Label what form each function is in. Then graph each and list out the information wanted.

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

Form: Intercept

$a = 1$

X	-1
X	x^2	-X
3	3X	-3

$x^2 + 2x - 3$

$a = 1 \quad b = 2 \quad c = -3 \quad \dfrac{-(2)}{2(1)} = -1$
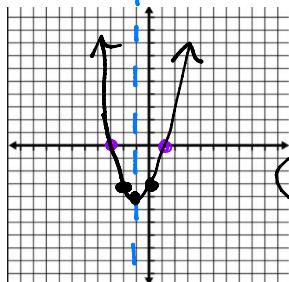
Vertex: $(-1, -4)$

x-ints:
$X - 1 = 0 \qquad X + 3 = 0$
$+1 +1 \qquad -3 \; -3$
$X = 1 \qquad X = -3$
$(1, 0) \qquad (-3, 0)$

Axis of Symm: $X = -1$

y-int: $(0, -3)$

$(-1)^2 + 2(-1) - 3$
$-4 \; k$

2) $y = 2(x - 2)(x - 6)$

Form: Intercept
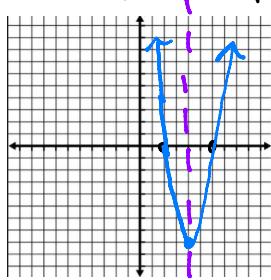
std. form
$\underline{2x^2 - 16x + 24}$
a

$2(4)^2 - 16(4) + 24 \quad 2(4-2)(4-6) =$
$= -8 \qquad\qquad -8$

Vertex: $(4, -8)$

x-ints:
$X - 2 = 0 \qquad X - 6 = 0$
$(2, 0) \qquad (6, 0)$

Axis of Symm: $X = 4$

y-int: $(0, 24)$

3) $f(x) = -x(x + 4)$

Form: Intercept
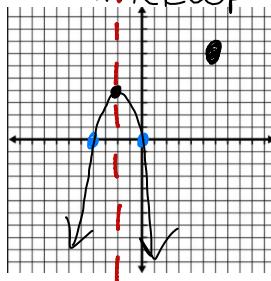
Std.
$-x^2 - 4x$
$-(-2)^2 - 4(-2)$
$-(-2)(-2+4)$
4

Vertex: $(-2, 4)$

x-ints:
$\begin{array}{cc} x = 0 & x + 4 = 0 \\ -1 & -4 \; -4 \\ & X = -4 \end{array}$
$X = 0 \qquad (-4, 0)$
$(0, 0)$

Axis of Symm: $X = -2$

y-int: $(0, 0)$

$a = -$

Based on these three, what do you know about the vertex and the two x-intercepts? Should the vertex be in the middle of the two numbers or not?

Vertex is ½ way between X-ints.

0   10
   5

Graph the following. Tell what form and list out the information needed.

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

Standard
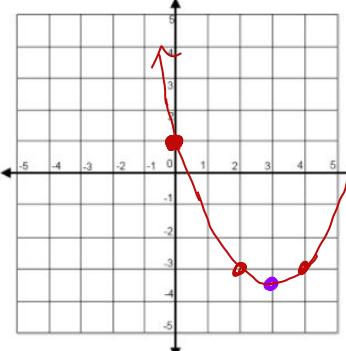
Vertex: $(3, -3.5)$

Axis of Symm: $X = 3$

Direction: UP

Vertical/Horizontal Stretch?
$\frac{1}{2} \rightarrow$ H. stretch

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

$\frac{-b}{2a}$

y-int: $(0, 1)$

$a = \frac{1}{2}$ $b = -3$ $c = 1$

$\frac{-(-3)}{2(\frac{1}{2})} = 3$ h

$\frac{1}{2}(3)^2 - 3(3) + 1$
-3.5 k

Make a table of values to graph

X	Y
2	-3
3	-3.5
4	-3

5) $f(x) = -4(x - 3)^2 - 1$ (h, k labeled)
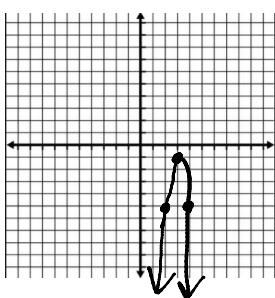
Vertex

Vertex: $(3, -1)$

Axis of Symm: $X = 3$

Direction: Down

Vertical/Horizontal Stretch?
$4 \rightarrow$ v. stretch

$-4(2-3)^2 - 1$

y-int:
$-4(0-3)^2 - 1$
$= -37$
$(0, -37)$

Make a table of values to graph

X	Y
2	-5
3	-1
4	-5

List out all the shifts/transformations each equation has done from the parent function $y = x^2$.

a. $y = -2x^2 - 4x$

Std. form $a = -2$
$b = -4$
$c = 0$ V. stretch
$\frac{-(-4)}{2(-2)} = -1$ h
$-2(-1)^2 - 4(-1) = 2$ k
$y = -2(x+1)^2 + 2$ left 1 up 2
Reflect left up

b. $f(x) = (x + 3)^2 - 7$

Vertex   ↓   Down 7

c. $y = \frac{1}{10}x^2 + 10$

Std. Vertex   ↓ up 10
H. stretch

d. $f(x) = -\frac{1}{3}(x - 2)^2 + 3$

Vertex   up 3
Reflect   Horiz stretch   Right 2

e. $f(x) = x^2 - 10x - 7$ $a = 1$ $b = -10$ $c = -7$

Std. form
$y = 1(x-5)^2 - 32$
Right 5 Down 32
$\frac{-(-10)}{2(1)} = 5$ h
$(5)^2 - 10(5) - 7$
-32 k