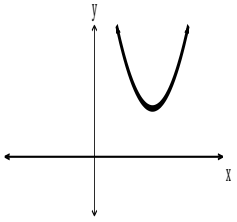
Math 2200 **Chapter 4 Review** **Name: _____**

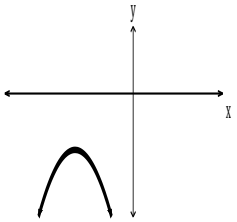
Part I: **Multiple Choice. Write the correct answer in the space provided at the end of this section.**

1. Which is a quadratic function with a positive discriminant?

(A)



(B)



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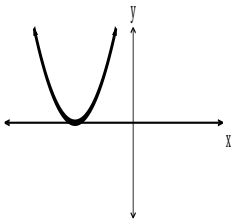

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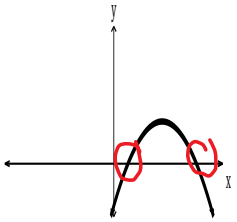


2. Which quadratic function has zeros of $\frac{3}{2}$ and -5 ?

(A) $f(x) = 2x^2 - 7x - 15$

(B) $f(x) = 2x^2 - 13x + 15$

(C) $f(x) = 2x^2 + 7x - 15$

(D) $f(x) = 2x^2 + 13x - 15$

$x = \frac{3}{2}$ $x = -5$

$2x = 3$ $x + 5 = 0$

$2x - 3 = 0$

$(2x-3)(x+5) = 0$

$2x^2 + 7x - 15$

3. Theresa's incorrect solution to the equation $4x^2 - 7x - 3 = 0$ is shown. In which step does the **first** error occur?

Step 1	$x = \frac{7 \pm \sqrt{(-7)^2 - (4)(4)(-3)}}{2(4)}$
Step 2	$x = \frac{7 \pm \sqrt{49 - 48}}{8}$
Step 3	$x = \frac{7 \pm \sqrt{1}}{8}$
Step 4	$x = 1, x = \frac{3}{4}$

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

4. What are the zeros of $y = (x - 2)(3x - 5)$?

$(x-2)(3x-5)=0$

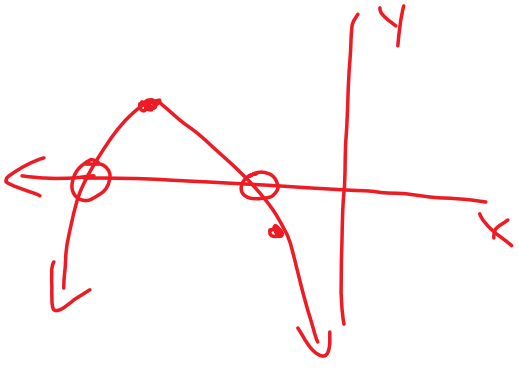
$x-2=0, 3x-5=0$

$x=2, x=5/3$

(A) $-2, -\frac{5}{3}$
(B) 0, 10
(C) $\frac{5}{3}, 2$
(D) 2, 5

5. Which describes the quadratic function that has vertex $(-9, 3)$ and passes through the point $(-4, -2)$?

(A) The axis of symmetry is $x = -9$ and the discriminant is negative.
(B) The axis of symmetry is $x = -9$ and the discriminant is positive.
(C) The axis of symmetry is $x = 9$ and the discriminant is negative.
(D) The axis of symmetry is $x = 9$ and the discriminant is positive.



6. Solve: $2x(x-3)+5(x-3)=0$

(A) $x=-3,\ x=-\frac{5}{2}$

(B) $x=-3,\ x=\frac{5}{2}$

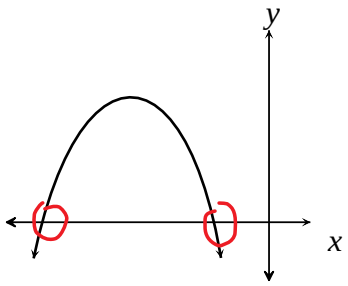
(C) $x=3,\ x=-\frac{5}{2}$

(D) $x=3,\ x=\frac{5}{2}$

$(x-3)(2x+5)=0$

$x=3,\ x=-5/2$

7. The graph of a quadratic function $f(x)$ is shown. What best describes the discriminant for $f(x)=0$?



(A) $D<0$

(B) $D=0$

(C) $D\geq 0$

(D) $D>0$

8. If $x=5$ is one root of the equation $x^2+kx+30=0$, what is the value of 'k'?

(A) -11

(B) -5

(C) 5

(D) 11

$5^2+k(5)+30=0$

$25+5k+30=0$

$\frac{5k}{5}=\frac{-55}{5}$

$k=-11$

9. Which equation would be used to determine two consecutive odd integers whose product is 143?

(A) $x(x+1)=143$

(B) $x(x+2)=143$

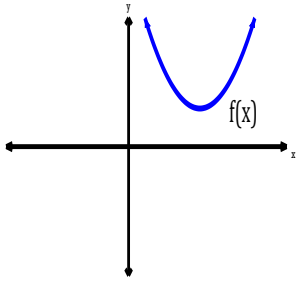
(C) $x(2x+1)=143$

(D) $(x+1)(x+2)=143$

$x,\ x+2$

$x(x+2)=143$

10. The graph of a quadratic function is shown. What is a possible value for the discriminant of the related equation $f(x) = 0$?



$D < 0$

(A) -1

(B) 0

(C) $\sqrt{2}$

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

11. What are the zeroes of the function $f(x) = 2x^2 - x - 3$?

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

$2x(x+1) - 3(x+1)$

$(x+1)(2x-3) = 0$

$x = -1, \; x = 3/2$

(A) $-\frac{3}{2}, 1$

(B) $-\frac{2}{3}, 1$

(C) $\frac{2}{3}, -1$

(D) $\frac{3}{2}, -1$

12. What value of n that will make the polynomial $36x^2 + nx + 16$ a perfect square trinomial?

$\sqrt{36} = 6$ $\quad$ $\sqrt{16} = 4$

$2(6 \times 4) = 48$

(A) 4

(B) 8

(C) 24

(D) 48

Answers to multiple choice.

1.___	**2.___**	**3.___**	**4.___**	**5.___**
6.___	**7.___**	**8.___**	**9.___**	**10.___**
11.___	**12.___**			

Part II: Constructed Response. Answer each question in the space provided.

13. Algebraically determine the **EXACT** roots, in simplest form, for:

$$2x(3x-1)=5$$

$6x^2-2x-5=0$

$x=\dfrac{-(-2)\pm\sqrt{(-2)^2-4(6)(-5)}}{2(6)}$

$x=\dfrac{2\pm\sqrt{124}}{12}$

$x=\dfrac{2\pm\sqrt{4}\sqrt{31}}{12}$

$x=\dfrac{2\pm2\sqrt{31}}{12}$

$x=\dfrac{1\pm\sqrt{31}}{6}$ → $x=\dfrac{1-\sqrt{31}}{6}$, $x=\dfrac{1+\sqrt{31}}{6}$

14. Algebraically determine the **EXACT** roots, in simplest form:

$$16(x^2 - 1) = 24(2x + 1)$$

$16x^2 - 16 = 48x + 24$

$16x^2 - 48x - 16 - 24 = 0$

$\frac{16x^2 - 48x - 40}{8} = \frac{0}{8}$

$2x^2 - 6x - 5 = 0$

$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(2)(-5)}}{2(2)}$

$x = \frac{6 \pm \sqrt{36 + 40}}{4}$

$x = \frac{6 \pm \sqrt{76}}{4}$

$x = \frac{6 \pm \sqrt{4}\sqrt{19}}{4}$

$x = \frac{6 \pm 2\sqrt{19}}{4}$

$x = \frac{3 \pm \sqrt{19}}{2}$

15. Algebraically determine the **EXACT** roots in simplest form for the equation:

$$5x(5x + 4) = -7$$

$25x^2 + 20x + 7 = 0$

$$x = \frac{-20 \pm \sqrt{20^2 - 4(25)(7)}}{2(25)}$$

$$x = \frac{-20 \pm \sqrt{-300}}{50}$$

$$x = \frac{-20 \pm \sqrt{100}\sqrt{3}\sqrt{-1}}{50}$$

$$x = \frac{-20 \pm 10\sqrt{3}\,i}{50}$$

$$x = \frac{-2 \pm \sqrt{3}\,i}{5}$$

16. Algebraically determine, the **EXACT** roots, in simplest form, for:

$$\frac{-3}{x} = x + 2 \quad | \cdot x$$

$$-3 = x^2 + 2x$$

$$0 = x^2 + 2x + 3$$

$$x = \frac{-2 \pm \sqrt{2^2 - 4(1)(3)}}{2(1)}$$

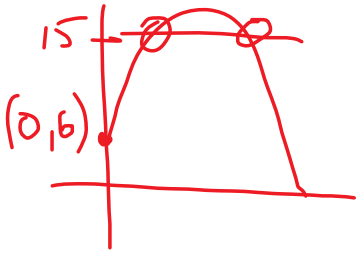
$$x = \frac{-2 \pm \sqrt{-8}}{2}$$

$$x = \frac{-2 \pm \sqrt{4}\sqrt{2}\sqrt{-1}}{2}$$

$$x = \frac{-2 \pm 2\sqrt{2}i}{2}$$

$$x = -1 \pm \sqrt{2}i$$

17. A toy rocket is launched in the air from a launcher located 6 m above the ground. The rocket's path is described by $h(t) = -5t^2 + 18t + 6$ where $h(t)$ is the height of the rocket above the ground t seconds after launch. At what times is the rocket 15 metres in the air?



$15 = -5t^2 + 18t + 6$

$5t^2 - 18t + 9 = 0$

$t = \frac{18 \pm \sqrt{(-18)^2 - 4(5)(9)}}{2(5)}$

$t = \frac{18 \pm \sqrt{144}}{10}$

$t = \frac{18 \pm 12}{10}$

$t = \frac{18+12}{10}$, $t = \frac{18-12}{10}$

$t = \frac{30}{10} = 3s$, $t = \frac{6}{10} = 0.6s$

Rocket is 15 m high at 0.6s and 3s.

18. Find two consecutive whole numbers such that the sum of their squares is 221.

$x, x+1$

$x^2 + (x+1)^2 = 221$

$x^2 + x^2 + 2x + 1 - 221 = 0$

$\frac{2x^2 + 2x - 220}{2} = \frac{0}{2}$

$x^2 + x - 110 = 0$

$(x - 10)(x + 11) = 0$

$x = 10, x = -11$

$x = 10$

$x + 1 = 10 + 1 = 11$

19. A toy rocket is launched in the air from a launcher located 6 m above the ground. The rocket's path is described by $h(t) = -5t^2 + 13t + 6$ where $h(t)$ is the height of the rocket above the ground t seconds after launch. How long is the rocket in the air?

$-5t^2 + 13t + 6 = 0$

$5t^2 - 13t - 6 = 0$

$x = \frac{-(-13) \pm \sqrt{(-13)^2 - 4(5)(-6)}}{2(5)}$

$x = \frac{13 \pm \sqrt{289}}{10}$

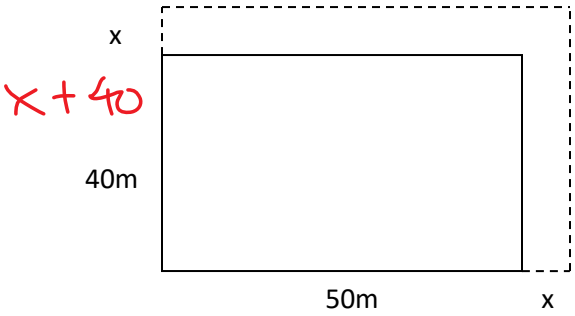
$x = \frac{13 \pm 17}{10}$

$x = \frac{13+17}{10}$, $x = \frac{13-17}{10}$

$x = \frac{30}{10} = 3s$, $x = -\frac{4}{10} = -0.4s$

The rocket is in the air for 3s.

20. The parking lot of a school is 40m by 50m. It is expanded by adding rectangular strips of equal widths, as shown in the diagram below. If the new parking lot has an area of $3575m^2$, what is the width of the strip?



$l \cdot w = A$

$(x+50)(x+40) = 3575$

$x^2 + 90x + 2000 - 3575 = 0$

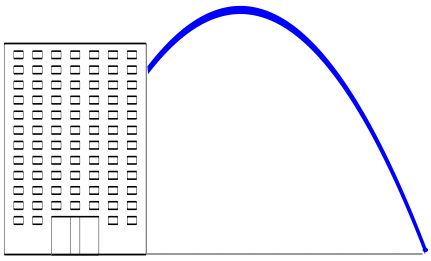
$x^2 + 90x - 1575 = 0$

$(x-15)(x+105) = 0$

$x = 15, x = -105$

The strip is 15m wide.

21. A ball is thrown from a balcony on a building and its path is represented by The function $y = -5x^2 + 20x + 60$, where x is the distance,in meters, from the building along the ground, and y is the height, in meters, above the ground. If the parking lot extends 5 m from the building, will the ball land on the parking lot or beyond?



$$\frac{0 = -5x^2 + 20x + 60}{-5}$$

$$x^2 - 4x - 12 = 0$$

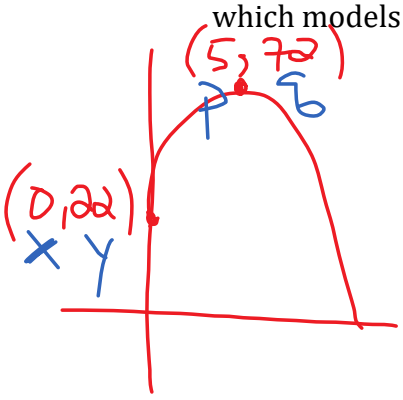
$$(x + 2)(x - 6) = 0$$

$$x = \cancel{-2}, \; x = 6$$

$$6 > 5$$

$\therefore$ Ball lands beyond the parking lot.

22. An arrow is fired from a building at an initial height of 22 metres and reaches a maximum height of 72 metres, 5 seconds after it is fired. Write a quadratic equation which models this situation use it to determine when the arrow hits the ground.



$y = a(x-p)^2 + q$

$22 = a(0-5)^2 + 72$

$22 - 72 = 25a$

$\frac{-50}{25} = \frac{25a}{25}$

$a = -2$

$y = -2(x-5)^2 + 72$

$0 = -2(x-5)^2 + 72$

$\frac{2(x-5)^2}{2} = \frac{72}{2}$

$\sqrt{(x-5)^2} = \sqrt{36}$

$x - 5 = \pm 6$

$x - 5 = -6, \quad x - 5 = 6$

~~$x = -1$~~ , $x = 11$

Arrow hits the ground at 11s.