

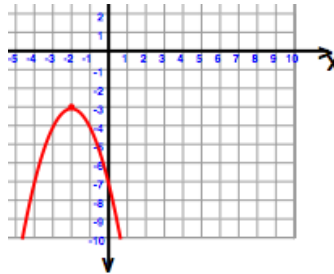
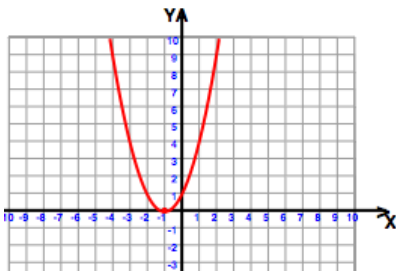
**College Bound Math Solutions #12**  
week of January 19, 2015

1. Some 8th graders may have only plotted straight lines, but the principle with these quadratic (second degree) functions is the same. They should know how to square a number.

x	$y=(x+1)^2$	y value
-4	$(-4+1)^2$	$(-3)^2 = 9$
-3	$(-3+1)^2$	$(-2)^2 = 4$
-2	$(-2+1)^2$	$(-1)^2 = 1$
-1	$(-1+1)^2$	$(0)^2 = 0$
0	$(0+1)^2$	$(1)^2 = 1$
1	$(1+1)^2$	$(2)^2 = 4$

x	$y=- (x+2)^2 - 3$	y value
-4	$- (-4+2)^2 - 3$	$-(-2)^2 - 3 = -7$
-3	$- (-3+2)^2 - 3$	$-(-1)^2 - 3 = -4$
-2	$- (-2+2)^2 - 3$	$-(0)^2 - 3 = -3$
-1	$- (-1+2)^2 - 3$	$-(1)^2 - 3 = -4$
0	$- (0+2)^2 - 3$	$-(2)^2 - 3 = -7$
1	$- (1+2)^2 - 3$	$-(-3)^2 - 3 = -12$

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



2. No math is required, just web search for some of the many practical uses of parabolas. More broadly, people who think high school math is impractical are not looking in the right places. This problem is an attempt to spark some interest (excitement?) by pointing out some of those places.
3. (a) The three points, in the order given, have distances of 1, 2, and 5 from the x-axis, so the issue is to show that they also have distances of 1, 2, and 5 from the point (0,2):
- 1: (0,1) and (0,2) have the same x-coordinate and differ by 1 in the y direction.
  - 2: (2,2) and (0,2) have the same y-coordinate and differ by 2 in the x direction.
  - 5: (4,5) and (0,2) have x values that differ by 4 and y values that differ by 3. Draw line segments from (0,2) to (4,2) to (4,5) and back to (0,2). This is a 3-4-5 right triangle with hypotenuse 5.
- (b) (-2,2) and (-4,5)
- (c) Anyone who got this far can do this one too.