

1. Write the equation in graphing form for the following.

a. a parabola with a vertex at (-1, 7) that passes through (3, 10).

$$y = a(x+1)^2 + 7$$

$$10 = a(3+1)^2 + 7$$

$$3 = 16a$$

$$a = \frac{3}{16}$$

$$y = \frac{3}{16}(x+1)^2 + 7$$

b. When Hope kicked the ball, it traveled a horizontal distance of 85 feet, and at its highest reached 30 ft. Write an equation to model the path of the ball.

$$y = -\frac{24}{1445}(x-42.5)^2 + 30$$

$$y = a(x-42.5)^2 + 30$$

$$0 = a(85-42.5)^2 + 30$$

$$a = -\frac{24}{1445} \approx -0.0166$$

c. $y = 2x^2 - 8x + 5$

$$y = 2(x^2 - 4x + \frac{4}{2}) + 5 - 8$$

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

-2	-2x	4
x	x ²	-2x
x	-2	

2. In 2005 movie tickets cost \$7.50. In 2016, they cost \$12. What yearly percentage increase is this?

Show your work.

YR	\$
0 → 2005	7.50 7.50 (M')
11 → 2016	12 ← 7.50 M''

$$7.50 M'' = 12$$

$$M'' = 1.6$$

$$M \approx 1.044$$

→ 104.4%
- 100%
4.4% ↑

3. The point (-1, 4) is on a line with slope of $\frac{2}{5}$.

If the point (-7, m) is also on the same line, what is the value of m? Show your work.

x	y
-1	4
-7	m

$\Delta y = m - 4$
 $\Delta x = -7 - (-1) \rightarrow -6$

$$m = \frac{\Delta y}{\Delta x} = \frac{m-4}{-6} = \frac{2}{5}$$

$$5(m-4) = -6(2)$$

$$5m - 20 = -12$$

$$5m = 8$$

$$M = \frac{8}{5}$$

4. Simplify

a. $(2-9i)(1+7i)$

$$65 + 5i$$

	2	-9i
1	2	-9i
+7i	14i	-63i ²

-63(-1)
63

b. $6\sqrt{72}$

$$6\sqrt{36}\sqrt{2}$$

$$6 \cdot 6 \cdot \sqrt{2}$$

$$36\sqrt{2}$$

5. Digger the Dog saves the same number of bones each week.

a. After week 4, he had 18 bones, and after week 8, he had 42 bones. How many did he start with? Show your table and the equation for your rule.

x	y
0	-6
4	18
8	42

$\Delta y = 24$
 $\Delta y = 24$

$$y = \frac{24}{4}x - 6$$

$$y = 6x - 6$$

$$500 = 6x - 6$$

$$506 = 6x$$

$$84.3 = x$$

weeks

b. When will he have more than 500 bones?

6. Solve the following equations

a. $7(x-5)^2 - 6 = 92$

$$7(x-5)^2 = 98$$

$$(x-5)^2 = 14$$

$$x-5 = \pm\sqrt{14}$$

$$x = 5 \pm \sqrt{14}$$

b. $(3x-1)(x+3) = 9+3x+x^2$

$$3x^2 + 8x - 3 = x^2 + 3x + 9$$

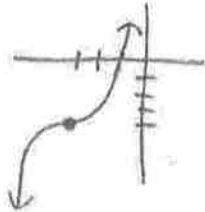
$$2x^2 + 5x - 12 = 0$$

$$(2x-3)(x+4) = 0$$

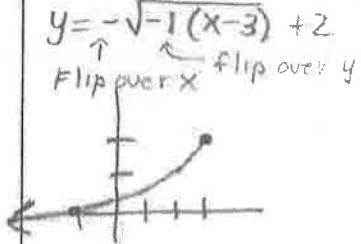
$$x = \frac{3}{2} \quad x = -4$$

1. Sketch the following functions and nonfunctions. Label all asymptotes and locator points.

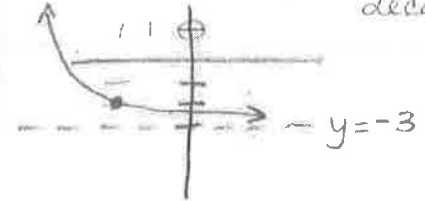
a. $y = (x+3)^3 - 4$ LP $(-3, -4)$



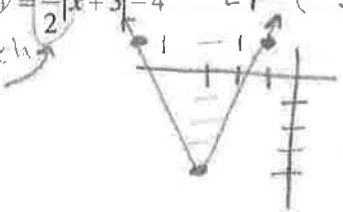
e. $y = -\sqrt{3-x} + 2$ LP $(3, 2)$



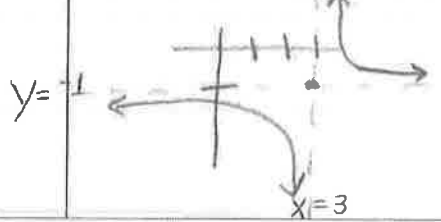
c. $y = 2^{-(x+2)} - 3$ $2^{-1} \rightarrow \frac{1}{2}$ decay



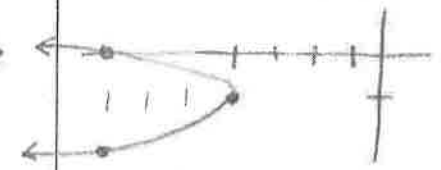
d. $y = \frac{5}{2}|x+3| - 4$ LP $(-3, -4)$
 stretch



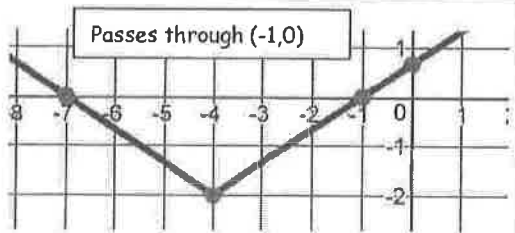
e. $y = \frac{1}{x-3} - 1$ $(3, -1)$



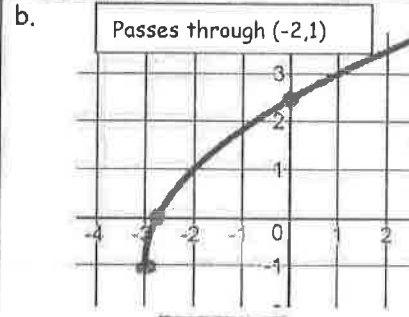
f. $x = -3(y+1)^2 - 4$ $(-4, -1)$
 stretch



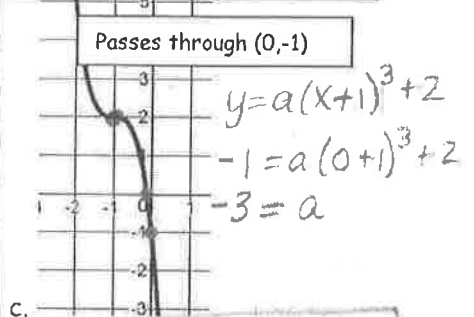
2. Write the equation of each graph below in graphing form. Assume $a=1$, unless a point is given.



a. $y = a|x+4| - 2$
 $0 = a|-1+4| - 2$
 $2 = 3a$
 $a = 2/3$
 $y = \frac{2}{3}|x+4| - 2$



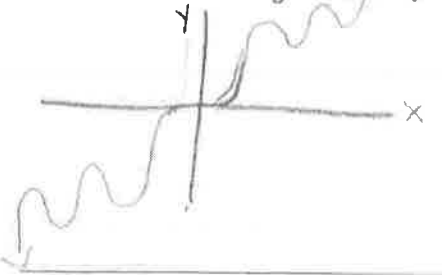
$y = a\sqrt{x+3} - 1$
 $1 = a\sqrt{-2+3} - 1$
 $2 = a$
 $y = 2\sqrt{x+3} - 1$



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

3. Determine if the function is EVEN, ODD or NEITHER

a. Draw a picture of an odd function sym w/ origin



b. $f(x) = \frac{2-x^4}{3x^2}$ Show algebraically

$f(-x) = \frac{2-(-x)^4}{3(-x)^2}$
 $= \frac{2-x^4}{3x^2}$

$f(-x) = f(x) \rightarrow$ **EVEN**

$y = \frac{x^3+3x}{4x}$
 $y = \frac{x^2+3}{4}$

4. Show algebraically which symmetries $y = \frac{x(x^2+3x)}{4x^2}$ holds. Show work!

a. x-axis $(x, -y)$

$(-y) = \frac{x^2+3}{4} \rightarrow y = \frac{-x^2-3}{4}$
 ☹️

b. y-axis $(-x, y)$

$y = \frac{(-x)^2+3}{4}$ 😊
 $y = \frac{x^2+3}{4}$
 Sym w.r.t y-axis

c. origin $(-x, -y)$

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