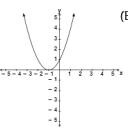
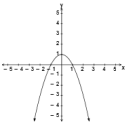
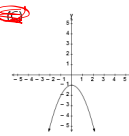
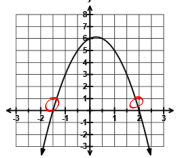


Mathematics 2200
Quadratic Equations

Name: _____

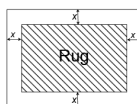
Part I: Multiple Choice - Place the letter of the correct answer in the space provided.

- What are the zeros of $f(x) = 3x(x-2)$?
(A) {3,2} (B) {3,-2} (C) {0,2} (D) {0,-2}
Handwritten: $3x = 0 \Rightarrow x = 0$, $x - 2 = 0 \Rightarrow x = 2$
- What are the roots of $x^2 - 24 = 10x$?
(A) {-6,-4} (B) {-12,2} (C) {6,4} (D) {-12,12}
Handwritten: $x^2 - 10x - 24 = 0$, $(x-12)(x+2) = 0$, $x = 12$, $x = -2$
- If $x = 5$ is one root of the equation $x^2 + kx + 40 = 0$, what is the value of 'k'?
(A) -13 (B) -10 (C) 10 (D) 13
Handwritten: $25 + 5k + 40 = 0$, $5k + 65 = 0$, $5k = -65$, $k = -13$
- What are the x-intercepts of the graph of $y = 3x^2 + 2x - 8$?
(A) {-6,4} (B) ~~{-2, 4/3}~~ (C) {2, -4/3} (D) {6,-4}
Handwritten: $3x^2 + 2x - 8 = 0$, $(3x-4)(x+2) = 0$, $x = 4/3$, $x = -2$
- What are the exact roots in simplest form of $3x^2 - 24 = 0$?
(A) $\sqrt{8}$ (B) $\pm\sqrt{8}$ (C) $2\sqrt{2}$ (D) $\pm 2\sqrt{2}$
Handwritten: $3x^2 = 24$, $x^2 = 8$, $x = \pm\sqrt{8}$
- Which is a quadratic equation having roots $\frac{1}{3}$ and 5?
(A) $3x^2 + 14x + 5 = 0$ (B) $3x^2 + 16x + 5 = 0$
(C) $3x^2 + 14x - 5 = 0$ (D) $3x^2 - 16x + 5 = 0$
Handwritten: $(x-5)(3x-1) = 0$, $x = \pm\sqrt{8}$
- Solve $(x-3)^2 = 25$.
(A) {8} (B) {2} (C) {-2, 8} (D) {2, -8}
Handwritten: $x - 3 = \pm 5$, $x = 3 \pm 5$
- Which quadratic equation has roots $1 + \sqrt{5}$ and $1 - \sqrt{5}$?
(A) $x^2 + 2x - 4 = 0$ (B) $x^2 - 2x - 4 = 0$ (C) $x^2 + 2x - 6 = 0$ (D) $x^2 - 2x - 6 = 0$
- Solve: $2x(x+7) = 5(x+7)$.
(A) {3} (B) {2} (C) {3, -7} (D) {2, -7}
Handwritten: $2x^2 + 14x = 5x + 35$
- Factor completely: $5(x+2)^2 + 3(x+2) - 2$.
(A) ~~$(5x+8)(x+3)$~~ (B) $(x)(x+7)$ (C) $(5x+10)(x+2)$ (D) $(x)(5x+11)$
Handwritten: Let $m = (x+2)$, $5m^2 + 3m - 2 = (5m-2)(m+1)$, $(5(x+2)-2)(x+2+1)$, $(5x+10-2)(x+3)$

- Factor completely: $9(x+4)^2 - (2x-1)^2$.
(A) $(-x+5)(3x+3)$ (B) $(5x+11)(x+13)$ (C) $(5x+11)(x+11)$ (D) $(11x+35)(7x+37)$
- What is the discriminant of the quadratic equation $3x^2 - 5x - 1 = 0$?
(A) $\sqrt{13}$ (B) $\sqrt{37}$ (C) 13 (D) 37
Handwritten: $b^2 - 4ac = 25 - 4(3)(-1) = 37$
- Which values of k will make $3x^2 + kx - 1$ factorable?
(A) -2 and 2 (B) -2 and 1 (C) 3 and -1 (D) -3 and 1
- Which graph represents a quadratic function with a discriminant of -1?
(A)  (B)  (C) 
Handwritten: (C) is circled.
- What is the value of 'a' if $0 = ax^2 - 5x + 2$ has a discriminant of 3?
(A) $-\frac{7}{2}$ (B) $-\frac{11}{4}$ (C) $\frac{11}{4}$ (D) $\frac{7}{2}$
Handwritten: $(-5)^2 - 4a(2) = 3$, $25 - 8a = 3$, $-8a = -22$, $8a = 22$, $a = \frac{11}{4}$
- What is the value of 'k' if $2x^2 - 3x + k = 0$ has two equal real roots?
(A) $-\frac{9}{8}$ (B) $\frac{3}{4}$ (C) $-\frac{9}{8}$ (D) $\frac{3}{4}$
Handwritten: $(-3)^2 - 4(2)k = 0$, $9 - 8k = 0$, $8k = 9$, $k = \frac{9}{8}$
- What value of c will make $x^2 + 5x + c$ a perfect square trinomial?
(A) $\frac{5}{2}$ (B) $\frac{25}{4}$ (C) $\frac{25}{4}$ (D) 25
Handwritten: (C) is circled.
- The graph of $f(x) = -2x^2 + x + 6$ is shown. What are the zeros of the function?
(A) $\frac{3}{2}$ & -2 (B) $-\frac{3}{2}$ & 2 (C) 0 & 6 (D) 0 & -6


Part II: Answer all questions in the space provided. Show ALL workings to be awarded full marks.

19. A rectangular rug 4 m by 2 m is placed in a room with floor area 24 m² such that a strip of bare floor of uniform width surrounds the rug. Set up a quadratic equation which models this situation and use it to algebraically determine the width of the strip of bare floor.



$$A = L \times W$$

$$24 = (4+2x)(2+2x)$$

$$24 = 8 + 8x + 4x + 4x^2$$

$$0 = 4x^2 + 12x - 16$$

$$0 = 4(x^2 + 3x - 4)$$

$$0 = (x+4)(x-1)$$

$x = -4$ & $x = +1$

22. 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. Algebraically determine the length of time the rocket is in the air? Round your answer to the nearest tenth.

\rightarrow irrelevant

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

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

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

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

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

$$t = \frac{30}{10} \quad \text{or} \quad \frac{-4}{10}$$

$$t = 3.0 \quad t = -0.4$$

23. A ball is thrown in the air from the top of a building, and falls to the ground. The height, h , in metres, of the ball t seconds after it has been thrown is given by the equation $h(t) = -2t^2 + 16t + 96$. Algebraically determine the two times when the ball is at a height of 126 m.

$$-2t^2 + 16t + 96 = 126$$

$$-2t^2 + 16t - 30 = 0$$

$$2t^2 - 16t + 30 = 0$$

$$t^2 - 8t + 15 = 0$$

$$(t-3)(t-5) = 0$$

$$t = 3 \quad t = 5$$

24. Algebraically determine the EXACT roots in simplest form for $\frac{5}{x-3} = \frac{x}{x+1}$

Cross multiply

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

$$5x+5 = x^2-3x$$

$$0 = x^2-8x-5$$

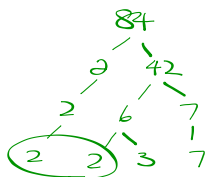
$$x = \frac{8 \pm \sqrt{(-8)^2 - 4(1)(-5)}}{2(1)}$$

$$= \frac{8 \pm \sqrt{64+20}}{2}$$

$$= \frac{8 \pm \sqrt{84}}{2}$$

$$= \frac{8 \pm 2\sqrt{21}}{2}$$

$$= \frac{4 \pm \sqrt{21}}{1}$$



TEST TOMORROW

→ 12 Multiple Choice

→ 4 Long Answer

x Should know

1. solve by.

→ graphing

→ complete square (square root property)

→ factoring

→ quadratic formula

2. Problem Solving

→ Area

→ Height of Rocket

3. Discriminant

$$d = b^2 - 4ac$$

Dec 2-10:50 AM