

MULTIPLE CHOICE SECTION

B 1. Considering factoring, what are all solutions of $x^2 - 5x + 4 = 0$?
 A. 2, 2
 B. 4, 1
 C. 4, -1
 D. -2, -2

B 2. What are the solutions of $x^2 = 16$?
 A. 4
 B. 4, -4
 C. -8, -2
 D. 0, 16

A 3. If you solve by square roots method, the solution of $x^2 - 15 = 34$ is....
 A. ± 7
 B. 7
 C. ± 49
 D. $\pm 7i$

D 4. The roots of $x^2 + 29 = 4$
 A. $\pm\sqrt{5}$
 B. ± 5
 C. $\pm 4i$
 D. $\pm 5i$

C 5. Solve $(x-8)(2x+1) = 0$ using the Zero Product Property.
 A. $x = -8$ or $x = -\frac{1}{2}$
 B. $x = -8$ or $x = \frac{1}{2}$
 C. $x = 8$ or $x = -\frac{1}{2}$
 D. $x = 8$ or $x = \frac{1}{2}$

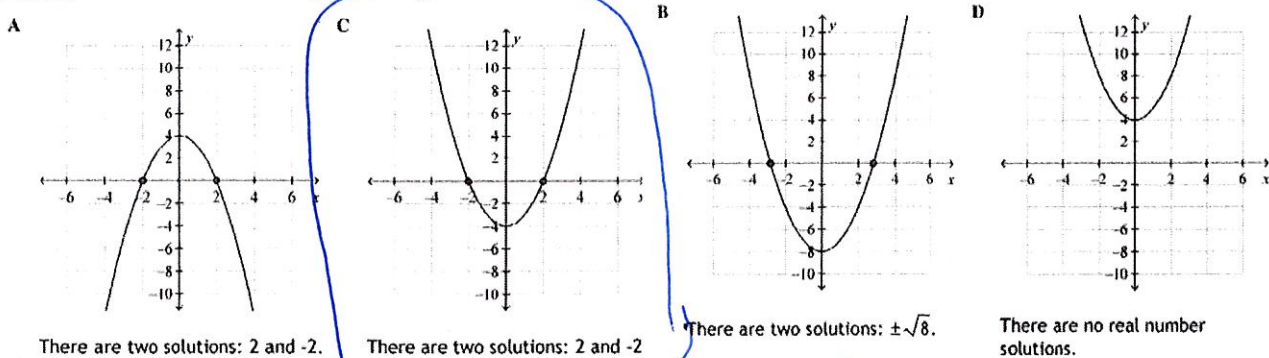
D 6. What are the zeros of $4x^2 - 28x = 0$?
 A. 4, 7
 B. 0, -7
 C. 0, 4
 D. 0, 7

Factoring $4x(x-7) = 0$
 $\frac{4x}{4} = 0$ $\frac{x-7}{1} = 0$
 $x = 0$ $x = 7$

A 7. Find the zeros of the function $x^2 + 23x + 60 = 0$ by factoring.
 A. $x = -20$ and $x = -3$
 B. $x = 4$ or $x = 15$
 C. $x = -4$ or $x = -15$
 D. $x = 20$ or $x = 3$

B 8. Find the roots of $x^2 + 4x - 5 = 0$.
 A. -5
 B. -5 and 1
 C. -2 and -9
 D. 5 and -1

C 9. Solve $x^2 + 2 = 6$ by graphing the related function.



D 10. Find the x-intercepts of the following: $30x^2 - 45 = 5x^2$.
 A. $x = -9$
 B. $x = -3$
 C. $x = 9$
 D. $x = 3$

$5x^2 - 30x + 45 = 0$
 $5(x^2 - 6x + 9) = 0$
 $5(x-3)(x-3) = 0$
 $x-3 = 0$
 $x = 3$

1 solution

C 11. Solve by completing the square or quadratic formula: $x^2 + 2x - 6 = 0$
 A. 2.24, 2.65
 B. -8, 6
 C. 1.65, -3.65
 D. 1.24, -3.24

$x^2 + 2x + 1 = 6 + 1$
 $(x+1)^2 = 7$
 $x+1 = \pm\sqrt{7}$
 $x = -1 \pm\sqrt{7}$

$x = -1 \pm\sqrt{7}$

Give the answer to this problem in radical form.

D 12. Solve by completing the square: $x^2 - 6x = -15$

- A. $-3 \pm 2i\sqrt{6}$ B. $3 \pm \sqrt{6}$
 C. $-3 \pm 2\sqrt{6}$ D. $3 \pm i\sqrt{6}$

$x^2 - 6x + 9 = -15 + 9$
 $\sqrt{(x-3)^2} = \sqrt{-6}$
 $x-3 = \pm i\sqrt{6}$

$x = 3 \pm i\sqrt{6}$

C 13. Solve by quadratic formula: $a^2 - 23a + 126 = 0$

What are you using for $a = \underline{1}$ $b = \underline{-23}$ and $c = \underline{126}$?

- A. 18, 28 B. -9, -14
C. 9, 14 D. -18, 28

D 14. Using the quadratic formula, the exact solutions in radical form of $x^2 + 5x + 2 = 0$ are...

- A. $\frac{5 \pm \sqrt{33}}{2}$ B. $\frac{5 \pm \sqrt{17}}{2}$
 C. $\frac{-5 \pm \sqrt{33}}{2}$ D. $\frac{-5 \pm \sqrt{17}}{2}$

$x = \frac{-5 \pm \sqrt{25 - 4(1)(2)}}{2}$
 $= \frac{-5 \pm \sqrt{17}}{2}$

C 15. When the discriminant is a value greater than 0 (positive), then the quadratic equation has real solutions.

- A. 0 B. 1 C. 2

A 16. When the discriminant is a value less than 0 (negative), then the quadratic equation has real solutions.

- A. 0 B. 1 C. 2

B 17. When the discriminant is a value = 0, then the quadratic solution has real solutions.

- A. 0 B. 1 C. 2

C 18. If an equation reads $6x^2 + 17x - 13 = 0$, then the number of real solutions this equation will have is:

- A. 0 B. 1 C. 2

$b^2 - 4ac$ $17^2 - 4(6)(-13)$
 $= 601$ (positive)

C 19. If a quadratic equation reads $3x^2 + 15x + 8 = 0$, then the number of real solutions is...

- A. 0 B. 1 C. 2

$b^2 - 4(3)(8)$
 $= 129$ (positive)

SHORT ANSWER SECTION (3 points each)

$2i\sqrt{10}$ 20. Simplify: $\sqrt{-40}$ ~~$\sqrt{4} \cdot 10$~~

$14i\sqrt{3}$ 21. Simplify: $2\sqrt{-147}$ ~~$2\sqrt{49} \cdot 3$~~

x^2 22. Every quadratic equation MUST contain this.....

$x = -2, 1$ 23. What are the roots of the parabola shown here?

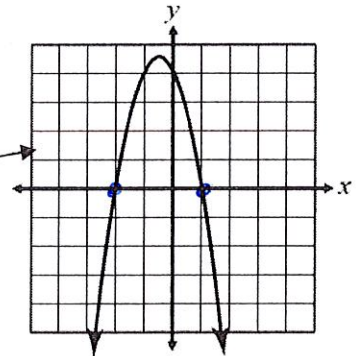
$\pm 2i\sqrt{2}$ 24. Solve by square roots method: $x^2 + 8 = 0$ (show your work)
 $\sqrt{x^2} = \sqrt{-8}$ $x = \pm 2i\sqrt{2}$

$x = 0, -6$ 25. Solve by factoring: $5x^2 + 30x = 0$ (show your work)

$5x(x+6) = 0$
 $5x = 0$ $x+6 = 0$
 $x = 0$ $x = -6$

$x = 2, 45$ 26. Solve by factoring: $x^2 - 47x = -90$ (show your work)

$x^2 - 47x + 90 = 0$
 $(x-45)(x-2) = 0$
 $x-45 = 0$ $x-2 = 0$
 $x = 45$ $x = 2$



Factor completely.

27. Mixed Review of Factoring.

a. $x^2 - 7x + 12$

$(x-3)(x-4)$

b. $x^2 + 4x - 12$

$(x+6)(x-4)$

c. $x^2 + 12x + 32$

$(x+4)(x+8)$

d. $x^2 - 10x + 21$

$(x-7)(x-3)$

e. $2x^2 - 13x + 6$

$(2x-1)(x-6)$

f. $4x^2 - 18x + 20$

$2(2x^2 - 9x + 10)$
 $2(2x-5)(x-2)$

g. $6x^2 - 26x - 20$

$2(3x^2 - 13x - 10)$
 $2(3x+2)(x-5)$

h. $5x^2 - 9x - 2$

$(5x+1)(x-2)$

i. $x^2 - 64$

$(x-8)(x+8)$

j. $25 - 9x^2$

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

k. $x^2 - 10x + 25$

$(x-5)(x-5)$
or
 $(x-5)^2$

l. $5t^3 - 80t$

$5t(t^2 - 16)$
 $5t(t-4)(t+4)$

m. $1 - 2x + x^2$

$(1-x)(1-x)$
 $(1-x)^2$

n. $14x + 18x^2$

$2x(7+9x)$

o. $2x^2 + 10x + 8$

$2(x^2 + 5x + 4)$
 $2(x+1)(x+4)$

28. Solve each quadratic equation for solutions of "x". These are called **Roots, Solutions, X-Intercepts, or Zeros**.

Solve by Square Roots

A. $16x^2 - 1 = 0$

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

$x = \frac{1}{4}, -\frac{1}{4}$

B. $\sqrt{(x-5)^2} = \sqrt{4}$

$x-5 = \pm 2$

$x = 5 \pm 2$

$x = 3, 7$

C. $-3x^2 + 11 = 17$

$-3x^2 = 6$
 $\frac{-3x^2}{-3} = \frac{6}{-3}$

$x^2 = -2$

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

29. Solve by Factoring:

A. $x^2 - 11x + 18 = 0$

$(x-2)(x-9) = 0$

$x = 2, x = 9$

B. $2x^2 - 32x + 128 = 0$

$2(x^2 - 16x + 64) = 0$

$2(x-8)(x-8) = 0$

$x = 8$ (real solution)

C. $8x^2 + 10x = 0$

$2x(4x+5) = 0$

$2x = 0$ $4x+5 = 0$

$x = 0$ $x = -\frac{5}{4}$

or -1.25

D. $7x^2 - 19x - 6 = 0$

$(7x+2)(x-3) = 0$

$7x+2 = 0$ $x-3 = 0$

$x = -\frac{2}{7}$ $x = 3$

30. Solve by Completing the Square.

A. $x^2 - 8x - 10 = 0$
 $x^2 - 8x + 16 = 10 + 16$
 $(x-4)(x-4) = 26$
 $\sqrt{(x-4)^2} = \sqrt{26}$
 $x-4 = \pm\sqrt{26}$
 $x = 4 \pm \sqrt{26}$

B. $-4x^2 - 48x - 20 = 0$
 $-4x^2 - 48x - 20 = 0$
 $x^2 + 12x + 30 = -5 + 30$
 $(x+6)^2 = 31$
 $x = -6 \pm \sqrt{31}$

C. $x^2 + 6x = 11$
 $x^2 + 6x + 9 = 11 + 9$
 $\sqrt{(x+3)^2} = \sqrt{20}$
 $x+3 = \pm 2\sqrt{5}$
 $x = -3 \pm 2\sqrt{5}$

31. Solve by Quadratic Formula

A. $2x^2 - 20x + 30 = -20$
 $2x^2 - 20x + 50 = 0$
 Could use $a=2$ $b=-20$ $c=50$
 or factor out 2
 $2(x^2 - 10x + 25)$
 $a=1$ $b=-10$ $c=25$
 $x = \frac{10 \pm \sqrt{100 - 4(1)(25)}}{2}$
 $= \frac{10 \pm 0}{2} = 5$ solution

B. $x^2 + 12x + 43 = 0$
 $a=1$ $b=12$ $c=43$
 $x = \frac{-12 \pm \sqrt{144 - 4(1)(43)}}{2(1)}$
 $= \frac{-12 \pm \sqrt{-28}}{2}$
 $= \frac{-12 \pm 2i\sqrt{7}}{2}$
 $= -6 \pm i\sqrt{7}$

C. $x^2 + 5x - 7 = 0$
 $a=1$ $b=5$ $c=-7$
 $x = \frac{-5 \pm \sqrt{25 - 4(1)(-7)}}{2(1)}$
 $x = \frac{-5 \pm \sqrt{53}}{2}$ radical form
 $x = 1.14, -6.14$ decimal form

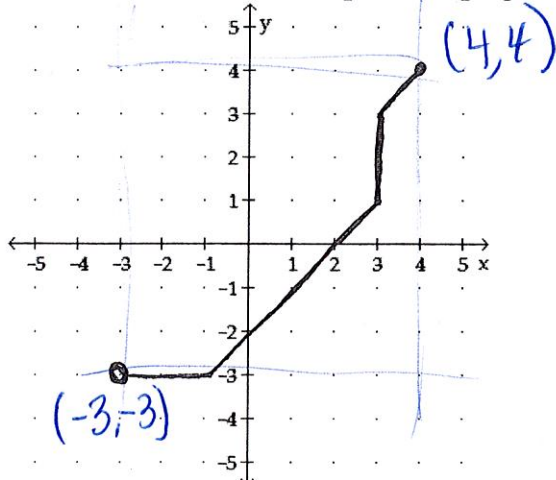
32. Solve each quadratic equation for solutions of "x". MUST show some work or sketch to support your answer.

Method of Choice: factoring
 e. $x^2 - 7x - 6 = 2$
 $x^2 - 7x - 8 = 0$
 $(x+1)(x-8) = 0$
 $x = -1$ $x = 8$

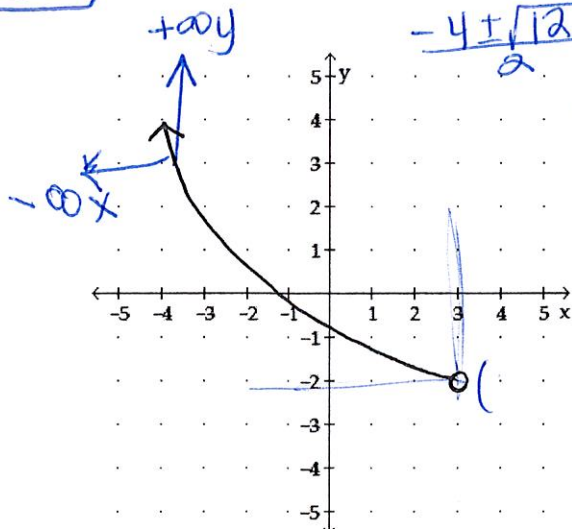
f. $3x^2 + 7 = 0$ sq. roots
 $\frac{3x^2}{3} = \frac{-7}{3}$
 Get x^2 by itself
 $x^2 = -\frac{7}{3}$
 $x = \pm i\sqrt{\frac{7}{3}}$

g. $2x^2 + 8x = -2$
 $2x^2 + 8x + 2 = 0$
 $2(x^2 + 4x + 1) = 0$
 Quad formula won't factor anymore.
 $a=1$ $b=4$ $c=1$
 $x = \frac{-4 \pm \sqrt{16 - 4(1)(1)}}{2}$
 $= \frac{-4 \pm \sqrt{12}}{2}$
 $= \frac{-4 \pm 2\sqrt{3}}{2}$
 $= -2 \pm \sqrt{3}$ radical answer
 $x = -2.68, -1.32$

33. Find the Domain and Range of the graphs:



D: $-3 < x \leq 4$ R: $-3 < y \leq 4$



D: $-\infty < x < 3$ or $x < 3$ R: $-2 < y < \infty$ or $y > -2$