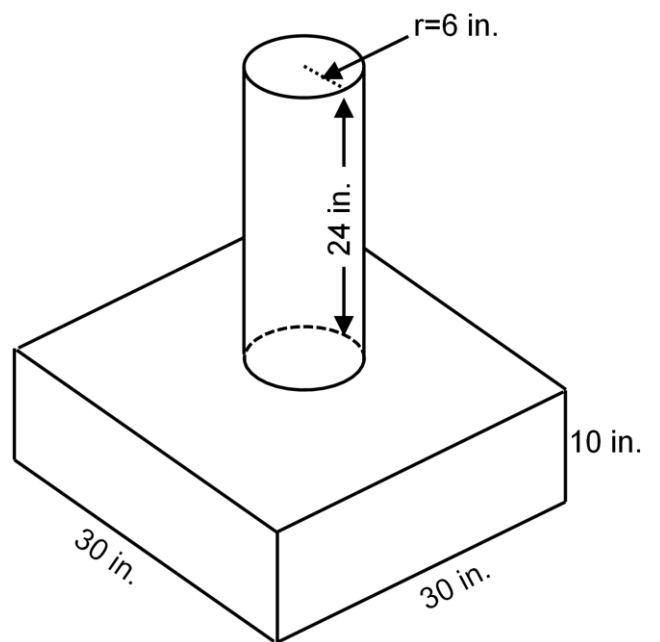3   41.   A right square pyramid has side length 36 cm and slant height 30 cm. What
is the volume of the pyramid to the nearest cm³.
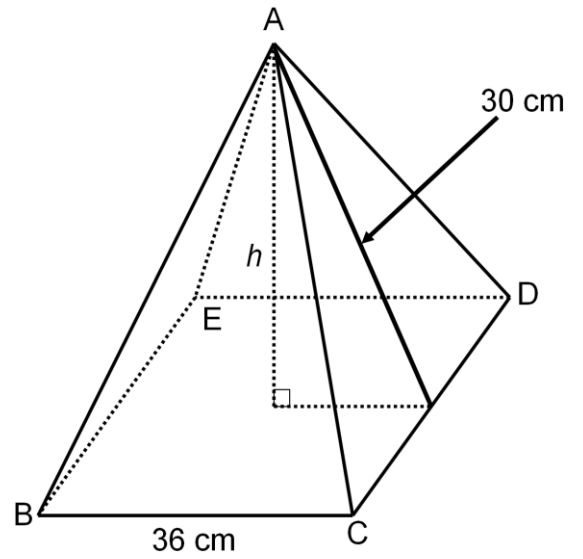
2   42.   The surface area of a sphere is 804.2 in.². What is the radius of the sphere?

4   43.   Joe made a wooden scratching post for his cat and wants to cover it with carpet. About how much carpet will he need if he covers everything except the bottom of the square block?

r=6 in.

24 in.

10 in.

30 in.

30 in.

4   44.   Solve ΔCAT. Give all measurements to the nearest tenth.

C   9.3 cm   A

5.1 cm

T
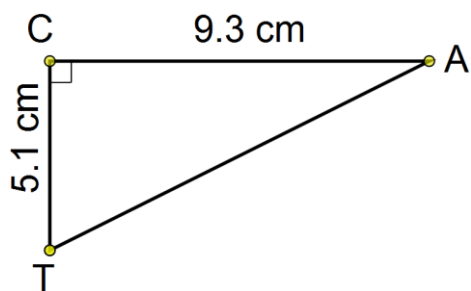
4   45.   At 180 m from shore, some tourists spot a lighthouse from their boat. The angle of elevation to the bottom of the lighthouse is $26°$. The angle of elevation to the top of the lighthouse is $36°$. What is the height, *h*, of the lighthouse?
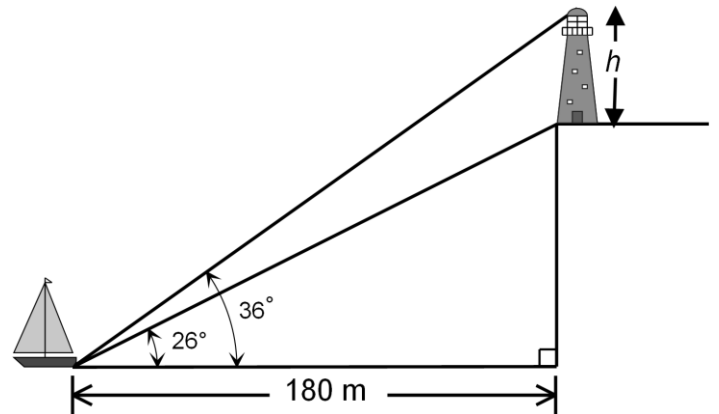
3   46.   Julie completed a math problem and made a mistake. In which step does the first error occur? Rewrite Julie's solution so that it is correct.

The error occurs in step _____

Correct solution:

$$\frac{\left(4a^{-3}b^4\right)^{-2}}{a^6 b^{-1}}$$
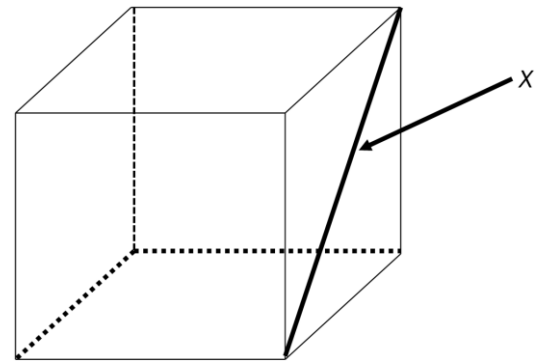
$$Step\ 1\ =\frac{4^{-2}a^6 b^{-8}}{a^6 b^{-1}}$$

$$Step\ 2\ =\frac{a^0 b^{-9}}{4^2}$$

$$Step\ 3\ =\frac{1}{16b^9}$$

3   47.   Simplify: (the final answer must contain only positive exponents)

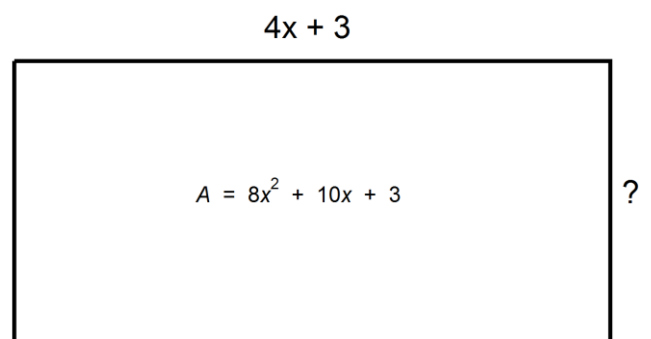$$\left(\frac{x^6 y^{-\frac{1}{3}}}{125x^{-9}y^{\frac{8}{3}}}\right)^{-\frac{1}{3}}$$

4   48.   The surface area of a cube is 96 cm². Determine the length of the diagonal, x, of one of the faces. Express your answer in simplest radical form.
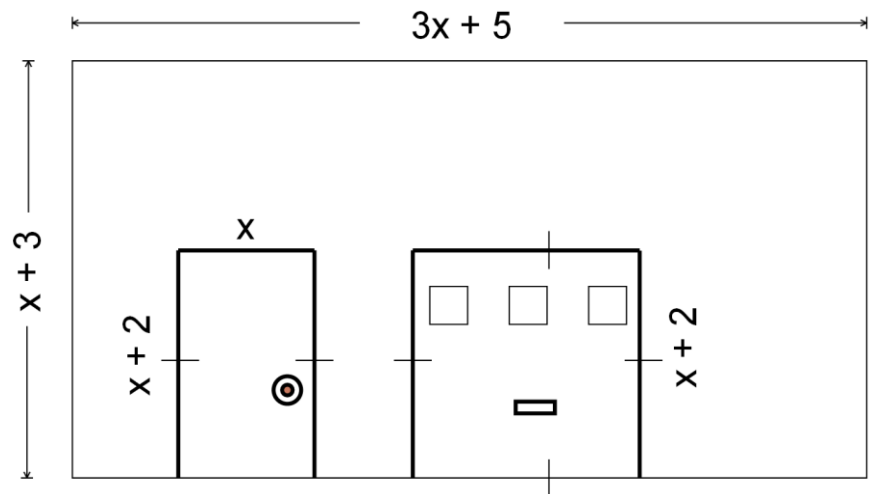

3   49.   Expand and simplify: $(2x - 7)(3x^2 + 4x + 2)$

3   50.   Factor completely: $4x^3 + 6x^2 - 4x$

3   51.   The area of a rectangle is represented by the polynomial 8x² + 10x + 3. If the length of one side is 4x + 3, determine the width of the rectangle.

4x + 3

$A = 8x^2 + 10x + 3$?

4   52.   Valerie plans to put siding on the front of her garage pictured below. Find an expression (in simplest form) to represent the area of the surface to be covered with siding. (Note: There will be **NO** siding on the two doors.)

$3x + 5$

$x + 3$

$x + 2$

X

$x + 2$

4   53.   A t-shirt printing company charges $20 for the initial setup of the printing press plus $5 for every t-shirt printed. Illustrate this relationship using each of the four methods requested in the table below. (Note: **n** is the number of t-shirts and **C** is the cost in dollars.)

Table of Values:

n	C

Graph:

Equation:

Initial fee: $20.00
Charge per km: $5.00

Ordered Pairs:

3 54. The graph shows Jake leaving home at Point A and travelling by motorcycle to Gros Morne, located at point H.
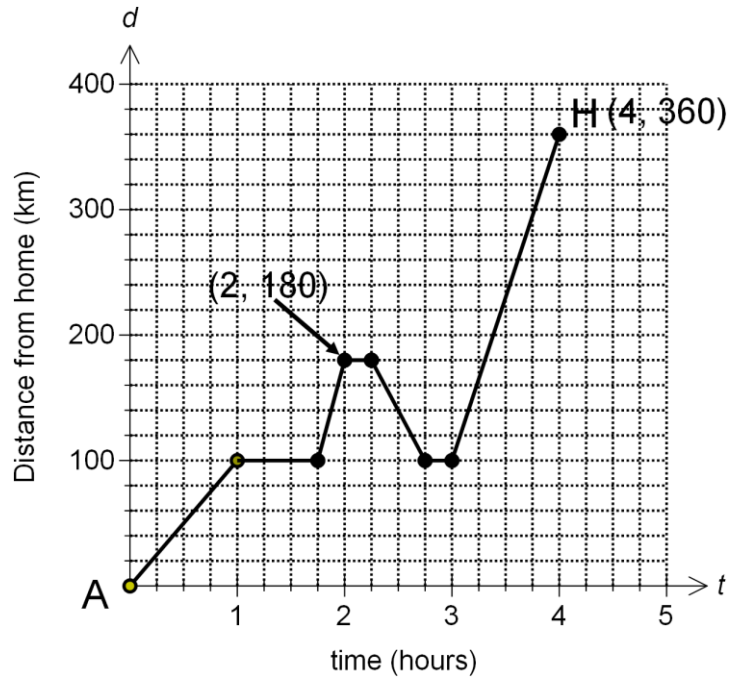
A) What was Jake's maximum rate of change (i.e. speed)?

B) From the time he left home, how many times did Jake stop and what was the total minutes stopped?

Jake stopped _____ times

He was stopped for a total of _____ minutes

C) How many kilometres did Jake put on his motorcycle from the time he left home (at point A) until he arrived at Gros Morne (point H)?

_____

3 55. A line passes through the points $(6, 4)$ and $(2, -6)$. Determine the equation of the line in slope-intercept form ($y = mx + b$).

4   56.   Determine the equation of the line that passes through $(10, -4)$ and is perpendicular to the line $7x - 14y + 28 = 0$.

3   57.   Solve graphically:
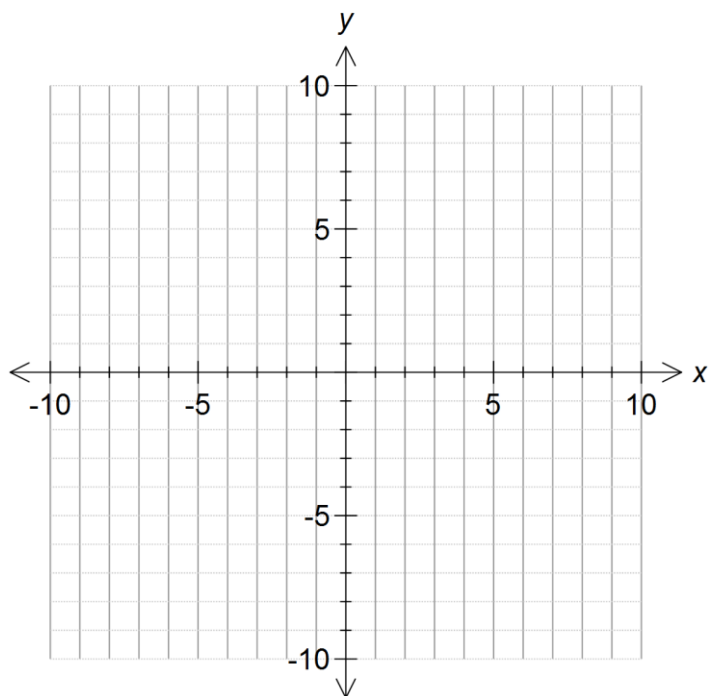
$$\begin{cases} y - 1 = -\dfrac{1}{2}(x-2) \\ y = \dfrac{1}{2}x + 4 \end{cases}$$

3   58.   At a music store, all CDs are the same price and all DVDs are the same price. Andrew buys 6 CDs and 8 DVDs for a total of $126. Jane buys 1 CD and 4 DVDs for a total of $53. Write a linear system and solve the system **algebraically** to determine the price of one CD and one DVD.

Math 1201 Formulae Sheet

(This sheet may be removed from the exam paper.)

Measurement

Imperial			Imperial to SI Units
1 ft. = 12 in.			1 in. = 2.54 cm $\doteq$ 2.5 cm
1 yd. = 3 ft.			1 mi. $\doteq$ 1.6 km
1 mi. = 1760 yd.			

Surface Area and Volume

Surface Area	Volume
Cylinder $A = 2\pi r^2 + 2\pi rh$	Pyramid $V = \dfrac{1}{3}[l \times w \times h]$
Cone $A = \pi r^2 + \pi rs$	Cone $V = \dfrac{1}{3}[\pi r^2 h]$
Sphere $A = 4\pi r^2$	Sphere $V = \dfrac{4}{3}\pi r^3$

Math 1201 Multiple Choice Answer Sheet

(This sheet may be removed from the exam paper.)

Teacher:_____   **Name:**_____

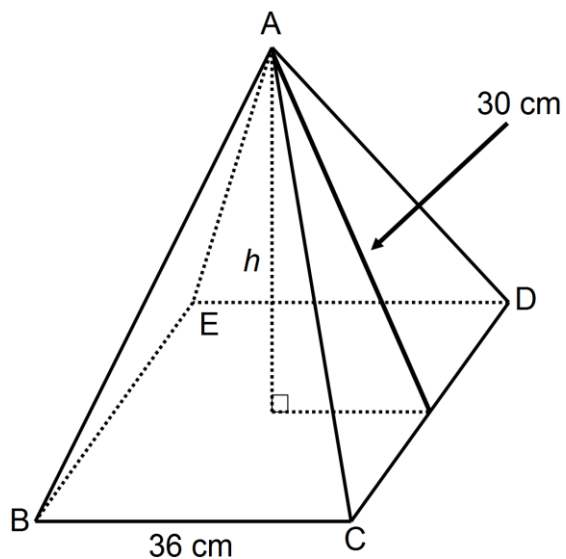|	
1.	21.
2.	22.
3.	23.
4.	24.
5.	25.
6.	26.
7.	27.
8.	28.
9.	29.
10.	30.
11.	31.
12.	32.
13.	33.
14.	34.
15.	35.
16.	36.
17.	37.
18.	38.
19.	39.
20.	40.

value

3   41.   A right square pyramid has side length 36 cm and slant height 30 cm. What
              is the volume of the pyramid to the nearest cm³.

Height of Pyramid	
$18^2 + h^2 = 30^2$	0.5 mark
$h^2 = 900 - 324$	
$h^2 = 576$	
$h = \sqrt{576}$	
$\boldsymbol{h = 24}$	1 mark
Volume	
$V = \dfrac{1}{3}lwh$	
$V = \dfrac{1}{3}(36)(36)(24)$	0.5 marks
$V = \dfrac{1}{3}(31104)$	0.5 mark
$\boldsymbol{V = 10368\ cm^3}$	0.5 mark

A

30 cm

h

E

B

36 cm

C

D

2   42.   The surface area of a sphere is 804.2 in². What is the radius of the sphere?.

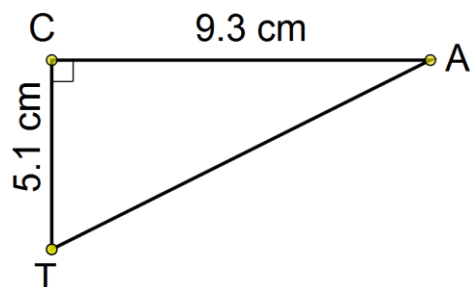|	
$Surface\ Area = 4\pi r^2$	
$804.2 = 4\pi r^2$	
$804.2 = 4(3.14)r^2$	0.5 mark
$804.2 = 12.56r^2$	0.5 mark
$64.03 = r^2$	0.5 mark
$\sqrt{64.03} = r$	
$r = 8$ in	0.5 mark
The radius is 8 inches in length.	
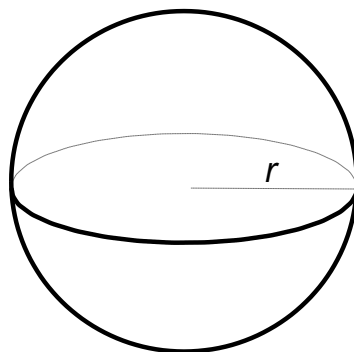
r

4   43.   Joe made a wooden scratching post for his cat and wants to cover it with carpet. About how much carpet will he need if he covers everything except the bottom of the square block?

Surface Area of Cylinder

$SA = 2\pi r^2 + 2\pi rh$
$SA = 2(3.14)(6)^2 + 2(3.14)(6)(24)$
$SA = 226.08 + 904.32$
$\boldsymbol{SA = 1130.40\ cm^2}$ 1 mark

Surface Area of Rectangular Prism

$A_{sides} = lw$
$A_{sides} = (30)(10) \times 4\ sides$
$A_{sides} = 300\ \times\ 4\ sides$
$\boldsymbol{A_{sides} = 1200\ cm^2}$ 1 mark

$A_{top} = (30)(30)$
$\boldsymbol{A_{top} = 900\ cm^2}$ 0.5 mark

$A_{overlap} = 2\pi r^2$
$A_{overlap} = 2(3.14)6^2$
$\boldsymbol{A_{overlap} = 226.08\ cm^2}$ 1 mark

$Total\ SA = A_{cylinder} + A_{rectangular\ prism} - A_{overlap}$

$Total\ SA = 1130.4\ cm^2 + 2100\ cm^2 - 226.08\ cm^2$

$\boldsymbol{Total\ SA = 3004.32\ cm^2}$ 0.5 mark

6 in
24 in
10 in
30 in
30 in

4   44.   Solve ΔCAT. Give all measurements to the nearest tenth.

Sample Solution	**Find either $\angle$ A or $\angle$ T**
Find hypotenuse	$\tan \angle A = \dfrac{5.1}{9.3}$
$l^2 + l^2 = h^2$	$\tan \angle A = 0.5484$
$(5.1)^2 + (9.3)^2 = h^2$	
$26.01 + 86.49 = h^2$	$\angle A = 28.7°$ 1.5 marks
$112.5 = h^2$	
$h = \sqrt{112.5}$	$\angle T = 180 - 90 - \angle A$
$\boldsymbol{h \doteq 10.6\ cm}$ 1.5 marks	$\angle T = 90 - 28.7°$
	$\angle T = 61.3°$ 1 mark

C   9.3 cm   A
5.1 cm
T

4   45.   At 180 m from shore, some tourists spot a lighthouse from their boat. The angle of elevation to the bottom of the lighthouse is 26^0. The angle of elevation to the top of the lighthouse is 36^0. What is the height, h, of the lighthouse?

$\tan(36°) = \dfrac{a}{180}$ 0.5 *mark*	$\tan(26°) = \dfrac{b}{180°}$ 0.5 *mark*
$0.7265 = \dfrac{a}{180}$ 0.5 *mark*	$0.4877 = \dfrac{b}{180°}$ 0.5 *mark*
$a = 130.8\ m$ 0.5 *mark*	$b = 87.8\ m$ 0.5 *mark*

$h = a - b$
$h = 130.8 - 87.8$
$h = 43m$ 1 *mark*
The lighthouse is 43 metres high
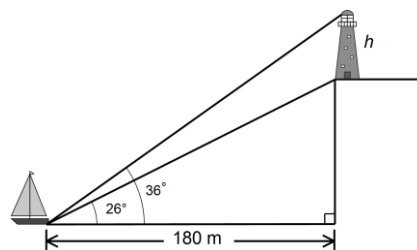
3   46.   Julie completed a math problem and made a mistake. In which step does the first error occur? Rewrite Julie's solution so that it is correct.

The error occurs in step __**2**__   1 *mark*

Correct solution:

$\dfrac{\left(4a^{-3}b^4\right)^{-2}}{a^6 b^{-1}}$

$= \dfrac{4^{-2} a^6 b^{-8}}{a^6 b^{-1}}$ 0.5 *mark*

$= \dfrac{1b}{4^2 b^8}$ 1 *mark*

$= \dfrac{1}{16b^7}$ 0.5 *mark*

$\dfrac{\left(4a^{-3}b^4\right)^{-2}}{a^6 b^{-1}}$

Step 1 $= \dfrac{4^{-2} a^6 b^{-8}}{a^6 b^{-1}}$

Step 2 $= \dfrac{a^0 b^{-9}}{4^2}$

Step 3 $= \dfrac{1}{16b^9}$

3   47.   Simplify: (the final answer must contain only positive exponents)

Sample Solution

$\left(\dfrac{x^6 y^{-\frac{1}{3}}}{125 x^{-9} y^{\frac{8}{3}}}\right)^{-\frac{1}{3}}$

$= \left(\dfrac{x^6 x^9}{125 y^{\frac{8}{3}} y^{\frac{1}{3}}}\right)^{-\frac{1}{3}}$ 0.5 *mark*

$= \left(\dfrac{x^{15}}{125 y^3}\right)^{-\frac{1}{3}}$ 0.5 *mark*

$= \dfrac{x^{-5}}{(125)^{-\frac{1}{3}} y^{-1}}$ 1 *mark*

$= \dfrac{125^{\frac{1}{3}} y}{x^5}$ 0.5 *mark*

$= \dfrac{5y}{x^5}$ 0.5 *mark*

4   48.   The surface area of a cube is 96 cm². Determine the length of the diagonal, x, of one of the faces. Express your answer in simplest radical form.

SA = 96 cm²

$96 \div 6\ sides = 16\ cm^2\ per\ side$ 1 mark

Let s represent side length

$A = s^2$
$16\ cm^2 = s^2$
$\sqrt{16} = s$
$4 = s$ 1 mark

$x^2 = s^2 + s^2$
$x^2 = 4^2 + 4^2$
$x^2 = 16 + 16$
$x^2 = 32$ 1 mark
$x = \sqrt{32}$
$x = \sqrt{16 \times 2}$
$x = 4\sqrt{2}$ 1 mark
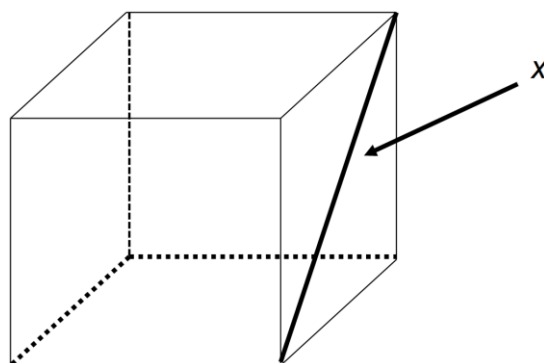
3   49.   Expand and simplify: $(2x - 7)(3x^2 + 4x + 2)$

$(2x - 7)(3x^2 + 4x + 2)$	
$6x^3 + 8x^2 + 4x - 21x^2 - 28x - 14$	1.5 marks
$6x^3 - 13x^2 - 24x - 14$	1.5 marks

3   50.   Factor completely: $4x^3 + 6x^2 - 4x$

$2x(2x^2 + 3x - 2)$	1 mark
$2x(2x^2 + 4x - x - 2)$	0.5 mark
$2x[2x(x + 2) - 1(x + 2)]$	1 mark
$2x(2x - 1)(x + 2)$	0.5 mark

3   51.   The area of a rectangle is represented by the polynomial 8x² + 10x + 3. If the length of one side is 4x + 3, determine the width of the rectangle.

Sample Solution	
$8x^2 + 10x + 3$	
$8x^2 + 4x + 6x + 3$	1 mark
$4x(2x + 1) + 3(2x + 1)$	1 mark
$(4x + 3)(2x + 1)$	1 mark
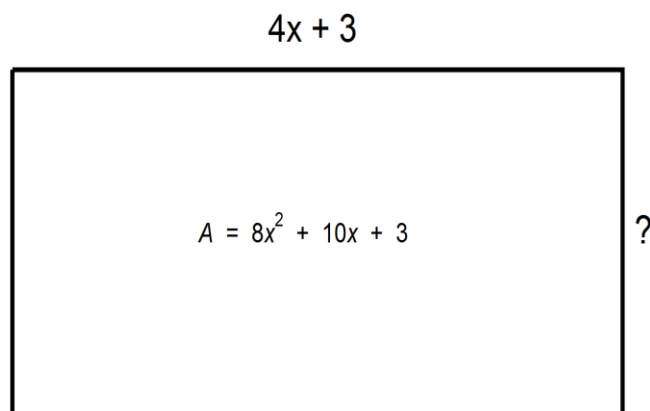
4x + 3

$A = 8x^2 + 10x + 3$?

4   52.   Valerie plans to put siding on the front of her garage pictured below. Find an expression (in simplest form) to represent the area of the surface to be covered with siding (Note: There will be **NO** siding on the two doors)

$A_{siding} = A_{front} - A_{doors}$	
$A_{front} = (x + 3)(3x + 5)$	
$A_{front} = (3x^2 + 5x + 9x + 15)$	
$\boldsymbol{A_{front} = (3x^2 + 14x + 15)}$	1 mark
$A_{doors} = x(x + 2) + (x + 2)(x + 2)$	1 mark
$A_{doors} = x^2 + 2x + x^2 + 2x + 2x + 4$	
$\boldsymbol{A_{doors} = 2x^2 + 6x + 4}$	0.5 mark
$A_{siding} = (3x^2 + 14x + 15) - (2x^2 + 6x + 4)$	0.5 mark
$A_{siding} = 3x^2 + 14x + 15 - 2x^2 - 6x - 4$	
$\boldsymbol{A_{siding} = x^2 + 8x + 11}$	1 mark
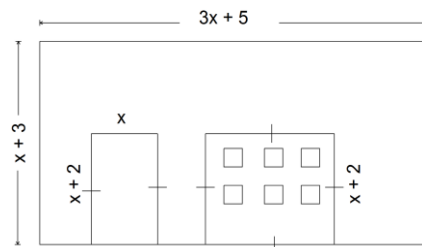
3x + 5

x + 3

x + 2

x

x + 2

4   53.   A t-shirt printing company charges $20 for the initial setup of the printing press plus $5 for every t-shirt printed. Illustrate the relationship using each of the four methods requested in the table below. (Note: **n** is the number of t-shirts and **C** is the cost in dollars)

Table of Values:

n	C
0	20
1	25
2	30
3	35
4	40
5	45
6	50

Graph:

Initial fee: $20.00
Charge per km: $5.00

Equation:

C = 5n + 20

Ordered Pairs:

(0, 20)	(5, 45)
(1, 25)	(6, 50)
(2, 30)	
(3, 35)	
(4, 40)	

3 54. The graph shows Jake leaving home at Point A and travelling by motorcycle to Gros Morne, located at point H.

a) What was Jake's maximum rate of change (i.e. speed)?

$$\frac{180-100}{2-1\frac{3}{4}} = \frac{80}{\frac{1}{4}} = \textbf{320 km/h} \qquad \text{1 mark}$$

b) From the time he left home, how many times did Jake stop and what was the total minutes stopped?

Jake stopped **3** times   0.5 mark

He was stopped for a total of **75** minutes   0.5 mark

c) How many kilometres did Jake put on his motorcycle from the time he left home (at point A) until he arrived at Gros Morne (point H)? **520 km**   1 mark

3 55. A line passes through the points $(6, 4)$ and $(2, -6)$. Determine the equation of the line in slope-intercept form $y = mx + b$

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$	$y = \dfrac{5}{2}x - 11$
$m = \dfrac{-6-4}{2-6}$ 0.5 mark	$4 = \dfrac{5}{2}(6) + b$ 0.5 mark
$m = \dfrac{-10}{-4}$	$4 = \dfrac{30}{2} + b$
$m = \dfrac{5}{2}$ 0.5 mark	$4 = 15 + b$
	$-11 = b$ 1 mark

$$y = \tfrac{5}{2}x - 11 \qquad \text{0.5 mark}$$

4 56. Determine the equation of the line that passes through $(10, -4)$ and is perpendicular to the line $7x - 14y + 28 = 0$.

$7x - 14y + 28 = 0$

$-14y = -7x - 28$ 0.5 mark

$\dfrac{-14y}{-14} = \dfrac{-7x}{-14} - \dfrac{28}{-14}$

$y = \dfrac{1}{2}x + 2$ 0.5 mark

Slope of perpendicular line = -2   1 mark

$y = -2x + b$ 0.5 mark

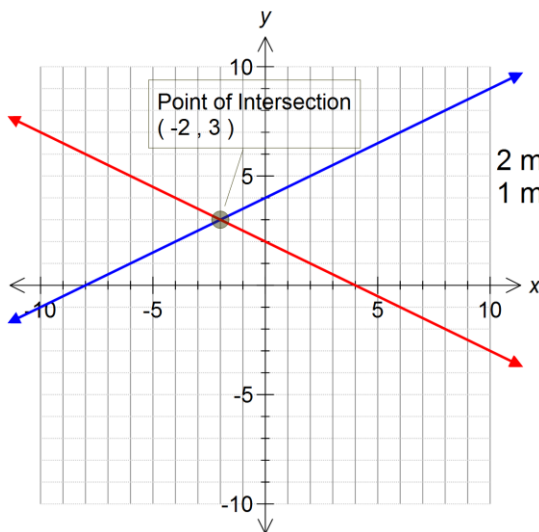Plug $(10, -4)$ in for x and y

$-4 = -2(10) + b$ 0.5 mark
$-4 = -20 + b$
$16 = b$ 0.5 mark

$\mathbf{y = -2x + 16}$ 0.5 mark

3 57. Solve graphically:
$$\begin{cases} y - 1 = -\dfrac{1}{2}(x-2) \\ y = \dfrac{1}{2}x + 4 \end{cases}$$

Point of Intersection
(-2 , 3)

2 marks for graphing the equations
1 mark for identifying the point of intersection (solution)

3   58.   At a music store, all CDs are the same price and all DVDs are the same price. Andrew buys 6 CDs and 8 DVDs for a total of $126. Jane buys 1 CD and 4 DVDs for a total of $53. Write a linear system and solve the system **algebraically** to determine the price of one CD and one DVD.

Sample Solution:

Let C = price of CDs Let D = price of DVDs $\begin{cases} 6C + 8D = 126 \quad 1\,mark \\ 1C + 4D = 53 \end{cases}$ **Elimination** 6C + 8D = 126 <u>1C + 4D = 53</u> x 6 0.5 mark 6C + 8D = 126 <u>-6C − 24D = -318</u> -16D = -192 0.5 mark <u>-16D</u> = <u>-192</u> -16 -16 **D = 12** 0.5 mark C + 4(12) = 53 C + 48 = 53 **C = 5** 0.5 mark The CDs cost $5 each The DVDs cost $5 each	Let C = price of CDs Let D = price of DVDs $\begin{cases} 6C + 8D = 126 \\ 1C + 4D = 53 \end{cases}$ **Substitution** Jane C = 53 − 4D 0.5 mark Andrew 6C + 8D = 126 6(53 − 4D) + 8D = 126 0.5 mark 318 − 24D + 8D = 126 318 − 16D = 126 318 − 126 = 16D 192 = 16D <u>192</u> = <u>16D</u> 0.5 mark 16 16 **12 = D** C = 53 − 4(12) C = 53 − 48 **C = 5** 0.5 mark The CDs cost $5 each The DVDs cost $5 each

Math 1201 Formulae Sheet

(This sheet may be removed from the exam paper.)

Measurement

Imperial		Imperial to SI Units
1 ft. = 12 in.		1 in. = 2.54 cm $\doteq$ 2.5 cm
1 yd. = 3 ft.		1 mi. $\doteq$ 1.6 km
1 mi. = 1760 yd.		

Surface Area and Volume

Surface Area	Volume
Cylinder $A = 2\pi r^2 + 2\pi rh$	Pyramid $V = \dfrac{1}{3}[l \times w \times h]$
Cone $A = \pi r^2 + \pi rs$	Cone $V = \dfrac{1}{3}[\pi r^2 h]$
Sphere $A = 4\pi r^2$	Sphere $V = \dfrac{4}{3}\pi r^3$

Math 1201 Multiple Choice Answer Sheet

(This sheet may be removed from the exam paper.)

Teacher:____Solutions____   **Name:_____**

1. C	21. A
2. D	22. B
3. B	23. A
4. C	24. B
5. B	25. A
6. D	26. D
7. D	27. D
8. C	28. C
9. C	29. A
10. A	30. C
11. D	31. B
12. C	32. B
13. D	33. A
14. D	34. A
15. A	35. C
16. B	36. D
17. A	37. C
18. D	38. B
19. D	39. D
20. C	40. A

**Newfoundland & Labrador
English School District**

Mathematics 1201
Final Examination
Monday, June 16th, 2014

Student Name: _____

Teacher Name: _____

Total Value: 70 marks   Time: 2 Hours

GENERAL INSTRUCTIONS

1. Candidates are required to do all items.

2. The examination has a total of 16 pages (including this cover) consisting of the following parts:

   Part I: 35 Selected Response Items   Value: 35 marks
   Part II: 10 Constructed Response Questions   Value: 35 marks

3. **Page 15 is a formulae sheet** to be used for the exam. This page may be removed.

4. **Part I** should be completed on the **answer sheet** provided on **page 16** of the exam. This page may be removed.

5. Answers to the constructed response questions for Part II are to be placed on this paper in the spaces provided.

6. For Part II items, candidates are reminded to show ALL necessary steps and calculations. Partial credit may be awarded for logical work even though you might not arrive at the correct solution. Correct answers without appropriate calculations will not merit full marks.

7. A self powered calculator may be used for calculations and to obtain special values. Graphing calculators are to be reset before the examination begins.

REGULATIONS FOR CANDIDATES

Candidates are expected to be thoroughly familiar with all regulations pertaining to their conduct during examinations. Candidates must comply with all requirements governing the following matters.

- Materials required
- Leaving the room
- Materials not permitted
- Models of calculators permitted

- Use of pen or pencil
- Use of unauthorized means and penalties
- Completion of required information
- Communication during the exam

1. What SI unit is best for measuring the width of this exam page?
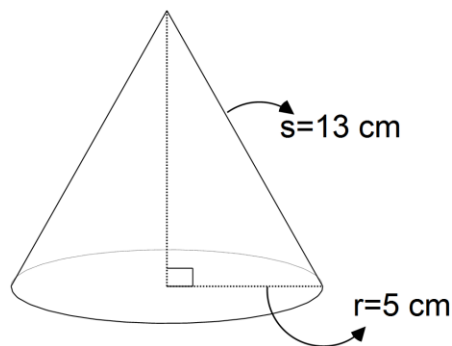
    A) centimetre

    B) feet

    C) inch

    D) metre

2. Which calculation would convert 6 km into yards?

    A) $6 \text{ km} \times \dfrac{3 \text{ ft}}{1 \text{ yd}}$

    B) $6 \text{ km} \times \dfrac{1 \text{ yd}}{3 \text{ ft}}$

    C) $6 \text{ km} \times \dfrac{1.6 \text{ km}}{1 \text{ mi}} \times \dfrac{1 \text{ mi}}{1760 \text{ yd}}$
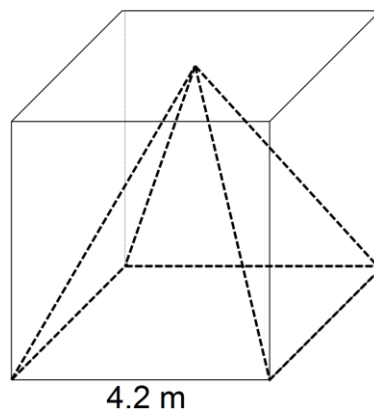
    D) $6 \text{ km} \times \dfrac{1 \text{ mi}}{1.6 \text{ km}} \times \dfrac{1760 \text{ yd}}{1 \text{ mi}}$

3. A cone has a radius of 5 cm and a slant height of 13 cm. What is its surface area to the nearest square centimetre? (Note: use $\pi = 3.14$)

    A) 220

    B) 283

    C) 314

    D) 340

4. What is the volume, to the nearest tenth of a cubic metre, of the square pyramid that just fits inside a cube with the same height?

    A) 5.9

    B) 24.7

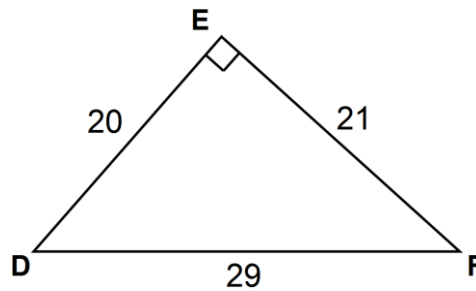   C) 74.1

    D) 222.3

    4.2 m

5. What is the surface area of this sphere to the nearest tenth of a square inch? (Note: use $\pi = 3.14$)
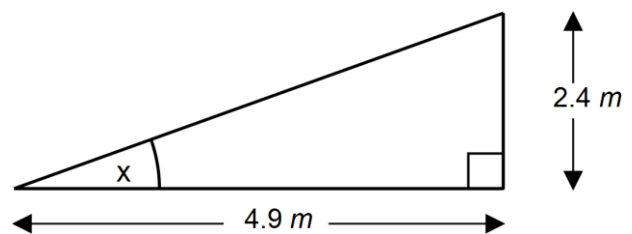
   A) 615.4

   B) 1436.0

   C) 2461.8

   D) 4308.8

   14 inches
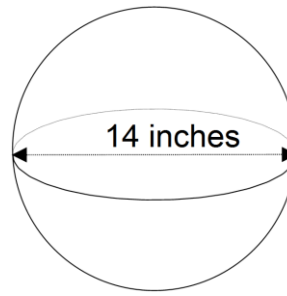
6. Which ratio represents $\cos\angle F$?

   A) $\dfrac{20}{29}$

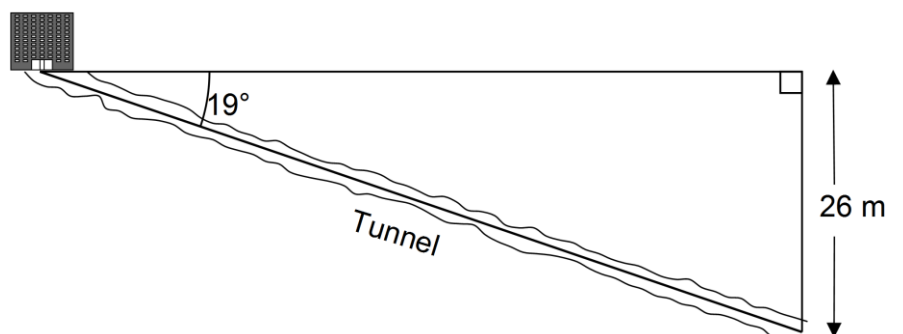   B) $\dfrac{21}{29}$

   C) $\dfrac{20}{21}$

   D) $\dfrac{29}{21}$

   E

   20   21

   D   29   F

7. Which equation can be used to determine the measure of angle x ?

   A) $\sin x = \dfrac{2.4}{4.9}$

   B) $\sin x = \dfrac{4.9}{2.4}$

   C) $\tan x = \dfrac{2.4}{4.9}$

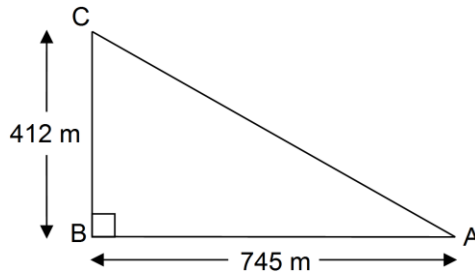   D) $\tan x = \dfrac{4.9}{2.4}$

   x

   2.4 m

   4.9 m

8. A mine tunnel is dug at an angle of 19°. How long must the tunnel be to the nearest tenth of a metre to reach a depth of 26 m?

   A) 8.5

   B) 27.5

   C) 75.5

   D) 79.9

   19°

   Tunnel

   26 m

9. What is the measure of $\angle A$ to the nearest degree?

A) 29°

B) 34°

C) 56°

D) 61°

10. What is the least common multiple of 312 and 416 ?

A) 13

B) 104

C) 1248

D) 129 792

11. Which is irrational?

A) −3.211

B) $\sqrt[3]{-8}$

C) $\sqrt{5}$

D) $\sqrt{16}$

12. What is $9^{-\frac{3}{4}}$ expressed as a radical?

A) $-\sqrt[4]{9^3}$

B) $\dfrac{1}{\sqrt[4]{9^3}}$

C) $\dfrac{1}{\sqrt[3]{9^4}}$

D) $\sqrt[3]{9^4}$

13. Evaluate: $\left(\dfrac{9}{4}\right)^{-\frac{3}{2}}$

A) $-\dfrac{3}{2}$

B) $\dfrac{8}{27}$

C) $\dfrac{4}{9}$

D) $\dfrac{27}{8}$

14. Simplify: $\left(\dfrac{2b^5c^3}{a^2b^3}\right)^4$

A) $\dfrac{2b^2c^7}{a^6}$

B) $\dfrac{8b^8c^{12}}{a^8}$

C) $\dfrac{16b^8c^{12}}{a^8}$

D) $\dfrac{16b^2c^7}{a^6}$

15. What is $\sqrt{72}$ as a mixed radical in simplest form?

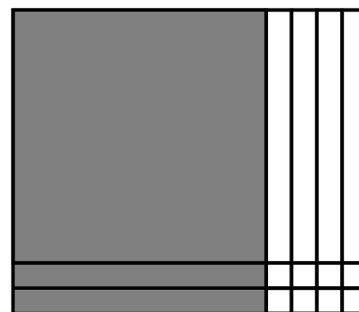A) $3\sqrt{8}$

B) $6\sqrt{2}$

C) $9\sqrt{8}$

D) $36\sqrt{2}$

16. A polynomial is represented by the tiles shown. What are the factors of the polynomial? (Note: Shaded tiles represent 'positive'.)
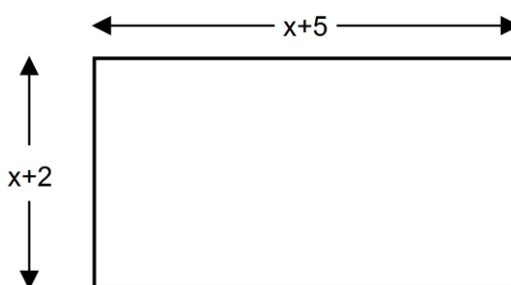
A) $(x-2)(x-4)$

B) $(x-2)(x+4)$

C) $(x+2)(x-4)$

D) $(x+2)(x+4)$

17. What is the area of this rectangle?

A) x^2+7

B) x^2+10

C) x^2+7x+7

D) $x^2+7x+10$

18. Factor completely: $12x^3y^2 - 18x^2y^3$

   A) $6\left(2x^3y^2 - 3x^2y^3\right)$

   B) $x^2y^2\left(12x - 18y\right)$

   C) $2x^2y^2\left(6x - 8y\right)$

   D) $6x^2y^2\left(2x - 3y\right)$

19. Expand and simplify: $\left(3x - 5\right)^2$

   A) $9x^2 - 25$

   B) $9x^2 + 25$

   C) $9x^2 - 30x + 25$

   D) $9x^2 + 30x + 25$

20. Factor completely: $64a^2 - 81b^2$

   A) $(8a - 9b)^2$

   B) $(8a + 9b)^2$

   C) $(8a - 9b)(8a + 9b)$

   D) $(8a + 9b)(8a + 9b)$

21. Which trinomial **CANNOT** be factored?

   A) $x^2 - 2x - 4$

   B) $x^2 - 3x - 4$

   C) $x^2 + 3x + 2$

   D) $x^2 + 6x + 5$

22. Factor completely: $4x^2 + 11x + 6$

   A) $(2x + 2)(2x + 3)$

   B) $(2x + 3)(2x + 2)$

   C) $(4x + 2)(x + 3)$

   D) $(4x + 3)(x + 2)$

23. Which represents a linear equation?

A) $y = -\dfrac{1}{4}x - 1$

B) $y = x^2$
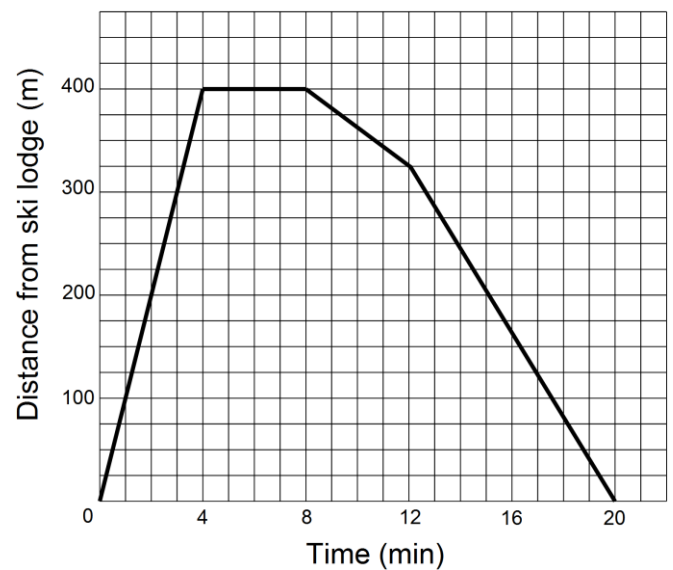
C) $y = 3x + 2x^2$

D) $y = -x^3 + 3x^2 + x - 2$

24. The graph below represents Sherry's distance from a ski lodge with respect to time. In which interval is she travelling the fastest?

A) 0 – 4 minutes

B) 4 – 8 minutes

C) 8 – 12 minutes

D) 12 – 20 minutes

25. Which set of ordered pairs represents a function?

A) $\{(0,4),(0,6),(6,8),(9,10)\}$

B) $\{(0,4),(3,6),(3,8),(6,10)\}$

C) $\{(0,10),(3,8),(6,6),(6,4)\}$

D) $\{(0,10),(3,8),(6,8),(9,4)\}$

26. The rental charge at a movie store is given by the equation $C(n) = 3n + 5$, where C is the total cost in dollars and n is the number of days past the return date. Jeremy returns a movie and the charge is $44. How many days was his movie overdue?
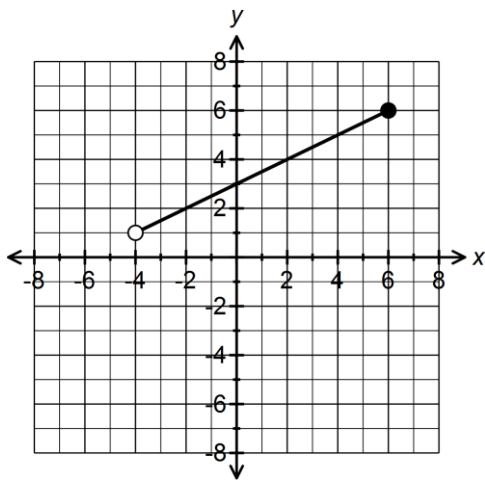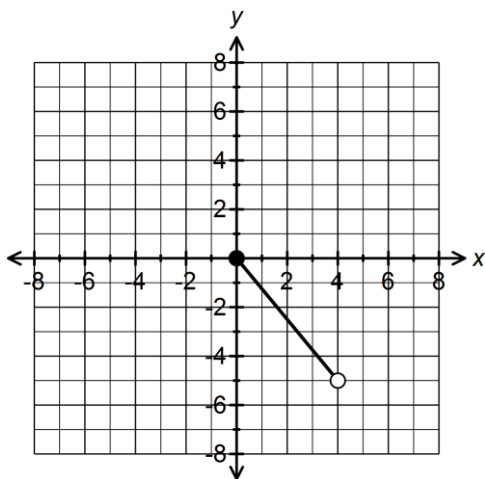
A) 13

B) 16

C) 39

D) 137

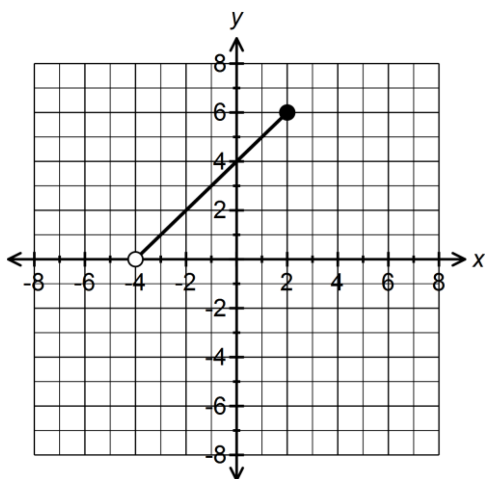27. Which graph has domain $\{x \mid -4 < x \le 6, x \in R\}$ and range $\{y \mid 0 \le y < 5, y \in R\}$?
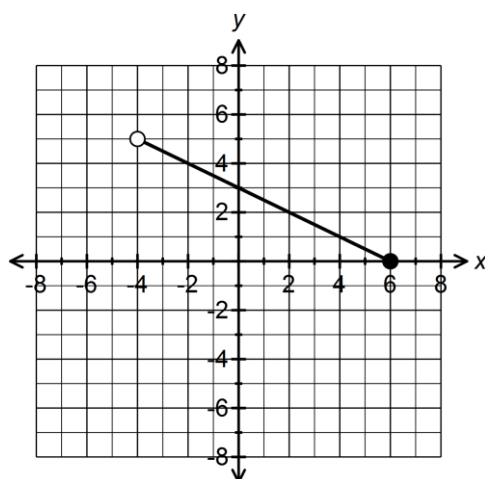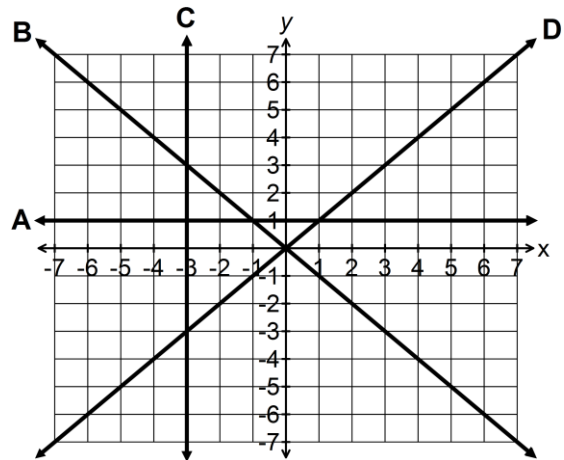
A)

B)

C)

D)

28. What is the slope of a line that is parallel to $y = -3x + 4$?

A) -3

B) $-\dfrac{1}{3}$

C) $\dfrac{1}{3}$

D) 3

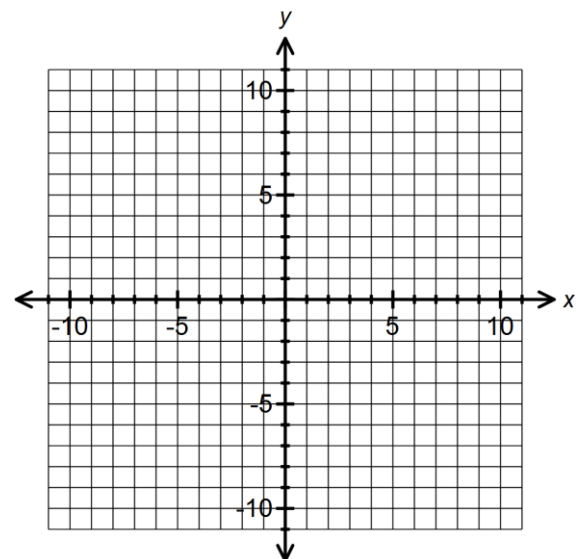29. Which line has a slope that is undefined?

A) A

B) B

C) C

D) D

30. What is the equation of the line that passes through the point $(-5, -4)$ and has a slope of $-\dfrac{2}{5}$?

A) $y = -\dfrac{2}{5}x - 6$

B) $y = -\dfrac{2}{5}x - 2$
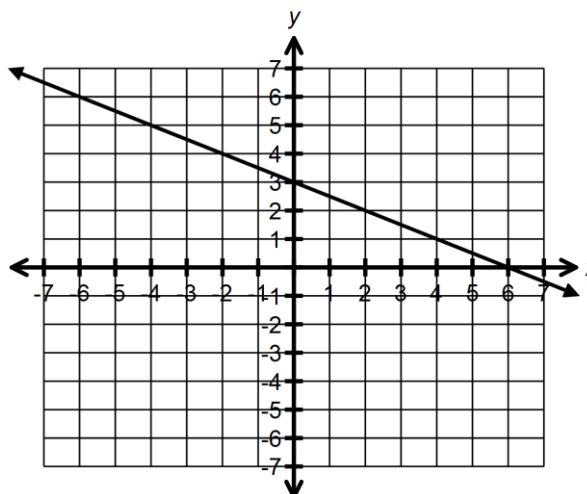
C) $y = -\dfrac{2}{5}x + 2$

D) $y = -\dfrac{2}{5}x + 6$

31. A line passes through the point $(2, 1)$ and has a slope of $\dfrac{2}{3}$. Which point does the line also pass through?
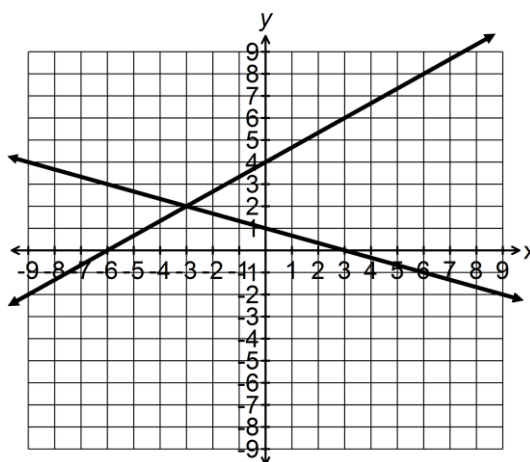
A) $(0, -2)$

B) $(4, 4)$

C) $(5, -1)$

D) $(8, 5)$

32. What is the equation of the line graphed below?

A) $x - 2y - 6 = 0$

B) $x - 2y + 6 = 0$

C) $x + 2y - 6 = 0$

D) $x + 2y + 6 = 0$

33. What is the solution to the system of equations graphed below?

A) $(-6, 0)$

B) $(-3, 2)$

C) $(0, 4)$

D) $(3, 0)$

34. Which linear system has an infinite number of solutions?

A) $\begin{cases} y = -2x + 4 \\ 4x + 2y = 2 \end{cases}$

B) $\begin{cases} y = -2x + 4 \\ 4x + 2y = 8 \end{cases}$

C) $\begin{cases} y = 2x + 4 \\ 4x + 2y = 2 \end{cases}$
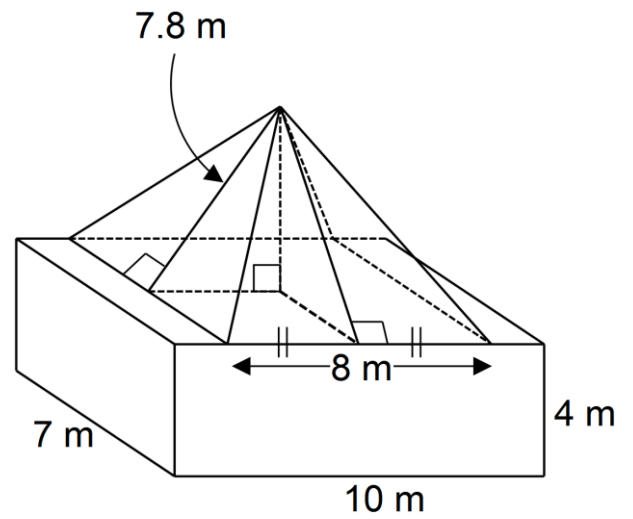
D) $\begin{cases} y = 2x + 4 \\ 4x + 2y = 8 \end{cases}$

35. Solve: $\begin{cases} 3x + 10y = -4 \\ 2x + y = 3 \end{cases}$

A) $(-2, 1)$

B) $(-1, 2)$

C) $(1, -2)$

D) $(2, -1)$
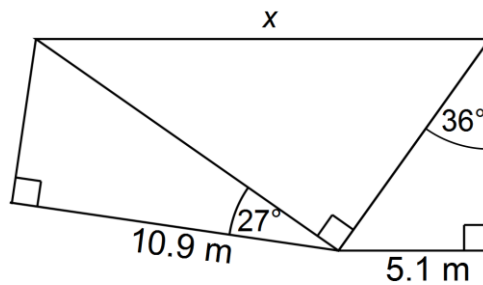
Value

4 36. This composite object is a rectangular pyramid on top of a rectangular prism. Find the height of the rectangular pyramid and use this to help determine the volume of the composite object. (answers to the nearest tenth)

7.8 m

8 m

4 m

7 m

10 m

4 37. Determine the value of *x* to the nearest tenth of a metre.

x

36°

27°

10.9 m

5.1 m

4   38.   Simplify completely: (Note: Answers should have only positive exponents.)

$$\frac{\left(a^6 b^{-5} c\right)^{-2}\left(a^{\frac{1}{3}} c^{-4}\right)^3}{\left(a^4 b^{-6}\right)^{-\frac{1}{2}}}$$

3   39.   The volume of a cube is $4096\ cm^3$. Determine the surface area of the cube.
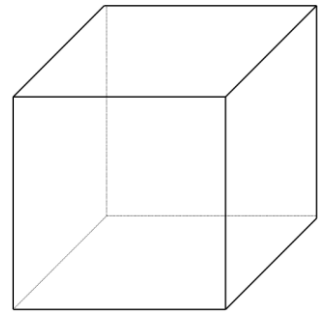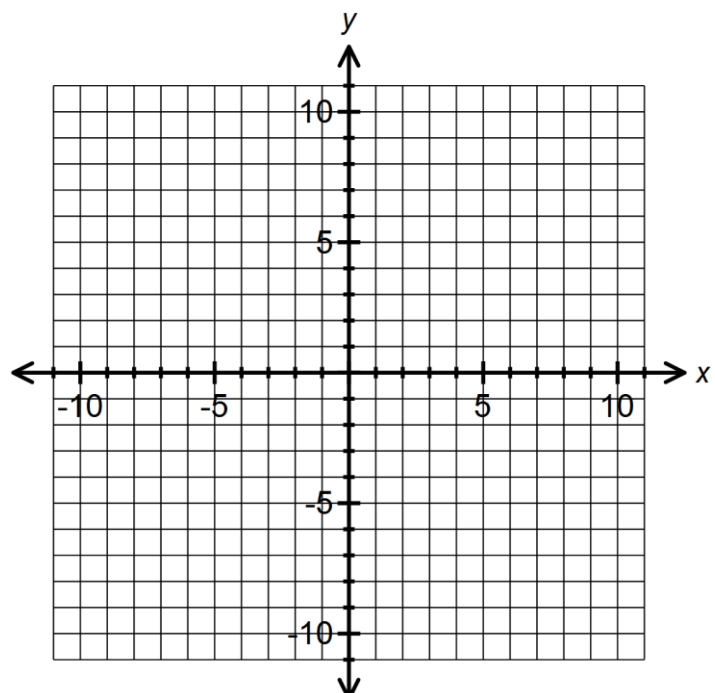

3   40.   Factor completely: $12x^2 + 36x + 27$

2   41.   Expand and simplify: $(2x+3)(x^2-5x+4)$

3   42.   Determine the simplified expression that would represent the area of the
          shaded region.
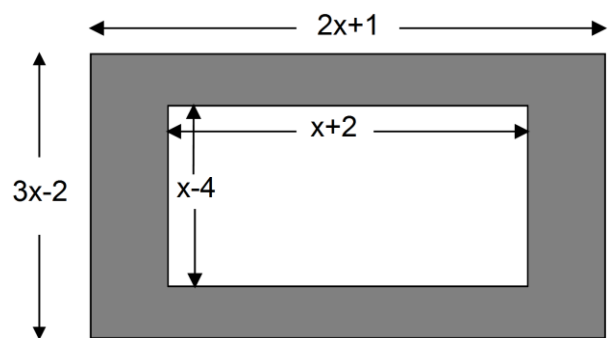
4   43.   Determine the x and y intercepts of the function defined by $f(x)=-3x-9$
          where $x \in R$ and sketch the graph of the function.

44.   A line passes through the points $L(2,2)$ and $M(6,10)$.

2   A) Determine the equation of the line in slope-intercept form.(i.e. $y = mx + b$)

2   B) Determine the equation of the line in slope-intercept form that passes
      through L and is perpendicular to $\overline{LM}$.

4   45.   Solve this system: $\begin{cases} \dfrac{5}{2}x + 2y = 7 \\ \\ -2x - 3y = 7 \end{cases}$

Math 1201 Formulae Sheet

(This sheet may be removed from the exam paper.)

Measurement

Imperial		Imperial to SI Units
1 ft. = 12 in.		1 in. = 2.54 cm $\doteq$ 2.5 cm
1 yd. = 3 ft.		1 mi. $\doteq$ 1.6 km
1 mi. = 1760 yd.		

Surface Area and Volume

Surface Area	Volume
Cylinder $A = 2\pi r^2 + 2\pi rh$	Pyramid $V = \dfrac{1}{3}[l \times w \times h]$
Cone $A = \pi r^2 + \pi rs$	Cone $V = \dfrac{1}{3}[\pi r^2 h]$
Sphere $A = 4\pi r^2$	Sphere $V = \dfrac{4}{3}\pi r^3$

Math 1201 Selected Response Answer Sheet

(This sheet may be removed from the exam paper.)

Student Name:_____   **Teacher Name:**_____

1.	21.
2.	22.
3.	23.
4.	24.
5.	25.
6.	26.
7.	27.
8.	28.
9.	29.
10.	30.
11.	31.
12.	32.
13.	33.
14.	34.
15.	35.
16.	
17.	
18.	
19.	
20.	

Part II
Total Value: 35 marks

Value

4   36.   This composite object is a rectangular pyramid on top of a rectangular prism. Find the height of the rectangular pyramid and use this to help determine the volume of the composite object. (answers to the nearest tenth)
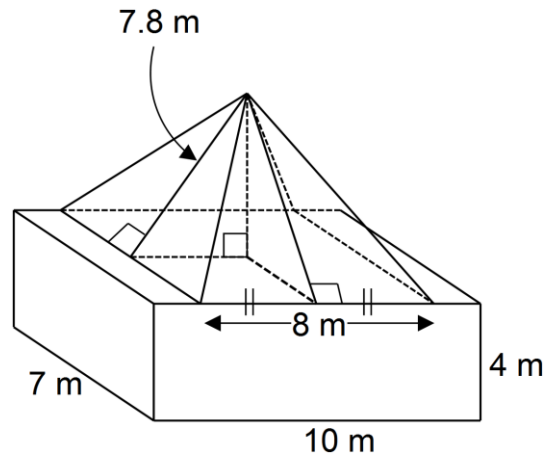
7.8 m

Find height of rectangular pyramid :

$4^2 + h^2 = 7.8^2$

$16 + h^2 = 60.84$

$h^2 = 60.84 - 16 = 44.84$

$\therefore h = \sqrt{44.84} = 6.7\,m$

8 m

7 m

4 m

10 m

Find volume of rectangular pyramid :

$v = \dfrac{1}{3}(l \times w \times h)$

$v = \dfrac{1}{3}(8 \times 7 \times 6.7) = 125.1\,m^3$

Find volume of rectangular prism :

$v = l \times w \times h = 10 \times 7 \times 4 = 280\,m^3$

Volume of composite object :

$125.1\,m^3 + 210\,m^3 = 405.1\,m^3$

4   37.   Determine the value of x to the nearest tenth of a metre.

x

Find length v :

$\cos 27° = \dfrac{10.9}{v}$

$0.891 = \dfrac{10.9}{v}$

$0.891v = 10.9$

$v = \dfrac{10.9}{0.891} = 12.2\,m$

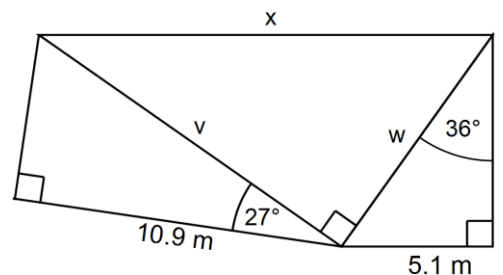_Find length of w :_

$\sin 36° = \dfrac{5.1}{w}$

$0.588 = \dfrac{5.1}{w}$

$0.588w = 5.1$

$w = \dfrac{5.1}{0.588} = 8.7\,m$

v

w   36°

27°

10.9 m

5.1 m

Find length x :

$v^2 + w^2 = x^2$

$12.2^2 + 8.7^2 = x^2$

$x^2 = 224.53$

$\therefore x = \sqrt{224.53} = 15.0\,m$

4   38.   Simplify completely: (Note: Answers should have only positive exponents):

$$\frac{\left(a^6b^{-5}c\right)^{-2}\left(a^{\frac{1}{3}}c^{-4}\right)^3}{\left(a^4b^{-6}\right)^{-\frac{1}{2}}}$$

$$\frac{\left(a^6b^{-5}c\right)^{-2}\left(a^{\frac{1}{3}}c^{-4}\right)^3}{\left(a^4b^{-6}\right)^{-\frac{1}{2}}} = \frac{\left(a^{-12}b^{10}c^{-2}\right)\left(ac^{-12}\right)}{a^{-2}b^3} = \frac{a^{-11}b^{10}c^{-14}}{a^{-2}b^3} = a^{-9}b^7c^{-14} = \frac{b^7}{a^9c^{14}}$$

3   39.   The volume of a cube is $4096\,cm^3$. Determine the surface area of the cube.

Find length x:

volume of cube $= x^3$

$4096 = x^3$
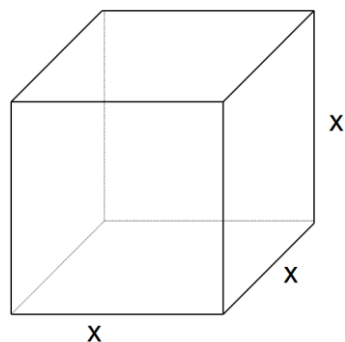
$x^3 = 4096$

$\sqrt[3]{x^3} = \sqrt[3]{4096}$

$\therefore x = 16\,cm$

Surface Area of cube :

$\left(16\times16\right)\times6 = 1536\,cm^2$

3   40.   Factor completely: $12x^2 + 36x + 27$

$12x^2 + 36x + 27$

$3(4x^2 + 12x + 9)$

$3(4x^2 + 6x + 6x + 9)$

$3\left[2x(2x+3) + 3(2x+3)\right]$

$3(2x+3)(2x+3)$

2 41. Expand and simplify: $(2x+3)(x^2-5x+4)$

$$(2x+3)(x^2-5x+4)$$
$$2x(x^2-5x+4)+3(x^2-5x+4)$$
$$\left(2x^3-10x^2+8x\right)+\left(3x^2-15x+12\right)$$
$$2x^3-10x^2+8x+3x^2-15x+12$$
$$2x^3-7x^2-7x+12$$

3 42. Determine the simplified expression that would represent the area of the shaded region.

Area of "inner" rectangle :

$$(x+2)(x-4)$$
$$x^2+2x-4x-8$$
$$x^2-2x-8$$

Area of "outer" rectangle :

$$(2x+1)(3x-2)$$
$$6x^2+3x-4x-2$$
$$6x^2-x-2$$

Area of "shaded region"

"*outer rectangle*" − "*inner rectangle*"

$$\left(6x^2-x-2\right)-\left(x^2-2x-8\right)$$
$$6x^2-x-2-x^2+2x+8$$
$$5x^2+x+6$$
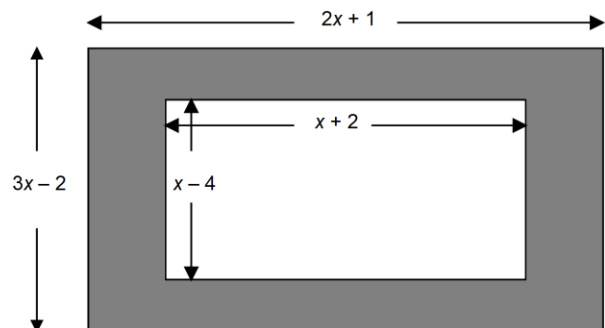
4 43. Determine the x and y intercepts of the function defined by $f(x)=-3x-9$ where $x\in R$ and sketch the graph of the function.

x intercept:

occurs when $f(x)$ *or* $y=0$
$$0=-3x-9$$
$$3x=-9$$
$$x=\frac{-9}{3}=-3$$
∴ x intercept occurs at (-3,0)

y intercept:

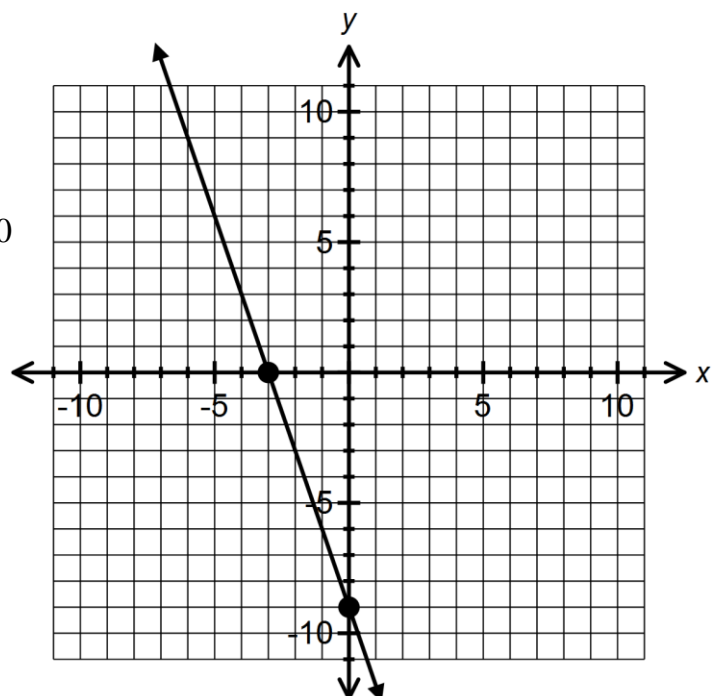*occurs when* $x=0$
$$f(0)=-3(0)-9$$
$$f(0)=0-9$$
$$f(0)=-9$$
∴ y intercept occurs at (0,-9)

(NOTE: students could also graph it first using y=mx+b and then read off and list the intercepts)

44. A line passes through the points $L(2,2)$ and $M(6,10)$.

2   A) Determine the equation of the line in slope-intercept form. (i.e. $y = mx + b$)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 2}{6 - 2} = \frac{8}{4} = 2$$

$$\therefore$$

$$y = mx + b$$
$$y = 2x + b$$
$$10 = 2(6) + b$$
$$10 = 12 + b \Rightarrow b = -2$$
$$\therefore y = 2x - 2$$

2   B) Determine the equation of the line in slope-intercept form that passes through L and is perpendicular to $\overline{LM}$.

$$\Rightarrow \text{line must have negative reciprocal slope to that of } LM \therefore m = -\frac{1}{2}$$

$$y = mx + b$$
$$y = -\frac{1}{2}x + b$$
$$2 = -\frac{1}{2}(2) + b$$
$$2 = -1 + b \Rightarrow b = 3$$
$$y = -\frac{1}{2}x + 3$$

4   45.   Solve this system: $\begin{cases} \dfrac{5}{2}x + 2y = 7 \\ \\ -2x - 3y = 7 \end{cases}$

$$\left\{ \begin{array}{l} 2\left[\dfrac{5}{2}x + 2y = 7\right] \\ -2x - 3y = 7 \end{array} \right\} \Rightarrow \left\{ \begin{array}{l} 5x + 4y = 14 \\ -2x - 3y = 7 \end{array} \right.$$

$$2(5x + 4y = 14)$$
$$5(-2x - 3y = 7)$$

$$\left. \begin{array}{l} 10x + 8y = 28 \\ -10x - 15y = 35 \end{array} \right\} \Rightarrow \text{"}add\text{"} \Rightarrow -7y = 63$$

$$y = -9$$

$$\therefore \text{substitute this in to an equation} \Rightarrow -2x - 3(-9) = 7$$

$$-2x + 27 = 7$$
$$-2x = -20 \Rightarrow x = 10 \qquad\qquad \text{Therefore, solution is } (10, -9)$$

KEY – MATH 1201 Final Exam – NLESD - June 2014

1. A
2. D
3. B
4. B
5. A
6. B
7. C
8. D
9. A
10. C
11. C
12. B
13. B
14. C
15. B
16. C
17. D
18. D
19. C
20. C

21. A
22. D
23. A
24. A
25. D
26. A
27. D
28. A
29. C
30. A
31. D
32. C
33. B
34. B
35. D