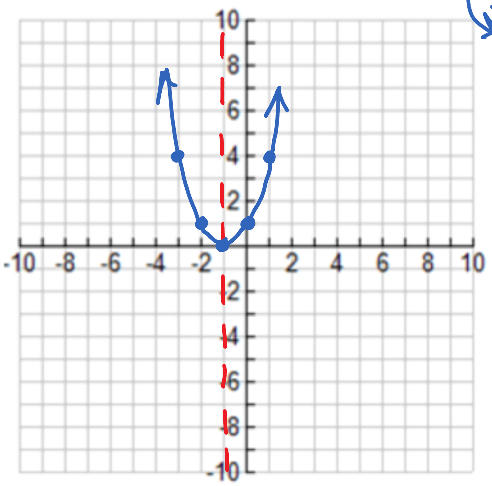
Honors Algebra
10.1-10.4 (with p.641 extension & 11.2) Review

Name: Key
Period:

(1-3) Graph the following quadratic functions. Draw at least three accurate points and sketch in the axis of symmetry. Then, complete the information about each graph.

1. $y = x^2 + 2x + 1$ $\Rightarrow$ $y = (x+1)(x+1)$



x-intercepts
$x+1=0$
$x=-1$

$x+1=0$
$x=-1$

vertex
$x = -\frac{b}{2a} = \frac{-2}{2(1)} = -1$

$y=(-1)^2+2(-1)+1$
$y=1-2+1$
$y=0$ $(-1,0)$

y-Intercept: (0,1)

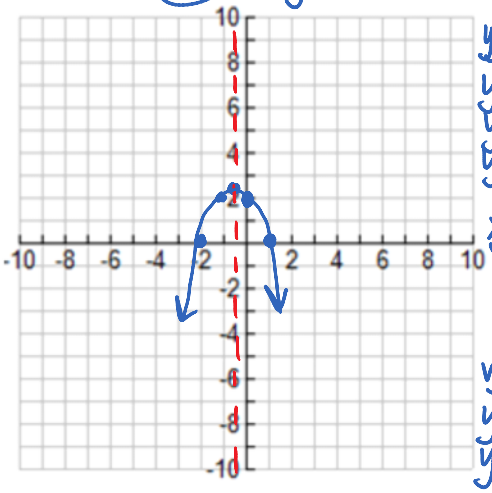
x-Intercept(s): (-1,0)

Vertex: (-1,0)

Axis of Symmetry: $x=-1$

Graph Opens: (Up) / Down (circle one)

2. $y = -(x-1)(x+2)$ $\Rightarrow$ $y=-(x^2+x-2)$ $\Rightarrow$ $y=-x^2-x+2$



y-intercept
$y=-(0-1)(0+2)$
$y=-(-1)(2)$
$y=2$

x-intercepts
$x-1=0$ $x+2=0$
$x=1$ $x=-2$

vertex
$y=-(-\frac{1}{2}-1)(-\frac{1}{2}+2)$
$y=-(-\frac{3}{2})(\frac{3}{2})$
$y=\frac{9}{4}=2.25$

y-Intercept: (0,2)

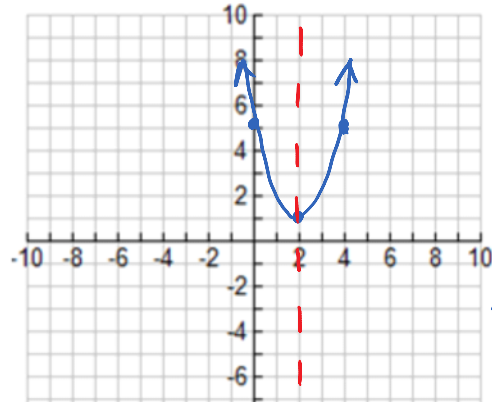
x-Intercept(s): (1,0) & (-2,0)

Vertex: $(-\frac{1}{2}, \frac{9}{4})$

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

Graph Opens: Up (Down) (circle one)

3. $y = x^2 - 4x + 5$



vertex:
$x = -\frac{b}{2a} = \frac{-(-4)}{2(1)} = 2$

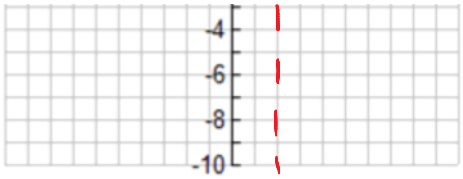
$y=(2)^2-4(2)+5$
$y=4-8+5$
$y=1$ $(2,1)$

y-Intercept: (0,5)

x-Intercept(s): n/a

Vertex: (2,1)

Axis of Symmetry: $x=2$



Axis of Symmetry: $x = 2$

Graph Opens: (Up) / Down (circle one)

(4-6) State whether the functions below have a maximum or minimum value. Then identify that value.

4. $y = 2x^2 - x + 3$

Min @ $y = \frac{23}{8}$

$x = \frac{-(-1)}{2(2)} = \frac{1}{4}$

$y = 2(\frac{1}{4})^2 - \frac{1}{4} + 3$

$y = 2(\frac{1}{16}) - \frac{1}{4} + 3 = \frac{1}{8} - \frac{2}{8} + \frac{24}{8} = \frac{23}{8}$

5. $y = -x^2 + 4x - 1$

MAX @ $y = 3$

$x = \frac{-4}{2(-1)} = 2$

$y = -(2)^2 + 4(2) - 1$

$y = -4 + 8 - 1$

$y = 3$

6. $y = -3x^2 + 12x + 2$

MAX @ $y = 14$

$x = \frac{-12}{2(-3)} = 2$

$y = -3(2)^2 + 12(2) + 2$

$y = -12 + 24 + 2$

$y = 14$

(7-9) Identify how many solutions the functions below have. Then find the x-intercepts.

7. $y = 4x^2 + 64$

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

$\frac{0}{4} = \frac{4(x^2 + 16)}{4}$

$0 = x^2 + 16$

$-16 \quad -16$

$\sqrt{-16} = \sqrt{x^2}$

NO real Solutions!

8. $y = 2x^2 + 8x + 8$

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

$y = 2(x + 2)(x + 2)$

$0 = x + 2 \quad 0 = x + 2$

$x = -2 \quad x = -2$

one solution $(-2, 0)$

9. $y = -x^2 + 4x - 3$

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

$y = -(x - 3)(x - 1)$

$x - 3 = 0 \quad x - 1 = 0$

$x = 3 \quad x = 1$

two solutions $(3, 0)$ & $(1, 0)$

(10-12) Use your calculator to find the vertex and x-intercept(s) of the functions below.

10. $y = -2x^2 + 3x - 4$

Maximum $(0.75, -2.88)$

x-intercepts n/a

11. $y = x^2 + 10x - 2$

Minimum $(-5, -27)$

x-intercepts (use zero on calc) $(-10.20, 0)$ & $(0.20, 0)$

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

Minimum $(0.17, 6.92)$

x-intercepts n/a

(13-17) Simplify. Leave no radicals in the denominator.

13. $\sqrt{32}$

$\sqrt{2 \cdot 16}$

$\pm 4\sqrt{2}$

14. $\sqrt{27}$

$\sqrt{3 \cdot 9}$

$\pm 3\sqrt{3}$

15. $\sqrt{\frac{9}{3}} = \frac{\sqrt{9}}{\sqrt{3}}$

$= \frac{3}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$= \frac{3\sqrt{3}}{3} = \pm\sqrt{3}$

16. $\sqrt{\frac{1}{4}} = \frac{\sqrt{1}}{\sqrt{4}}$

$= \pm\frac{1}{2}$

17. $\sqrt{3} \cdot \sqrt{27}$

$= \sqrt{3 \cdot 27}$

$= \sqrt{81}$

$= \pm 9$

(18-24) Solve for *x*. If necessary, round solutions to the nearest hundredths place.

18. $\frac{4x^2}{4} = \frac{16}{4}$

$\sqrt{x^2} = \sqrt{4}$

$x = \pm 2$

19. $-3x^2 - 1 = -10$

$+1 \quad +1$

$\frac{-3x^2}{-3} = \frac{-9}{-3}$

$\sqrt{x^2} = \sqrt{3}$

$x = \pm\sqrt{3}$

20. $25x^2 + 4 = 13$

$-4 \quad -4$

$\frac{25x^2}{25} = \frac{9}{25}$

$\sqrt{x^2} = \sqrt{\frac{9}{25}}$

21. $5x^2 + 8 = 3$

$-8 \quad -8$

$\frac{5x^2}{5} = \frac{-5}{5}$

$\sqrt{x^2} = \sqrt{-1}$

$x = \pm 2$

$\sqrt{x^2} = \sqrt{3}$

$x = \pm\sqrt{3}$

$\sqrt{x^2} = \sqrt{\frac{9}{25}}$

$x = \frac{\sqrt{9}}{\sqrt{25}} = \pm\frac{3}{5}$

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

no real solution

22. $\frac{3(x-1)^2}{3} = \frac{27}{3}$

$\sqrt{(x-1)^2} = \sqrt{9}$

$x - 1 = \pm 3$

$+1 \quad +1$

$x = 1 \pm 3$

$x = 1+3 \qquad x = 1-3$

$x = 4 \qquad x = -2$

23. $\frac{-6(x+2)^2}{-6} = \frac{-42}{-6}$

$\sqrt{(x+2)^2} = \sqrt{7}$

$x + 2 = \pm\sqrt{7}$

$-2 \quad -2$

$x = -2 \pm \sqrt{7}$

$x = -2+\sqrt{7} \qquad x = -2-\sqrt{7}$

$x \approx 0.65 \qquad x \approx -4.65$

24. $3x^2 + 2 = 2(4x^2 - 5)$

$3x^2 + 2 = 8x^2 - 10$

$-8x^2 \quad -8x^2$

$-5x^2 + 2 = -10$

$-2 \quad -2$

$\frac{-5x^2}{-5} = \frac{-12}{-5}$

$\sqrt{x^2} = \sqrt{\frac{12}{5}}$

$x = \pm\sqrt{\frac{12}{5}}$

$x \approx \pm 1.55$