Review for Test #4 over Ch 12

Work all the problems on a separate piece of paper showing all steps.

Solve the following using the square root property:

1) $3x^2 - 11 = 0$

2) $(x + \frac{3}{2})^2 - \frac{7}{2} = 0$

Solve the following:

3) $8x^3 - 125 = 0$

4) $6x(x + 2) + 8 = 2x(x - 3)$

5) $2x^2 - 3x - 7 = 0$

6) $x^2 + 4x + 7 = 0$

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

8) $12x^2 = 19x + 18$

9) $0.4x^2 - 0.4x + 0.9 = 0.8$

10) $\frac{5}{3}x^2 - 5x = -4x + \frac{3}{5}$

11) $t^{1/2} + 3t^{1/4} - 4 = 0$

12) $8(x^2 - 6x)^2 + 18(x^2 - 6x) = 5$

13) $(3 - \sqrt{x})^2 - 12(3 - \sqrt{x}) - 15 = 0$

14) $x^4 - 4x^3 + 8x - 32 = 0$

15) $x^4 + 2x^2 = 35$

16) $\frac{2}{(4x-1)^2} + \frac{8}{(4x-1)} = 12 + \frac{3}{(4x-1)}$

17) $w = \frac{km_1m_2}{d^2}$ for d (d ≥ 0)

18) $S = \pi r^2 + \pi rh$ for r (r ≥ 0)

Solve by completing the square:

19) $9x^2 + 18x + 8 = 0$

20) $3x^2 + 5x - 2 = 0$

21) $x^2 - 5x = -11$

22) $\frac{1}{2}x^2 - 2x = -3$

Use the discrimnant to determine the type of solutions and how many solutions exist:

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

24) $3x^2 - 6x + 5 = 0$

25) $x^2 + 5x = 11$

26) $3x^2 - \frac{5}{2}x + \frac{1}{2} = 0$

Find the vertex, the axis of symmetry, the intercepts, and the sketch the graph of the following:

27) $h(x) = -2(x + \frac{1}{2})^2 + 2$

28) $g(x) = \frac{1}{2}(x - 2)^2 - 3$

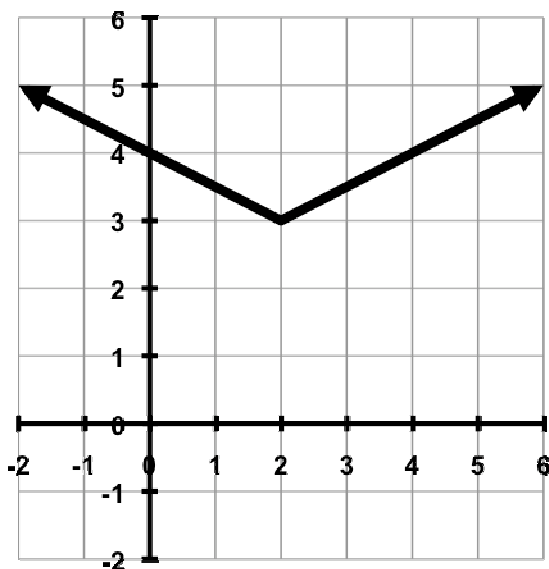29) $y = 9x^2 + 6x + 4$

30) $f(x) = -2x^2 + 5x + 3$

Sketch the graph of the following:
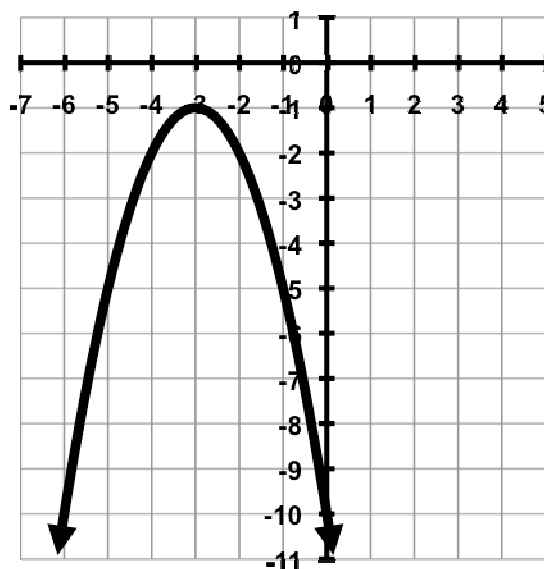
31) $f(x) = 2|x + 1| - 3$

32) $g(x) = -\frac{1}{3}|x - 3| + 6$

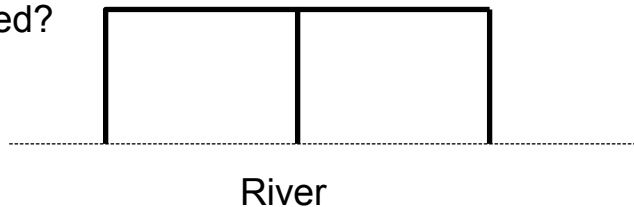**Given the graphs below, write the equation:**

33)   34)

Set-up the equation(s) and Solve the following:

35) A rancher needs to enclose two adjacent rectangular corrals, one for sheep and one for cattle. A river forms one side of the corrals. If 480 yards of fencing is available, what is the largest total area that can be enclosed?

River

36) What is the minimum product of two numbers that differ by 10? What are the numbers?

37) The supply and demand functions for a certain commodity are $Q = 0.2p^2 + p + 50$ and $Q = -0.1p^2 + 90$ respectively where p is the price of the commodity and Q is the number of units. Find the equilibrium price and the corresponding number of units supplied and demanded by finding where these functions intersect.

Answers:

1) The solutions are $\left\{-\dfrac{\sqrt{33}}{3}, \dfrac{\sqrt{33}}{3}\right\}$.

2) The solutions are $\left\{\dfrac{-3-\sqrt{14}}{2}, \dfrac{-3+\sqrt{14}}{2}\right\}$.

3) The solutions are $\left\{\dfrac{-5-5i\sqrt{3}}{4}, \dfrac{-5+5i\sqrt{3}}{4}, 2.5\right\}$.

4) The solutions are $\{-4, -0.5\}$.

5) The solutions are $\left\{\dfrac{3-\sqrt{65}}{4}, \dfrac{3+\sqrt{65}}{4}\right\}$.

6) The solutions are $\left\{-2 - i\sqrt{3}, -2 + i\sqrt{3}\right\}$.

7) The solutions are $\left\{\dfrac{1-i\sqrt{83}}{6}, \dfrac{1+i\sqrt{83}}{6}\right\}$.

8) The solutions are $\left\{-\dfrac{2}{3}, \dfrac{9}{4}\right\}$.   9)   The solution is $\{0.5\}$.

10) The solutions are $\left\{\dfrac{3-3\sqrt{5}}{10}, \dfrac{3+3\sqrt{5}}{10}\right\}$.   11)   The solution is $\{1\}$.

12) The solutions are $\left\{\dfrac{6-\sqrt{37}}{2}, \dfrac{6-\sqrt{26}}{2}, \dfrac{6+\sqrt{26}}{2}, \dfrac{6+\sqrt{37}}{2}\right\}$.

13) The solution is $\{60 - 6\sqrt{51}\}$.

14) The solutions are $\left\{1 - i\sqrt{3}, 1 + i\sqrt{3}, -2, 4\right\}$.

15) The solutions are $\{-i\sqrt{7}, i\sqrt{7}, -\sqrt{5}, \sqrt{5}\}$.

16) The solutions are $\left\{\dfrac{3}{16}, \dfrac{5}{12}\right\}$.   17) $d = \sqrt{\dfrac{km_1m_2}{w}}$

18) $r = \dfrac{-\pi h + \sqrt{\pi^2 h^2 + 4\pi S}}{2\pi}$ 19)   The solutions are $\left\{-\dfrac{4}{3}, -\dfrac{2}{3}\right\}$.

20) The solutions are $\left\{-2, \dfrac{1}{3}\right\}$.

21) The solutions are $\left\{\dfrac{5-i\sqrt{19}}{2}, \dfrac{5+i\sqrt{19}}{2}\right\}$.

22) The solutions are $\{2 - i\sqrt{2}, 2 + i\sqrt{2}\}$.

23) There are two real rational zeros.

24) There are two complex (not real) conjugates zeros.
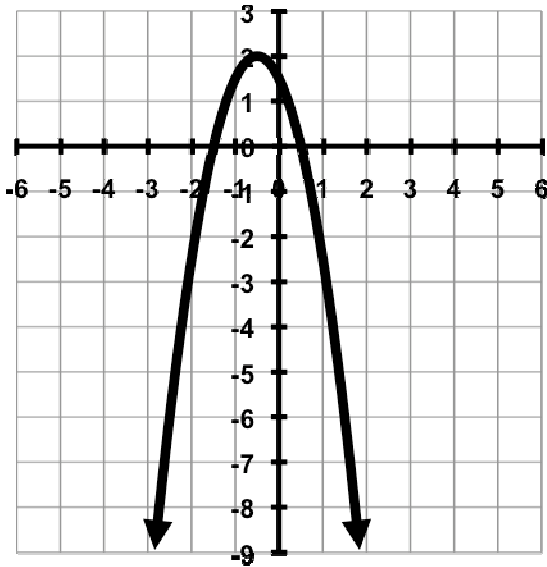
25) There are two real irrational zeros.
26) There are two real rational zeros.

27) Vertex: $\left(-\dfrac{1}{2}, 2\right)$

Axis of Symmetry: $x = -\dfrac{1}{2}$

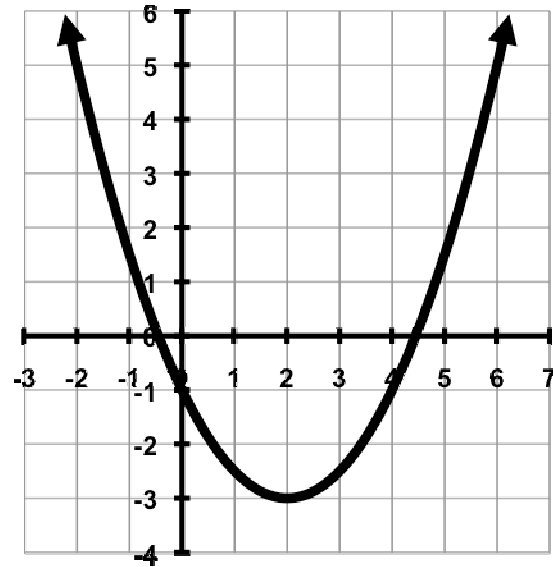x-intercepts: (– 1.5, 0) & (0.5, 0)

y-intercepts: (0, 1.5)

28) Vertex: (2, – 3)

Axis of Symmetry: x = 2

x-intercepts: $(2 + \sqrt{6}, 0)$
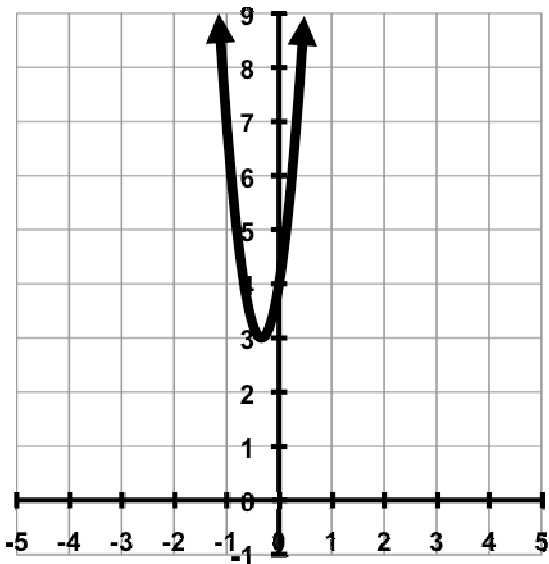& $(2 - \sqrt{6}, 0)$

y-intercepts: (0, – 1)

29) Vertex: $\left(-\frac{1}{3}, 3\right)$

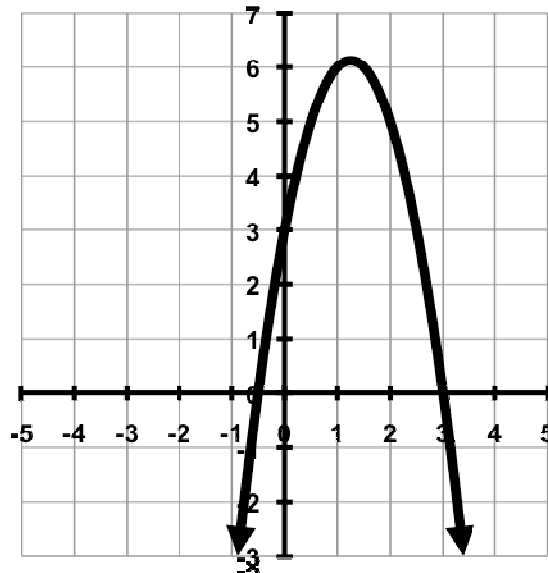Axis of Symmetry: $x = -\frac{1}{3}$

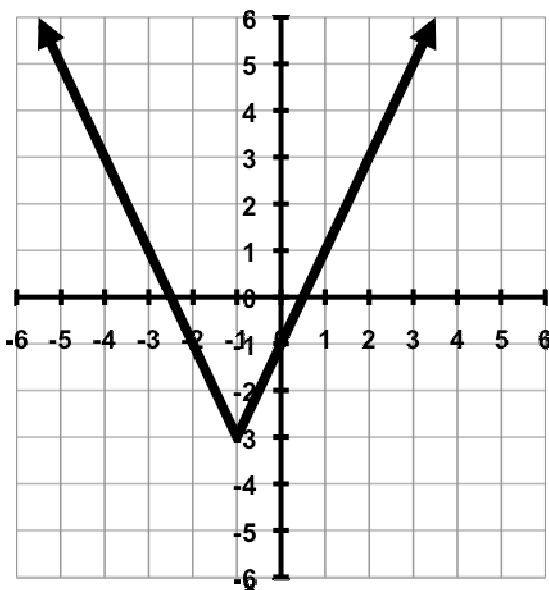x-intercepts: None

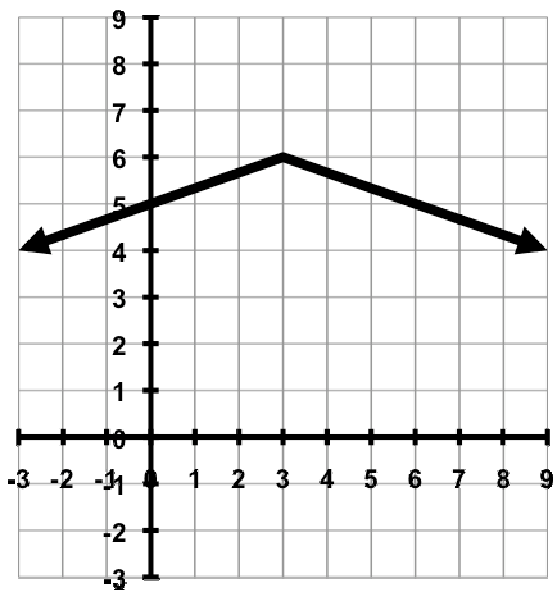y-intercepts: (0, 4)

30) Vertex: (1.25, 6.125)

Axis of Symmetry: x = 1.25

x-intercepts: $\left(-\frac{1}{2}, 0\right)$ & (3, 0)

y-intercepts: (0, 3)

31)

32)

33) $g(x) = \frac{1}{2}|x - 2| + 3$

34) $f(x) = -(x + 3)^2 - 1$

35) The maximum area is 19,200 yd^2

36) The product will be a minimum of -25 when the numbers are -5 & 5.

37) Eighty units of the commodity are sold at $10 per unit.