

SOLUTIONS => CHAPTERS 3 & 4 REVIEW

1. $y = (x+9)(x-5)$
 $x+9=0$ $x-5=0$
 $x=-9$ $x=5$

A

x-ints: -9 and 5

2. $y = 7(x+5)^2 - 8$

Vertex: (-5, -8)
↑Axis of Symmetry: $x = -5$

B

3. $y = -6(x+3)^2 + 9$

Vertex: (-3, 9) Opens Downward
↑Domain: $\{x \mid x \in \mathbb{R}\}$ Range: $\{y \mid y \leq 9, y \in \mathbb{R}\}$

A

$$4. y = \frac{3}{4}(x+1)^2 + 9$$

Vertex: $(-1, 9)$ Opens Upward

C

$$5. y = -2x^2 + 8x + 9 \quad (\text{To find vertex} \rightarrow \text{"complete the square"})$$

$$y = -2(x^2 - 4x) + 9$$

$$y = -2(x^2 - 4x + 4 - 4) + 9$$

$$y = -2[(x^2 - 4x + 4) - 4] + 9$$

$$y = -2[(x-2)^2 - 4] + 9$$

$$y = -2(x-2)^2 + 8 + 9$$

$$y = -2(x-2)^2 + 17$$

Vertex: $(2, 17)$

A

$$6. y = 3(x+2)^2 - 7 \quad (\text{Vertex Form})$$

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

$$y = 3(x^2 + 2x + 2x + 4) - 7$$

$$y = 3(x^2 + 4x + 4) - 7$$

$$y = 3x^2 + 12x + 12 - 7$$

$$y = 3x^2 + 12x + 5 \quad (\text{Standard Form})$$

A

$$7. -2x^2 - 54x - 340 = 0$$

$$a = -2, b = -54, c = -340$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{54 \pm \sqrt{(-54)^2 - 4(-2)(-340)}}{2(-2)}$$

$$x = \frac{54 \pm \sqrt{2916 - 2720}}{-4}$$

$$x = \frac{54 \pm \sqrt{196}}{-4}$$

$$x = \frac{54 \pm 14}{-4}$$

$$x = \frac{54 + 14}{-4} \quad \text{and} \quad x = \frac{54 - 14}{-4}$$

$$x = \frac{68}{-4}$$

$$x = \frac{40}{-4}$$

$$x = -17$$

$$x = -10$$

D

$$8. \quad 2x^2 - 24x = 26$$

$$2x^2 - 24x - 26 = 0$$

$$a=2, \quad b=-24, \quad c=-26$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{24 \pm \sqrt{(-24)^2 - 4(2)(-26)}}{2(2)}$$

$$x = \frac{24 \pm \sqrt{576 + 208}}{4}$$

$$x = \frac{24 \pm \sqrt{784}}{4}$$

$$x = \frac{24 \pm 28}{4}$$

$$x = \frac{24+28}{4} \quad \text{and} \quad x = \frac{24-28}{4}$$

$$x = \frac{52}{4}$$

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

$$x = 13$$

$$x = -1$$

C

9. $81x^2 - 400 = 0$ (Diff. of Squares)

$$(9x-20)(9x+20) = 0$$

$$9x-20=0 \quad 9x+20=0$$

$$\frac{9x}{9} = \frac{20}{9}$$

$$x = \frac{20}{9}$$

$$\frac{9x}{9} = \frac{-20}{9}$$

$$x = \frac{-20}{9}$$

A

10. $(x-12)(x+11) = 0$

$$x-12=0 \quad x+11=0$$

$$x=12 \quad x=-11$$

D

11. $x^2 + 22x + k$

$$k = \left(\frac{22}{2}\right)^2$$

$$k = (11)^2$$

$$k = 121$$

C

12. $y = 4.9x^2 - 0.5x + 8.7$ (Discriminant)

$$a=4.9, b=-0.5, c=8.7$$

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

$$= (-0.5)^2 - 4(4.9)(8.7)$$

$$= 0.25 - 170.52$$

$$= -170.27$$

Since $D < 0$, no real roots.

C

$$\begin{aligned}
 13. \quad & 4x^2 + 24x - 64 \\
 & = 4(x^2 + 6x - 16) \\
 & = 4(x-2)(x+8)
 \end{aligned}$$

B

$$\begin{aligned}
 14. \quad & x^2 + 5x - 300 \\
 & (x+20)(x-15)
 \end{aligned}$$

A

MATCHING

1. $y = -x^2 - 6x - 6 \Rightarrow A$
2. $y = x^2 - 3x - 3 \Rightarrow B$
3. $y = -(x+3)^2 + 6 \Rightarrow C$
4. $y = -2(x+3)^2 + 6 \Rightarrow D$
5. $y = -(x+6)^2 + 3 \Rightarrow E$

SHORT ANSWER

$$\begin{aligned}
 1. \quad & y = -3x^2 + 12x - 10 \text{ (Standard Form)} \\
 & y = -3(x^2 - 4x) - 10 \\
 & y = -3(x^2 - 4x + 4 - 4) - 10 \\
 & y = -3[(x^2 - 4x + 4) - 4] - 10 \\
 & y = -3[(x-2)^2 - 4] - 10 \\
 & y = -3(x-2)^2 + 12 - 10 \\
 & y = -3(x-2)^2 + 2
 \end{aligned}$$

$$2. \quad x^2 + 32x + k$$

$$k = \left(\frac{32}{2}\right)^2$$

$$k = (16)^2$$

$$k = 256$$

$$3. \quad 2(x-2)^2 + 20(x-2) + 48$$

$$\text{let } r = x - 2$$

$$\begin{aligned} \Rightarrow & 2r^2 + 20r + 48 \\ & = 2(r^2 + 10r + 24) \\ & = 2(r+4)(r+6) \\ & = 2[(x-2)+4][(x-2)+6] \\ & = 2(x+2)(x+4) \end{aligned}$$

$$4. \quad x^2 + 4x - 21 = 0$$

$$a=1, b=4, c=-21$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-4 \pm \sqrt{(4)^2 - 4(1)(-21)}}{2(1)}$$

$$x = \frac{-4 \pm \sqrt{16 + 84}}{2}$$

$$x = \frac{-4 \pm \sqrt{100}}{2}$$

$$x = \frac{-4 \pm 10}{2}$$

$$x = \frac{-4 + 10}{2} \quad \text{and} \quad x = \frac{-4 - 10}{2}$$

$$x = \frac{6}{2}$$

$$x = \frac{-14}{2}$$

$$x = 3$$

$$x = -7$$

$$5. \quad y = 3x^2 - 10x + 6$$

$$a=3, b=-10, c=6$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{10 \pm \sqrt{(-10)^2 - 4(3)(6)}}{2(3)}$$

$$x = \frac{10 \pm \sqrt{100 - 72}}{6}$$

$$x = \frac{10 \pm \sqrt{28}}{6}$$

$$x = \frac{10 \pm \sqrt{(2)(2)(7)}}{6}$$

$$x = \frac{10 \pm 2\sqrt{7}}{6}$$

$$x = \frac{5 \pm \sqrt{7}}{3} \quad (\text{Exact Roots})$$