SOLUTIONS => CHAPTERS 3 & 4 REVIEW

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

$x+9=0 \quad x-5=0$

$x=-9 \quad x=5$ A

x-ints: -9 and 5

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

Vertex: $(-5,-8)$

Axis of Symmetry: $x=-5$ B

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

Vertex: $(-3,9)$ Opens Downward

Domain: $\{x|x\in R\}$ Range: $\{y|y\leq 9, y\in R\}$

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

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

5. $y=-2x^2+8x+9$ (To find vertex → "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. $y = 3(x+2)^2-7$ (Vertex Form)

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

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

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

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

$y = 3x^2+12x+5$ (Standard Form) A

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

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

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

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

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

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

$$x=\frac{54\pm14}{-4}$$

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

$$x=\frac{68}{-4} \qquad x=\frac{40}{-4}$$

$$x=-17 \qquad x=-10$$

D

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

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

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

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

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

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

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

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

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

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

$$x = 13 \qquad x = -1$$

C

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

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

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

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

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

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

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

$x=12 \qquad x=-11$ 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

13. $4x^2+24x-64$
$= 4(x^2+6x-16)$
$= 4(x-2)(x+8)$ B

14. $x^2+5x-300$
$(x+20)(x-15)$ 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

1. $y=-3x^2+12x-10$ (Standard Form)
$y=-3(x^2-4x)-10$
$y=-3(x^2-4x+4-4)-10$
$y=-3[(x^2-4x+4)-4]-10$
$y=-3[(x-2)^2-4]-10$
$y=-3(x-2)^2+12-10$
$y=-3(x-2)^2+2$

2. $x^2+32x+K$

$K=\left(\frac{32}{2}\right)^2$
$K=(16)^2$
$K=256$

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

Let $r = x-2$

$\Rightarrow 2r^2+20r+48$
$= 2(r^2+10r+24)$
$= 2(r+4)(r+6)$
$= 2[(x-2)+4][(x-2)+6]$
$= 2(x+2)(x+4)$

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

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

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

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

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

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

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

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

$$x = \frac{6}{2} \qquad x = \frac{-14}{2}$$

$$x = 3 \qquad x = -7$$

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

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

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

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

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

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

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

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

$$x = \frac{5 \pm 1\sqrt{7}}{3}$$ (Exact Roots)