"How does the equation $y = a(x-r)(x-s)$ relate to it's graph?"

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

x	y
-6	42
-5	24
-4	10
-3	0
-2	-6
-1	-8
0	-6
1	0
2	10
3	24
4	42
5	64
6	90

because...

$2(-6-1)(-6+3) = 2(-7)(-3)$
$= 2(21)$
$= 42$

and so on...

$2(6-1)(6+3) = 2(5)(9)$
$= 2(45)$
$= 90$

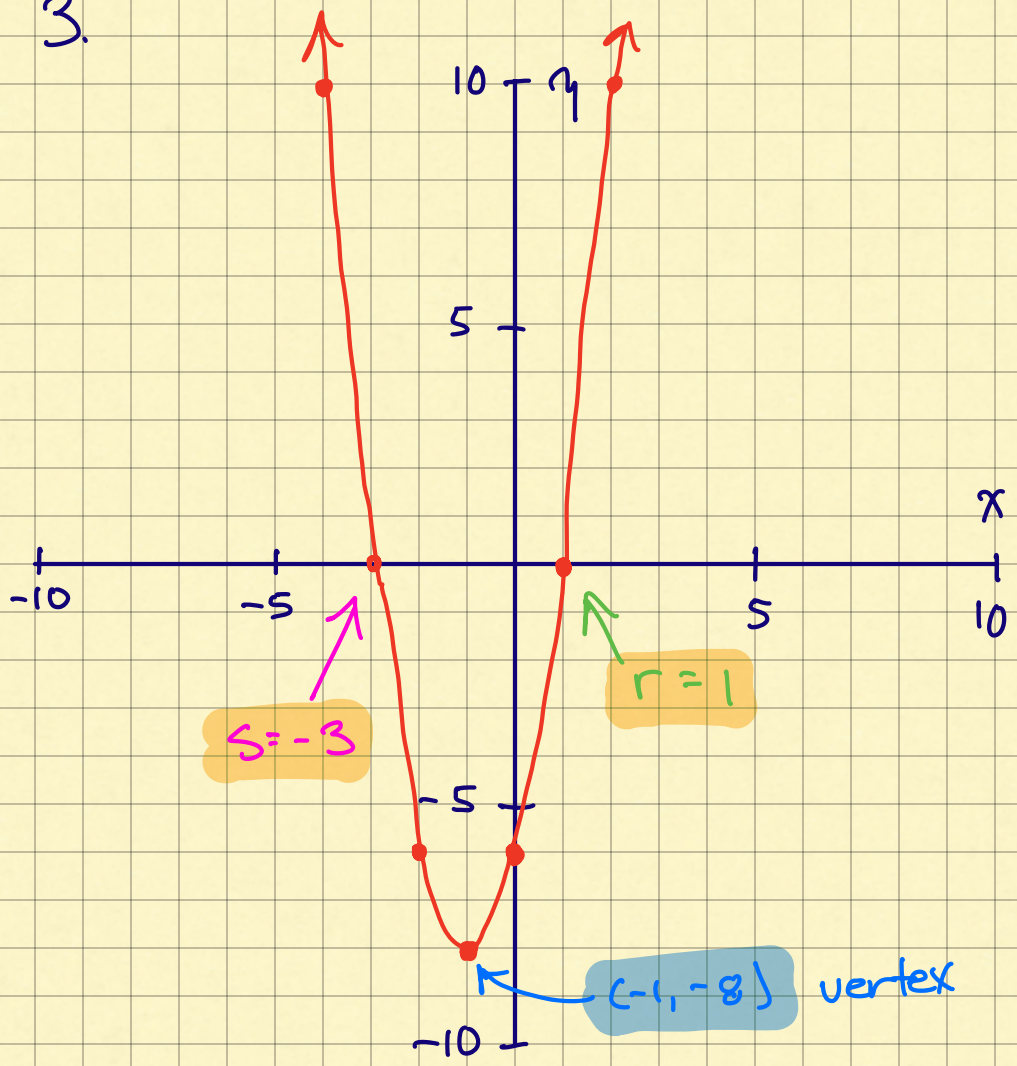
2.

x	y	1st	2nd
-6	42		
-5	24	-18	
-4	10	-14	4
-3	0	-10	4
-2	-6	-6	4
-1	-8	-2	4
0	-6	2	4
1	0	6	4
2	10	10	4
3	24	14	4
4	42	18	4
5	64	22	4
6	90	26	

vertex

The relation $y = 2(x-1)(x+3)$ is quadratic since the second differences are constant.

3.



4. The x-intercepts are 1 and -3.

The equation is $y = 2(x-1)(x+3)$

The intercepts can be identified as the constant term inside each set of brackets, but with the opposite sign.

For example: $y = a(x-r)(x-s)$

$y = 2(x-1)(x-(-3))$ } equivalent

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

5. The vertex is at $(-1, -8)$.

$$\text{x-value of vertex} = \frac{r+s}{2} = \frac{1+(-3)}{2} = \frac{-2}{2} = -1$$

(continued on next page)

y-value of vertex sub x-value into equation

$y = 2(x-1)(x+3)$
$= 2(-1-1)(-1+3)$
$= 2(-2)(2)$
$= 2(-4)$
$= -8$

$\therefore$ vertex is at $(-1, -8)$

6.
- Get x-intercepts by looking for "r" and "s".
- Average the intercepts to get x-value of vertex
- Substitute x-value of vertex into equation to get y-value of vertex.

7.

$y = -\frac{1}{2}(x+2)(x-6)$

$y = -\frac{1}{2}(x-(-2))(x-6)$

x-ints $r = -2$ $s = 6$

vertex

x-value

$\frac{r+s}{2} = \frac{-2+6}{2} = \frac{4}{2} = 2$

y-value

$y = -\frac{1}{2}(x+2)(x-6)$
$= -\frac{1}{2}(2+2)(2-6)$
$= -\frac{1}{2}(4)(-4)$
$= -\frac{1}{2}(-16)$
$= 8$ $\therefore$ vertex is $(2, 8)$