

Graph the following. Find the indicated values.

1.  $y = 2(x+2)(x-2)$

Axis of Symmetry:  $x=0$

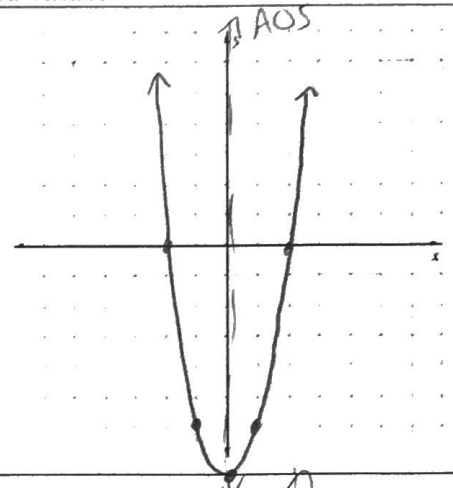
Vertex:  $(0, -8)$

Zero(s):  $x = -2, 2$

x-ints:  $(-2, 0) + (2, 0)$

Max or Min: min at  $-8$

x	y
-2	0
-1	-6
0	-8
1	-6
2	0



2.  $x^2 - 4x + 4 - 8y + 16 = 0$   
 $(x-2)^2 = 8(y-2)$

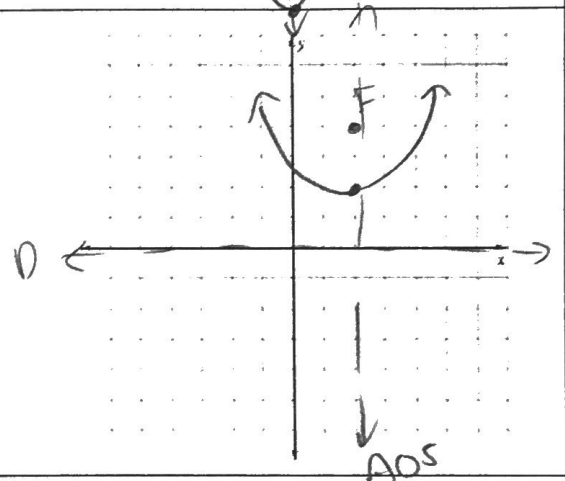
Axis of Symmetry:  $x=2$

Vertex:  $(2, 2)$

Directrix:  $y=0$

Focus:  $(2, 4)$

x	y



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

odd/neg

End Behavior:

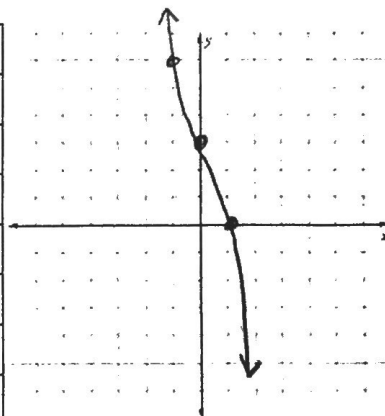
As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow +\infty$

As  $x \rightarrow +\infty$ ,  $f(x) \rightarrow -\infty$

Describe the intervals on which the function is positive and negative:

pos:  $(-\infty, 1)$   
 neg:  $(1, \infty)$

x	y
-2	15
-1	6
0	3
1	0
2	-9
3	-30



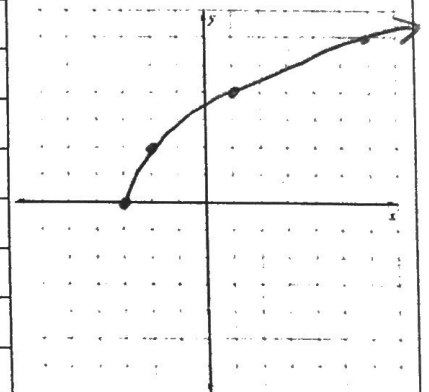
4.  $f(x) = 2\sqrt{x+3}$

Domain:  $x \geq -3$   
 Range:  $y \geq 0$

Describe the transformation from the parent function:

vertical stretch by 2  
 translated left + 3

x	y
-3	0
-2	2
1	4
6	6



## Simplify

5.  $(3-i)(4+2i)$

$$14 + 2i$$

hint:  
make a  
box

6.  $\frac{5}{(4+\sqrt{2})} \cdot \frac{(4-\sqrt{2})}{(4-\sqrt{2})}$

$$\frac{20 - 5\sqrt{2}}{16 - 2} = \boxed{\frac{20 - 5\sqrt{2}}{14}}$$

Solve:

7.  $-2(x-3)^2 = 10$

$$x = 3 \pm i\sqrt{5}$$

Solve the system:

8.  $y = 2x$

$x^2 + y^2 = 1$

$x^2 + (2x)^2 = 1$

$x^2 + 4x^2 = 1$

$5x^2 = 1$

$x^2 = \frac{1}{5}$

$x = \pm \sqrt{\frac{1}{5}}$

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

$y = 2 \left( \frac{\sqrt{5}}{5} \right)$

$y = \frac{2\sqrt{5}}{5}$

$y = 2 \left( \frac{-\sqrt{5}}{5} \right)$

$y = \frac{-2\sqrt{5}}{5}$

$\left( \frac{\sqrt{5}}{5}, \frac{2\sqrt{5}}{5} \right)$   
 $\left( -\frac{\sqrt{5}}{5}, \frac{-2\sqrt{5}}{5} \right)$

Factor given one factor:

9.  $2x^3 - 3x^2 - 23x + 12; (x+3)$

$$(2x-1)(x-4)(x+3)$$

Factor:

10.  $3x^2 - 14x - 24$

$$(3x+4)(x-6)$$

11. Write the equation of the conic section using the given information:

a) Parabola with vertex  $(1, 3)$  and focus  $(-4, 3)$ 

$$(y-3)^2 = -20(x-1)$$

b) Circle center  $(4, -5)$  and radius  $\sqrt{8}$ 

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

12. Solve:  $(3x+1)^3 = 8$ 

$$x = \frac{1}{3}$$