Writing an Equation from a Graph...

(Read this one)

3 methods... they all work... choose what works for you.

I. If you know the vertex and another point:

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

* plug in the vertex $(2,9) = (h,k)$

$y = a(x-2)^2+9$

* plug in another point $(4,1) = (x,y)$ ← It's your choice... they all work!

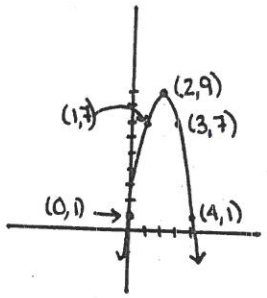
$1 = a(4-2)^2+9$

$1 = a\cdot 2^2+9$

$-8 = 4a$

$-2 = a$

$y = -2(x-2)^2+9$



II. If you know the roots & another point:

$y = a(x-root)(x-root)$

* plug in the roots

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

* plug in another point $(2,-6) = (x,y)$ ← It's your choice... just don't reuse a root!

$-6 = a(2+1)(2-3)$

$-6 = a\cdot 3\cdot -1$

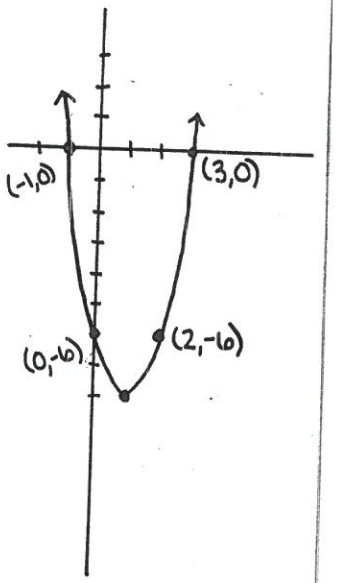
$-6 = -3a$

$2 = a$

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

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

$y = 2x^2-4x-6$



III. If you have 3 points: $(-1,6)$, $(0,5)$, $(1,10)$

$y = ax^2+bx+c$

* If one point has a zero, plug that one in ☺

$(0,5) = (x,y)$

$5 = a\cdot 0+b\cdot 0+c$ $\quad c = 5$ ← Now, I know $y = ax^2+bx+5$ ☺

* plug in each other point... use systems of equations:

$y = ax^2+bx+5$

$(-1,6)$ $\quad 6 = a\cdot 1+b\cdot -1+5$ $\quad 1 = a-b$

$(1,10)$ $\quad 10 = a\cdot 1+b\cdot 1+5$ $\quad 5 = a+b$

$1 = a-b$

$5 = a+b$

$6 = 2a$

$3 = a$

Plug $a=3$ into either $1=a-b$ or $5=a+b$

$1 = 3-b$ $\quad 2 = b$

$5 = 3+b$ $\quad 2 = b$

So, $a=3$, $b=2$, $c=5$

Answer: $y = 3x^2+2x+5$

WRITING THE EQUATION OF A QUADRATIC FUNCTION

Part 1: Write AN equation of a parabola that opens up, and has the following x intercepts.

1) (-3,0) and (4,0) 2) (-12,0) and (-3,0) 3) (2,0) and (5,0)

Part 2: Find AN equation of a parabola that opens down, and has the following x intercepts.

4) (-2,0) and (6,0) 5) (1,0) and (7,0) 6) (5,0)

Part 3: Write the equation of a parabola that:

7) has a vertex of (-3,2) and contains the point (4,7).

8) has a vertex of (4,5) and contains the point (-2,-2).

9) has a vertex of (-2,-3) and contains the point (4,1).

10) has a vertex of (0,3) and passes the x axis at (7,0).

11) has a vertex of (3,-1) and has a y intercept of (0,-8).

12) has a vertex of (5,0) and has a y intercept of (0,-12).

13) passes through (1,6), (2,5) and (0,5).

14) passes through (0,6), (2,2) and (5,11).

15) passes through (3,-10), (4,0) and (6,8).

16) passes through (0,6), (-6,0) and (2,16).

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