

Algebra 2

Name Key

Date _____ Hour _____

PARTNER TEST Chapter 4

1. Identify the vertex, the axis of symmetry, the maximum or minimum value, y intercept, domain and the range of each quadratic function. Also, fill out the table and sketch the graph.

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

Vertex: $(-2, 1)$

AOS: $x = -2$

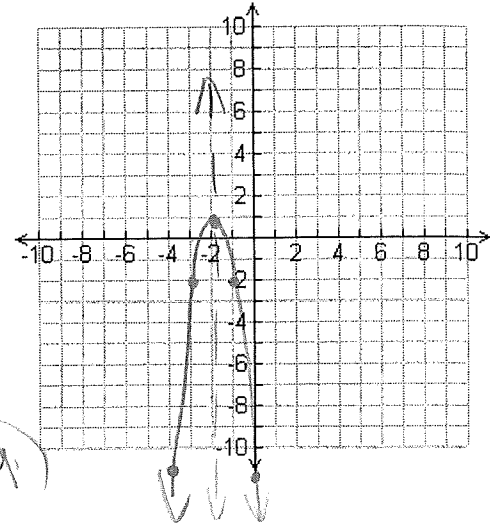
Max/Min: MAX

Y intercept: $(0, -11)$

Domain: all

Range: $y \leq 1$

		$x-2$		$(y)-3$		$y+1$	
x	y	x	y	x	y	x	y
-2	4	-4	4	-4	-12	-4	-11
-1	1	-3	1	-3	-3	-3	-2
0	0	-2	0	-2	0	-2	1
1	1	-1	1	-1	-3	-1	-2
2	4	0	4	0	-12	0	-11



$-b/2a = 12/6 = 2$ $y = 3(x-2)^2 - 9$ (+9)

b. $f(x) = 3x^2 - 12x + 3$

Vertex: $(2, -9)$

AOS: $x = 2$

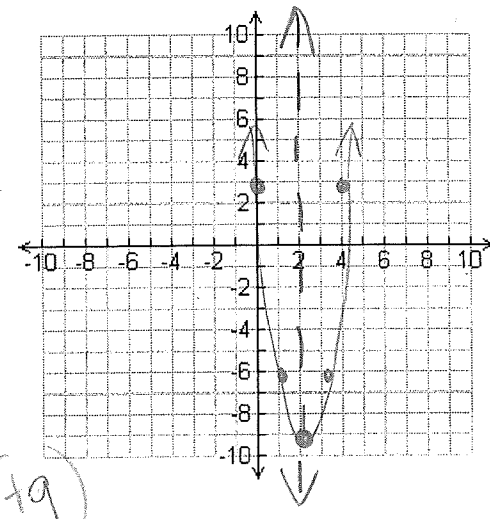
Max/Min:

Y intercept: $(0, 3)$

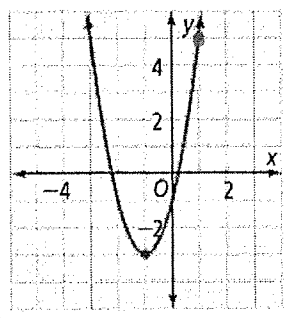
Domain: all

Range: $y \geq -9$

x	y



2. Write the quadratic equation in vertex form of the graph below. Show your work.



$y = a(x-h)^2 + k$
 $y = a(x+1)^2 - 3$
 $5 = a(1+1)^2 - 3$
 $5 = 4a - 3$
 $8 = 4a$
 $2 = a$

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

3. Rewrite $f(x) = -2(x+1)^2 - 3$ in standard form. Show your work.

$$\begin{aligned} & \leftarrow (x+1)(x+1) \\ & -2(x^2+2x+1) - 3 \\ & -2x^2 - 4x - 2 - 3 \end{aligned}$$

$$y = a(x-h)^2 + k$$

4. Convert $f(x) = 4x^2 - 8x + 3$ to vertex form. Show your work.

$$\begin{aligned} h &= \frac{-b}{2a} = \frac{8}{2(4)} = 1 & 4(1)^2 - 8(1) + 3 \\ & & 4 - 8 + 3 \\ k &= -4 + 3 \end{aligned}$$

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

4. $y = 4(x-1)^2 - 1$ +3

Factor each polynomial **completely**. There may be more than one method. HINT: GCF something first.

SHOW ALL WORK

5. $2x^2 + 6x + 4$

$$\begin{aligned} & 2(x^2 + 3x + 2) \\ & 2(x+2)(x+1) \\ & \underline{2(x+2)(x+1)} \\ & (2x+4)(x+1) \\ & 2(x+2)(x+1) \end{aligned}$$

6. $2x^2 - x - 3$

$$(2x-3)(x+1)$$

7. $4x^2 - 49$

5. $2(x+2)(x+1)$ +3

6. $(2x-3)(x+1)$ +3

7. $(2x-7)(2x+7)$ +3

Solve each polynomial by factoring. Show your work.

8. $(x+5)(3x-2) = 0$

$$x = -5 \quad x = \frac{2}{3}$$

9. $25x^2 - 4 = 0$

$$\begin{aligned} & (5x-2)(5x+2) \\ & x = \frac{2}{5} \quad x = -\frac{2}{5} \end{aligned}$$

10. $2x^2 - x - 3 = 0$

$$\begin{aligned} & (2x^2 - x - 3) \\ & (2x-3)(x+1) \end{aligned}$$

8. $x = -5, \frac{2}{3}$ +3

9. $x = \pm \frac{2}{5}$ +3

10. $x = \frac{3}{2}, -1$ +3

Solve. Give exact answers and simplify all radicals.

11. $3x^2 - 24 = 0$

$$x^2 = 8$$

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

+4

12. $\frac{2x^2 - 8x - 4}{2} = 0$

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

$$x^2 - 4x + 4 = 2 + 4$$

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

$$x-2 = \pm\sqrt{6}$$

$$x = 2 \pm \sqrt{6}$$

4

13. $a=5 \quad b=-7 \quad c=-3$
 $5x^2 - 7x - 3 = 0$

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

$$\frac{7 \pm \sqrt{49 - 4(5)(-3)}}{10}$$

4 $\frac{7 \pm \sqrt{109}}{10}$

11. $\pm 2\sqrt{2}$

12. $2 \pm \sqrt{6}$

13. $\frac{7 \pm \sqrt{109}}{10}$

Evaluate the discriminant for each equation. Determine the number of real solutions.

14. $-2x^2 - 6x - 4 = 0$

$$d = \frac{b^2 - 4ac}{36 - 4(-2)(-4)}$$

$$36 - 32$$

$d = 4$

of sol. = 2

15. $4x^2 - 12x + 9 = 0$

$$d = \frac{b^2 - 4ac}{144 - 4(4)9}$$

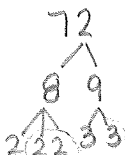
$$144 - 144$$

$d = 0$

of sol. = 1

Simplify the number by using the imaginary number i . Simplify all radicals.

16. $\sqrt{-72}$
 $i\sqrt{72}$



16. $6\sqrt{2}i$
 $6i\sqrt{2}$

Plot and label each complex number and find its absolute value.

17. $A = 4i$

$|4i| = 4$

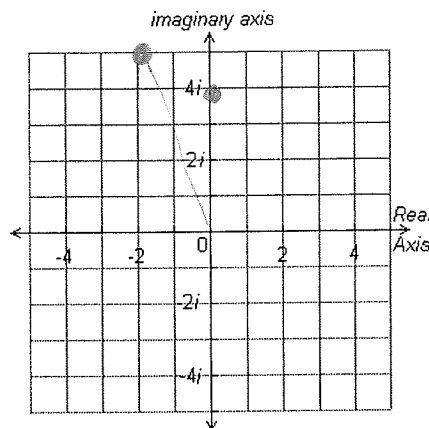
18. $B = -2 + 5i$

$|-2 + 5i| = \sqrt{29}$

$$2^2 + 5^2 = c^2$$

$$29 = c^2$$

$$\sqrt{29} = c$$



Simplify each expression. Write in $a + bi$ form. Be careful – is it addition, subtraction, or multiplication?

19. $(3 + 2i) - (5 - 3i)$
 $3 + 2i - 5 + 3i$

19. $-2 + 5i$

20. $(4 - 2i)^2$
 $(4 - 2i)(4 - 2i)$
 $16 - 8i - 8i + 4i^2$
 $16 - 16i - 4$

20. $12 - 16i$

21. $4(2 - 6i) + i(4 - 5i)$
 $8 - 24i + 4i - 5i^2$
 $8 - 20i + 5$

21. $13 - 20i$

22. $(6 + \sqrt{-9})(-2 + \sqrt{-49})$
 $(6 + 3i)(-2 + 7i)$
 $-12 + 42i - 6i + 21i^2$
 $-12 + 36i - 21$

22. $-33 + 36i$

Write each quotient as a complex number in $a+bi$ form.

$$23. \frac{(2-3i)(5+2i)}{(5-2i)(5+2i)}$$

$$\frac{10+4i-15i-6i^2}{25+10i-10i-4i^2}$$

$$\frac{16-11i}{29}$$

$$\frac{16-11i}{29}$$

$$29$$

Find the zeros for each function. Simplify all radicals.

$$24. \quad y=0 \quad \checkmark$$

$$f(x) = 2x^2 + 100$$

$$2x^2 + 100 = 0$$

$$2x^2 = -100$$

$$\sqrt{x^2} = \sqrt{-50}$$

$$x = \pm$$

$$50$$

$$\wedge$$

$$2 \quad 25$$

$$\wedge$$

$$55$$

$$24. \quad x = \pm 5i\sqrt{2}$$

Find all solutions to each quadratic equation. Simplify all radicals.

$$25. \quad x^2 - 10x - 4 = 0$$

$$x^2 - 10x + 25 = 4 + 25$$

$$(x-5)^2 = 29$$

$$x-5 = \pm\sqrt{29}$$

$$x = 5 \pm \sqrt{29}$$

$$25. \quad 5 \pm \sqrt{29}$$

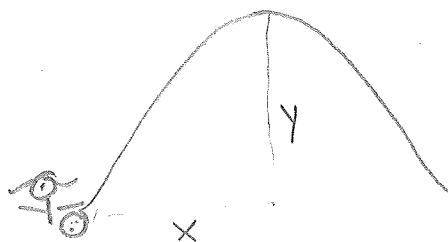
26. The function $y = -.03x^2 + 1.6x$ models the path of a kicked soccer ball. The height of the soccer ball is y and the distance is x . How far and high does the soccer ball travel?

Find the max (vertex)

$$x = \frac{-b}{2a} = \frac{-1.6}{2(-.03)}$$

$$= 26\frac{2}{3} \quad \text{or} \quad \frac{80}{3}$$

$$-21.339 +$$



$$26. \quad \frac{80}{3} \text{ ft far}$$

$$21.33 \text{ ft high}$$