Intersections
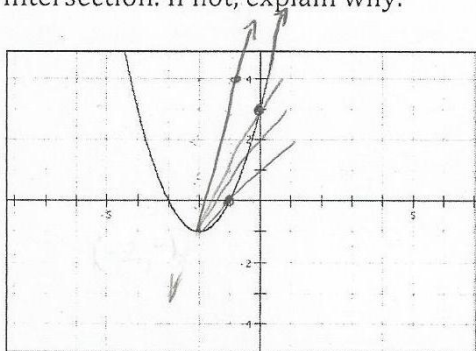
A line with slope 5 passes through the vertex of this parabola. Does it intersect the parabola in another point (other than the vertex)? If so, find the point of intersection. If not, explain why.

No, the right side of the parabola has slope of 3, so the line is too steep to intersect it again.

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

$(y+1) = 5(x+2)$

Now, think of all possible lines that pass through the vertex of this parabola. Which lines intersect the parabola again at another point and which ones do not? Explain.

Will pass through again:

$y = 1x + 1$

$y = 2x + 3$

or slope smaller than 3

Will **not** pass through:

any line with slope 5 or bigger since line will be steeper than parabola.

Finally, think of all possible lines with a slope of 5. Which of the lines intersect the parabola? How many times? Explain.

All lines with slope 5 will intersect the parabola one time. If the y-intercept is negative, it will intersect the parabola far to the right since the parabola is getting wider.