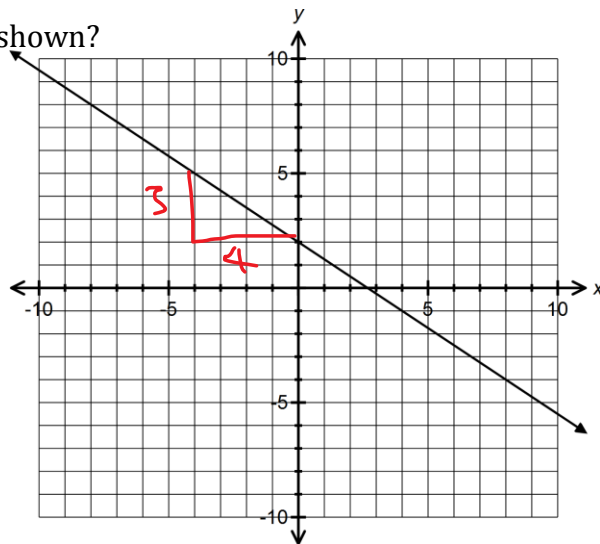12   **Part I: Multiple Choice. Place the correct answer in the corresponding blank at the end of this section.**

1. What is the slope of a line perpendicular to the graph shown?

   (A) $-\frac{4}{3}$

   (B) $-\frac{3}{4}$

   (C) $\frac{3}{4}$

   (D) $\frac{4}{3}$

   $m = -\frac{3}{4}$

   $reciprocal = \frac{4}{3}$

2. What is the slope of the line $y = 4$?

   (A) 0

   (B) Undefined

   (C) 1

   (D) 2

   $y = 0x + 4$

3. What is the slope of a line passing through the points $(1, 3)$ and $(-3, 5)$?

   (A) -2

   (B) $-\frac{1}{2}$

   (C) $\frac{1}{2}$

   (D) 2

   $x_1 y_1 \quad x_2 y_2$

   $\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5-3}{-3-1} = \frac{2}{-4} = -\frac{1}{2}$

4. Rewrite the line $y = \frac{3}{5}x + 2$ in general form. $LCD: 5$

   (A) $-\frac{3}{5}x + 5y - 2 = 0$

   (B) $\frac{3}{5}x - 5y + 2 = 0$

   (C) $-3x + 5y - 10 = 0$

   (D) $3x - 5y + 10 = 0$

   $5 \cdot y = 5 \cdot \frac{3}{5}x + 5(2)$

   $5y = 3x + 10$

   $0 = 3x - 5y + 10$

   $3x - 5y + 10 = 0$

5. What is the equation of a line that is parallel to the line $y = -3x + 7$ and passes through the point $(4, -5)$?

   (A) $(y - 5) = -3(x + 4)$

   (B) $(y + 5) = -3(x - 4)$

   (C) $(y - 5) = \frac{1}{3}(x + 4)$

   (D) $(y + 5) = \frac{1}{3}(x - 4)$

   $x_1 \ y_1$

   $m = -3$

   $y - y_1 = m(x - x_1)$

   $y - 4 = -3(x + 5)$

6. What is the equation of a line that has a slope perpendicular to $y = \frac{2}{3}x - 4$ and a

   y - intercept of 7.

   (A) $y = -\frac{3}{2}x + 7$

   (B) $y = -\frac{3}{2}x - 7$

   (C) $y = \frac{2}{3}x + 7$

   (D) $y = \frac{2}{3}x - 7$

   [handwritten: $m = -\frac{3}{2}$ $b = 7$ $y = mx + b$ $y = -\frac{3}{2}x + 7$]

7. The equation $C = 0.35d + 5$ represents the cost of getting a taxi. What does 0.35 represent?

   (A) The base cost of getting the taxi.

   (B) The cost per kilometer.

   (C) The number of kilometers.

   (D) The total cost of the taxi.

8. Write the equation of a vertical line that passes through the point $(-5, 7)$.

   (A) $x = -7$

   (B) $x = -5$ *[handwritten: $x = -5$]*

   (C) $x = 5$

   (D) $x = 7$

9. The daily cost of renting a scooter is \$36.00 plus \$0.26 for every kilometer. What equation represents the cost, C, of renting a scooter for k kilometers?

   (A) $C = 0.26k + 36$ *[handwritten: $C = 0.26k + 36$]*

   (B) $C = 26k + 36$

   (C) $C = 0.26 + 36k$

   (D) $C = 0.26k + 36d$

10. Find the equation of the graph below? *[handwritten: $y = mx + b$ $b: 2$]*

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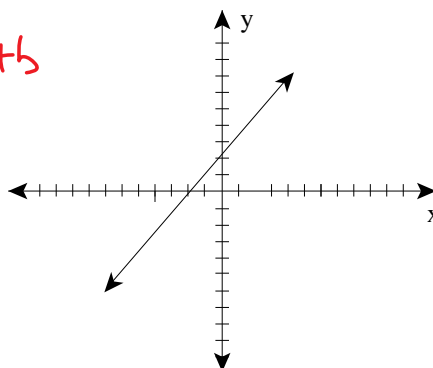
   (B) $y = -2x + 2$

   (C) $y = 2x - 2$

   (D) $y = 2x + 2$

11. There is a fixed cost of $250 to publish a book plus $0.80 for each book printed. How many books can be published and printed for a total cost of $290?

(A)   5

(B)   50

(C)   500

(D)   5000

$C = 0.8b + 250$

$290 = 0.8b + 250 \rightarrow b = 50$

$290 - 250 = 0.8b$

$\dfrac{40}{0.8} = \dfrac{0.8b}{0.8}$

12. Rewrite the equation $y - 3 = -2(x + 1)$ in slope-intercept form.

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

(B) $y = -2x + 1$

(C) $y = -2x + 3$

(D) $y = -2x + 4$

$y - 3 = -2x - 2$

$y = -2x - 2 + 3$

$y = -2x + 1$

Answers to multiple choice.

1.___   2.___   3.___   4.___   5.___   6.___

7.___   8.___   9.___   10.___   11.___   12.___

20   **Part II: Constructed Response. Show all workings.**

3   13.   Find the equation of a line in **general form** that passes through the points $(4, 7)$ and $(-5, 2)$.

$$x_1, y_1$$

$$x_2, y_2$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{2 - 7}{-5 - 4}$$

$$m = \frac{-5}{-9}$$

$$m = \frac{5}{9}$$

$$y - y_1 = m(x - x_1)$$

$$y - 7 = \frac{5}{9}(x - 4) \quad \text{LCD: } 9$$

$$9 \cdot y - 9(7) = 9 \cdot \frac{5}{9}(x - 4)$$

$$9y - 63 = 5(x - 4)$$

$$9y - 63 = 5x - 20$$

$$0 = 5x - 9y - 20 + 63$$

$$5x - 9y + 43 = 0$$

3   14.   Find the equation of a line that is perpendicular to the line $y = \frac{1}{4}x - 5$ and passes through the point $(-3, 1)$. Rewrite your answer in slope-intercept form.

$$m = -4$$

$$x_1, y_1$$

$$y - y_1 = m(x - x_1)$$

$$y - 1 = -4(x + 3)$$

$$y - 1 = -4x - 12$$

$$y = -4x - 12 + 1$$

$$y = -4x - 11$$

3   15.   Line segment OT has endpoints O (3, –7) and T (8, 11).
Line segment VL has endpoints V (–1, –2) and L (4, 2).

Are these two line segments parallel, perpendicular, or neither?

$$M_{OT} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$M_{OT} = \frac{11 - (-7)}{8 - 3}$$

$$M_{OT} = \frac{18}{5}$$

$$M_{VL} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$M_{VL} = \frac{2 - (-2)}{4 - (-1)}$$

$$M_{VL} = \frac{4}{5}$$

16.   To join a private pool league, there is a monthly cost plus a cost per evening. To play 4 evenings, it costs \$22. To play 9 evenings, it costs \$37.

2   (A) Determine the equation that represents this pool league.

$$(4, 22)$$
$$(9, 37)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \rightarrow m = 3$$

$$m = \frac{37 - 22}{9 - 4}$$

$$m = \frac{15}{5}$$

$$y - 22 = 3(x - 4)$$

or

$$y - 37 = 3(x - 9)$$

1   (B) Rewrite the equation from part (A) in slope-intercept form.

$$y - 22 = 3(x - 4) \rightarrow y = 3x + 10$$

$$y - 22 = 3x - 12$$

$$y = 3x - 12 + 22$$

3   17.   The line $\overleftrightarrow{BD}$ is tangent to the circle at point $A(3, 5)$. If the centre of the circle is $C(-2, -1)$, write the equation of the tangent line $\overleftrightarrow{BD}$.
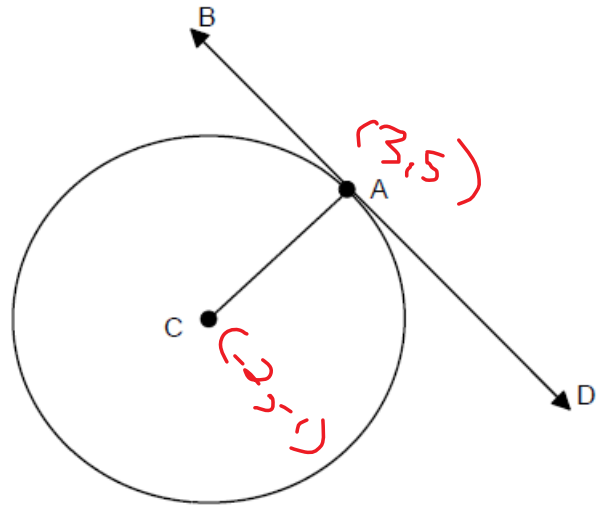
$m_{\overline{AC}} = \dfrac{y_2 - y_1}{x_2 - x_1}$

$m_{\overline{AC}} = \dfrac{5 - (-1)}{3 - (-2)}$

$m_{\overline{AC}} = \dfrac{6}{5}$

$\overline{AC} \perp \overline{BD}$

$y - 5 = -\dfrac{5}{6}(x - 3)$

B

$(3, 5)$
A

C
$(-2, -1)$

D

3   18. Determine the x and y-intercepts of the function and then graph:

$$2x - 3y - 12 = 0$$

x-int: y=0

$2x - 3(0) - 12 = 0$

$2x = 12$

$\frac{2x}{2} = \frac{12}{2}$

$x = 6$

$(6, 0)$

y-int: x=0

$2(0) - 3 - 12 = 0$

$-3y = 12$

$\frac{-3}{-3}y = \frac{12}{-3}$

$y = -4$

$(0, -4)$