

CW Unit 12 Review

Find the discriminant of each quadratic equation then state the number of solutions.

1) $6v^2 + v + 5 = 0$

$b^2 - 4ac$

-119; zero real solutions

$(1)^2 - 4(6)(5)$

$1 - 120$

-119

2) $-v^2 - 8v - 7 = 0$

36; two real solutions

$(-8)^2 - 4(-1)(-7)$

$64 - 28$

36

3) $-9p^2 - 2p + 4 = -3$

256; two real solutions

$-9p^2 - 2p + 7 = 0$

$(-2)^2 - 4(-9)(7)$

$4 + 252$

256

4) $v^2 + 15v + 9 = 9v$

0; one real solution

$v^2 + 6v + 9 = 0$

$(6)^2 - 4(1)(9)$

$36 - 36$

0

Solve each equation by completing the square.

5) $v^2 - 2v - 70 = 2$

$\{1 + \sqrt{73}, 1 - \sqrt{73}\}$

$v^2 - 2v + 1 = 72 + 1$

$\sqrt{(v-1)^2} = \pm\sqrt{73}$

$v-1 = \pm\sqrt{73}$

$v = 1 \pm\sqrt{73}$

6) $4x^2 + 16x - 20 = 0$

$\{1, -5\}$

$4(x^2 + 4x) = 20$

$4(x^2 + 4x + 4) = 20 + 16$

$4(x+2)^2 = 36$

$\sqrt{(x+2)^2} = \pm\sqrt{9}$

$x+2 = \pm 3 \rightarrow 1$

-1-

$x = -2 \pm 3 \rightarrow -5$

Solve each equation with the quadratic formula.

7) $10x^2 - 2x - 23 = 0$

$$\left\{ \frac{1 + \sqrt{231}}{10}, \frac{1 - \sqrt{231}}{10} \right\}$$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(10)(-23)}}{2(10)}$$

$$x = \frac{2 \pm \sqrt{4 + 920}}{20}$$

$$x = \frac{2 \pm \sqrt{924}}{20} = \frac{2 \pm 2\sqrt{231}}{20} = \frac{1 \pm \sqrt{231}}{10}$$

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

8) $6x^2 - 12x + 3 = -9$

No solution.

$$6x^2 - 12x + 12 = 0$$

$$x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(6)(12)}}{2(6)}$$

$$x = \frac{12 \pm \sqrt{144 - 288}}{12} = \frac{12 \pm \sqrt{-144}}{12}$$

No solution

Solve each equation using any method.

9) $3n^2 + 9n - 12 = 0$

$$\{1, -4\}$$

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

$$3(n + 4)(n - 1) = 0$$

$$n = -4, n = 1$$

10) $v^2 - 4v - 18 = 4$

$$\{2 + \sqrt{26}, 2 - \sqrt{26}\}$$

$$v^2 - 4v - 22 = 0$$

$$v^2 - 4v + 4 = 22 + 4$$

$$\sqrt{(v-2)^2} = \pm\sqrt{26}$$

$$v - 2 = \pm\sqrt{26}$$

$$v = 2 \pm \sqrt{26}$$

11) $r^2 - 60 = -11r$

$$\{4, -15\}$$

$$r^2 + 11r - 60 = 0$$

$$(r + 15)(r - 4) = 0$$

$$r = -15, r = 4$$

12) $11x^2 - 4x - 2 = 6$

$$\left\{ \frac{2 + 2\sqrt{23}}{11}, \frac{2 - 2\sqrt{23}}{11} \right\}$$

$$11x^2 - 4x - 8 = 0$$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(11)(-8)}}{2(11)}$$

$$x = \frac{4 \pm \sqrt{16 + 352}}{22} = \frac{4 \pm \sqrt{368}}{22}$$

$$= \frac{4 \pm 4\sqrt{23}}{22} = \frac{2 \pm 2\sqrt{23}}{11}$$

-2-

$$\sqrt{16\sqrt{23}}$$