

4.4 Graphing in factored form- Notes

Factored form: $y = a(x-h)(x-q)$

Where p and q are the x-intercepts (change sign!)

The axis of symmetry is halfway between $\rightarrow \frac{p+q}{2}$.

The vertex is on the AOS - Plug it in!.

Example: Graph $y = (x - 5)(x + 1)$

What are the x-intercepts?

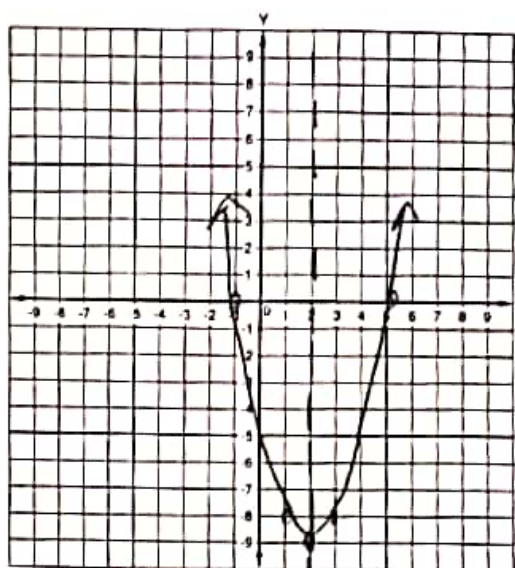
$$(5, 0) \quad (-1, 0)$$

Where is the axis of symmetry?

$$\frac{5 + (-1)}{2} = 2$$

Where is the vertex?

$$\begin{aligned} (2-5)(2+1) \\ (-3)(3) = -9 \\ (2, -9) \end{aligned}$$



$$\begin{aligned} (1-5)(1+1) \\ -4(2) \\ -8 \end{aligned}$$

Example: Graph $y = (x - 4)(x + 2)$

X-intercepts:

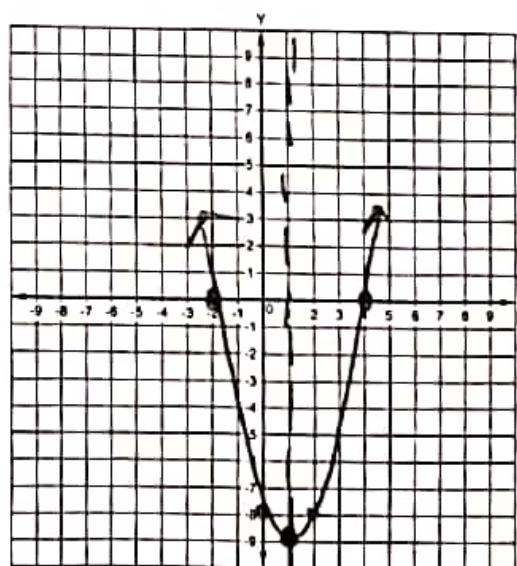
$$(4, 0) \quad (-2, 0)$$

Axis of symmetry:

$$1$$

Vertex:

$$\begin{aligned} (1-4)(1+2) \\ = -9 \\ (1-4)(1+2) \\ = -9 \\ (1, -9) \end{aligned}$$



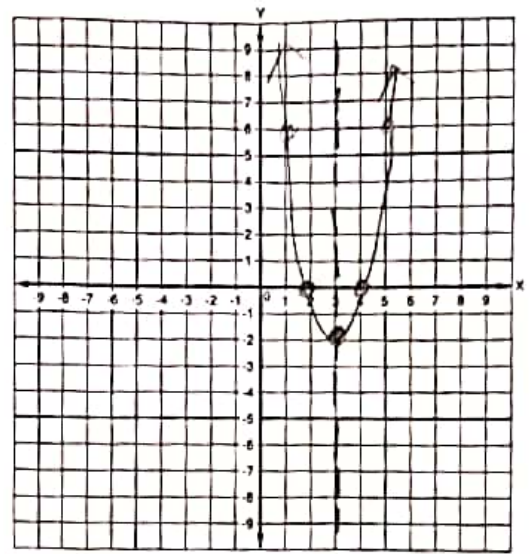
Re-write in factored form, and then graph. $y = 2x^2 - 12x + 16$

Factored form: $2(x^2 - 6x + 8)$
 $2(x-4)(x-2)$

x-intercepts: $(4,0)$ $(2,0)$

Axis of symmetry: 3

Vertex: $2(3-4)(3-2)$
 $2(-1)(1)$
 $= -2$



$$2(1-4)(1-2)$$
$$2(-3)(-1)$$
$$= 6$$

Re-write in factored form, and then graph. $y = -3x^2 + 12$

Factored form: $-3(x^2 - 4)$
 $-3(x+2)(x-2)$

x-intercepts: $2, -2$

Axis of symmetry: 0

Vertex: $0, 12$

$$-3(1+2)(1-2)$$
$$-3(3)(-1)$$
$$= 9$$

