Chapter 4 Review #2

Date _____   Period _____

Graph and label the parts of the quadratic function.   **Round to 2 decimals.**
Create a table of 5 values with the vertex the middle point.
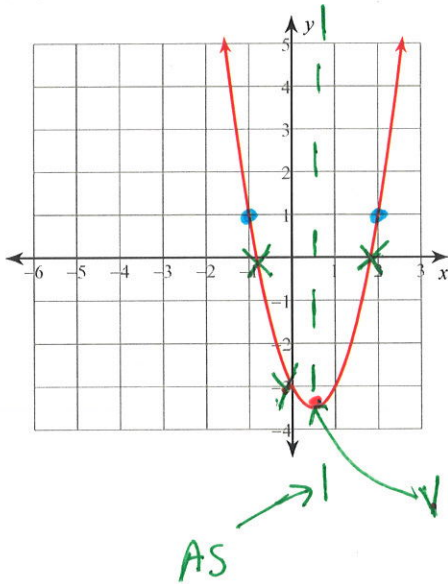**What is the vertex?** __(.50, −3.5)__ (Label with a V)
What is the Axis of Symmetry? __X = .50__ (Label with A.S.)
What is the Y-intercept as an ordered pair? (0, −3) (Label with a Y)
Find the Solutions: __X = −.82, 1.82__ (Label with X's)

X	−1	0	.50	1	2
Y	1	−3	−3.5	−3	1

(V above .50 column)

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

AS

STANDARD FORM

$\boxed{A = 2}$ open UP

$B = -2$

$\boxed{C = -3 \quad \text{y int} \downarrow}$

A.S. $X = \dfrac{-B}{2A} = \dfrac{2}{2(2)} = \dfrac{2}{4}$

$\boxed{X = .5}$

Vertex $(.5, -3.5)$

$y = 2(.5)^2 - 2(.5) - 3 = -3.5$

Shape is A   +A → opens up
                    −A → opens down

Y intercept is C   Coordinates are (0, C)

Graph and label the parts of the quadratic function.
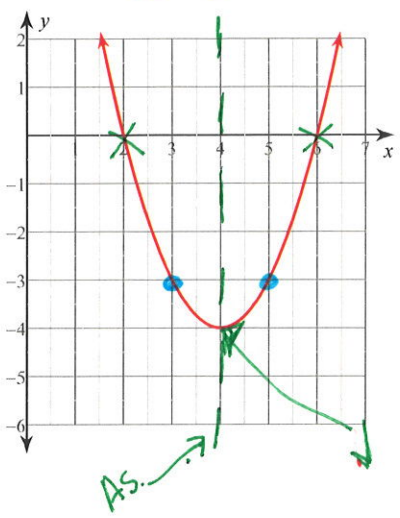**Create a table of 5 values with the vertex the middle point.**
What is the vertex? _(4, -4)_ **(Label with a V)**
What is the Axis of Symmetry? _X = 4_ **(Label with A.S.)**
Find the Solutions: _X = 2, 6_ **(Label with X's)**
(2, 0) (6, 0)

VERTEX FORM

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

A = 1 (opens up)
Vertex (4, -4)

X	Y
2	0
3	-3
4	-4
5	-3
6	0

A.S.

Solutions are X intercepts (X, 0)

-2-

Graph and label the parts of the quadratic function.   **Round to 2 decimals.**

Create a table of 5 values with the vertex the middle point.

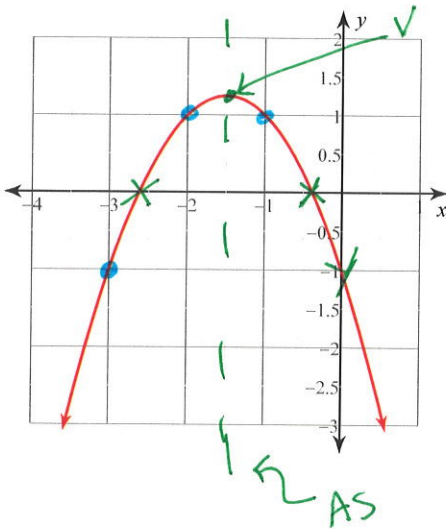**What is the vertex?** $(-1.5, 1.25)$ (Label with a V)

What is the Axis of Symmetry? $X = -1.5$ (Label with A.S.)

What is the Y-intercept as an ordered pair? $(0, -1)$ (Label with a Y)

Find the Solutions: $X = -2.62, -0.38$ (Label with X's)

X	-3	-2	-1.5	-1	0
y	-1	1	1.25	1	-1

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

$A = -1 \qquad B = -3 \qquad C = -1$

opens down

$A.S. \quad X = \dfrac{-B}{2A} = \dfrac{3}{2(-1)} \qquad \boxed{X = -1.5}$

Vertex $(-1.5, 1.25)$

$y = -(-1.5)^2 - 3(-1.5) - 1 = 1.25$

Solve each equation by taking square roots. Leave answers in <mark>**simple radical form.**</mark>

4) $-1 + 4n^2 = 99$

$\quad +1 \qquad +1$

$\dfrac{4n^2}{4} = \dfrac{100}{4}$

$\sqrt{n^2} = \sqrt{25}$

$\boxed{N = \pm 5}$

STEP 1: ISOLATE X

STEP 2 TAKE $\sqrt{\ }$ OF BOTH SIDES

* remember + and - !

5) $\sqrt{x^2} = \sqrt{50}$

$X = \pm\sqrt{50}$

$X = \pm\sqrt{25}\sqrt{2}$

$\boxed{X = \pm 5\sqrt{2}}$

6) $p^2 - 8 = -16$

$\quad +8 \quad +8$

$\sqrt{p^2} = \sqrt{-8}$

$p = \pm i\sqrt{8} = \pm i\sqrt{4}\sqrt{2}$

$\boxed{p = \pm 2i\sqrt{2}}$

7) $\dfrac{10m^2}{10} = \dfrac{750}{10}$

$\sqrt{m^2} = \sqrt{75}$

$m = \pm\sqrt{75} = \pm\sqrt{25}\sqrt{3}$

$\boxed{m = \pm 5\sqrt{3}}$

8) $\dfrac{9x^2}{9} = \dfrac{-900}{9}$

$\sqrt{x^2} = \sqrt{-100}$

$\boxed{X = \pm 10i}$

-3-

Solve each equation with the quadratic formula. Leave solutions in simple radical form.

9) $3p^2 + 12p + 12 = 0$

$A = 3 \quad B = 12 \quad C = 12$

$X = \dfrac{-12 \pm \sqrt{144 - 4(3)12}}{2(3)}$

$X = \dfrac{-12 \pm 0}{6}$

$\boxed{X = -2}$

10) $x^2 + 10x - 19 = 0$

$A = 1 \quad B = 10 \quad C = -19$

$X = \dfrac{-10 \pm \sqrt{100 - 4(1)(-19)}}{2(1)}$

$X = \dfrac{-10 \pm \sqrt{176}}{2}$

$X = \dfrac{-10 \pm \sqrt{16}\sqrt{11}}{2}$

$X = \dfrac{-10 \pm 4\sqrt{11}}{2}$

$\boxed{X = -5 \pm 2\sqrt{11}}$

11) $-5r^2 + 2r + 51 = 0$

$A = -5 \quad B = 2 \quad C = 51$

$X = \dfrac{-2 \pm \sqrt{4 - 4(-5)(51)}}{2(-5)}$

$X = \dfrac{-2 \pm \sqrt{1024}}{-10}$

$X = \dfrac{-2 \pm 32}{-10}$

$X = \dfrac{-2 + 32}{-10} \boxed{X = -3}$

$X = \dfrac{-2 - 32}{-10} \boxed{X = 3.4}$

12) $2x^2 + 4x + 4 = 0$

$A = 2 \quad B = 4 \quad C = 4$

$X = \dfrac{-4 \pm \sqrt{16 - 4(2)(4)}}{2(2)}$

$X = \dfrac{-4 \pm \sqrt{-16}}{4}$

$X = \dfrac{-4 \pm 4i}{4}$

$X = \dfrac{-4}{4} \pm \dfrac{4i}{4} \longrightarrow \boxed{X = -1 \pm i}$

Solve each equation with the quadratic formula. Round solutions to 2 decimals.

13) $7x^2 + 11x - 24 = 0$

$A = 7 \quad B = 11 \quad C = -24$

$X = \dfrac{-11 \pm \sqrt{121 - 4(7)(-24)}}{2(7)}$

$X = \dfrac{-11 \pm \sqrt{793}}{14}$

$X = \dfrac{-11 + \sqrt{793}}{14} \quad X = \dfrac{-11 - \sqrt{793}}{14}$

$\boxed{X = 1.23} \qquad \boxed{X = -2.80}$

14) $6m^2 - 6m - 21 = 0$

$A = 6 \quad B = -6 \quad C = -21$

$X = \dfrac{6 \pm \sqrt{36 - 4(6)(-21)}}{2(6)}$

$X = \dfrac{6 \pm \sqrt{540}}{12}$

$X = \dfrac{6 + \sqrt{540}}{12} \quad X = \dfrac{6 - \sqrt{540}}{12}$

$\boxed{X = 2.44} \qquad \boxed{X = -1.44}$

Solve each equation by completing the square.

15) $x^2 + 12x + 20 = 0$

$$-20 \quad -20$$

$$x^2 + 12x + \underline{36} = -20 + 36$$

$$\sqrt{(x+6)^2} = \sqrt{16}$$

$$x + 6 = \pm 4$$

$$-6 \quad -6$$

$$x = -6 \pm 4$$

$x = -6 + 4$ $x = -6 - 4$

$\boxed{x = -2}$ $\boxed{x = -10}$

16) $k^2 - 20k - 96 = 0$

$$+96 \quad +96$$

$$k^2 - 20k + \underline{100} = 96 + 100$$

$$\sqrt{(k-10)^2} = \sqrt{196}$$

$$k - 10 = \pm 14$$

$$+10 \quad +10$$

$$k = 10 \pm 14$$

$k = 10 + 14$ $k = 10 - 14$

$\boxed{k = 24}$ $\boxed{k = -4}$

17) $b^2 + 12b - 20 = -7$

$$+20 \quad +20$$

$$b^2 + 12b + \underline{36} = 13 + 36$$

$$\sqrt{(b+6)^2} = \sqrt{49}$$

$$b + 6 = \pm 7$$

$$-6 \quad -6$$

$$b = -6 \pm 7$$

$b = -6 + 7$ $b = -6 - 7$

$\boxed{b = 1}$ $\boxed{b = -13}$

18) $n^2 - 18n + 55 = -10$

$$-55 \quad -55$$

$$n^2 - 18n + \underline{81} = -65 + 81$$

$$\sqrt{(n-9)^2} = \sqrt{16}$$

$$n - 9 = \pm 4$$

$$+9 \quad +9$$

$$n = 9 \pm 4$$

$n = 9 + 4$ $n = 9 - 4$

$\boxed{n = 13}$ $\boxed{n = 5}$

Solve each equation by factoring.

19) $n^2 + 9n + 14 = 0$

$$(N+2)(N+7) = 0$$

$N+2 = 0$ $N+7 = 0$

$\boxed{N = -2}$ $\boxed{N = -7}$

20) $n^2 - 12n + 36 = 0$ ← repeated factor

$$(N-6)(N-6) = 0$$

$N - 6 = 0$

$\boxed{N = 6}$

21) $n^2 + 2n - 24 = 0$

$$(N+6)(N-4) = 0$$

$N+6 = 0$ $N-4 = 0$

$\boxed{N = -6}$ $\boxed{N = 4}$

22) $m^2 - 16 = 0$

$$(M+4)(M-4) = 0$$

$M+4 = 0$ $M-4 = 0$

$\boxed{M = -4}$ $\boxed{M = 4}$

23) $4x^2 + 20x = 0$

ALWAYS FACTOR OUT THE GCF FIRST!!

$$4X(X+5) = 0$$

$4X = 0$ $X+5 = 0$

$\boxed{X = 0}$ $\boxed{X = -5}$

$C: 4(0)^2 + 20(0) = 0$ $C: 4(-5)^2 + 20(-5) = 0$

$0 = 0 ✓$ $100 - 100 = 0$

$0 = 0 ✓$

24) $5n^2 - 45n + 100 = 0$

$$5(N^2 - 9N + 20) = 0$$
$$5(N-5)(N-4) = 0$$

$5 = 0 X$ $N-5 = 0$ $N-4 = 0$

↑
No Variable $\boxed{N = 5}$ $\boxed{N = 4}$

Sketch the graph of each function.
Label all points (x,y) that are turning points and intercepts. Estimate coordinates to 1 decimal place.
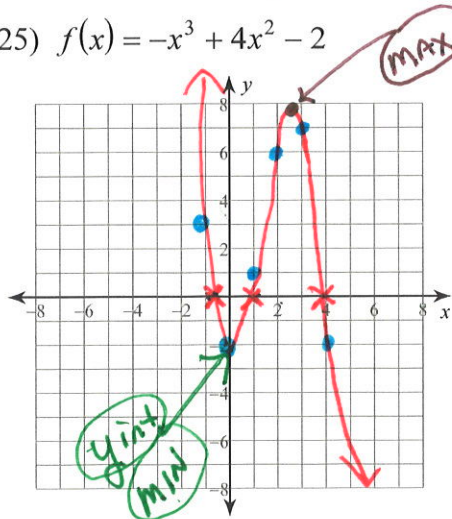
Minimum $(0, -2)$
Maximum $(2.7, 7.5)$
Y-intercept $(0, -2)$
X-intercepts $(-.7, 0)$ $(.8, 0)$ $(3.9, 0)$

25) $f(x) = -x^3 + 4x^2 - 2$ MAX

x	y
-1	3
0	-2	← y int $(0, y)$
1	1
2	6
3	7
4	-2