Graphing from Factored Form
of a Quadratic Equation

Example: $f(x) = 2(x - 3)(x + 2)$

x-intercepts:

$0 = 2(x-3)(x+2)$

$2 \neq 0$ OR $x-3=0$ OR $x+2=0$

$\phantom{2 \neq 0 \text{ OR }} +3 +3 \phantom{\text{ OR } x} -2 -2$

$\phantom{2 \neq 0 \text{ OR }} x = 3, -2$

$\boxed{(3,0) \ \& \ (-2,0)}$

1. Find the x-intercepts using **Zero Product Property.**

$\text{If } a \cdot b = 0, \text{ THEN } a=0 \text{ or } b=0$

*These are points → $(x, 0)$

Line of symmetry:

$x = \dfrac{3 + (-2)}{2} = \dfrac{1}{2}$

$\boxed{x = \dfrac{1}{2}}$

2. Find the line of symmetry by **averaging the values of the x intercepts.** *This is an EQUATION of a line!!

Vertex:

$f(\tfrac{1}{2}) = 2(\tfrac{1}{2} - 3)(\tfrac{1}{2} + 2)$

$\phantom{f(\tfrac{1}{2})} = 2(\tfrac{1}{2} - \tfrac{6}{2})(\tfrac{1}{2} + \tfrac{4}{2})$

$\boxed{(\tfrac{1}{2}, -\tfrac{25}{2})} \quad = 2(-\tfrac{5}{2})(\tfrac{5}{2}) = -\tfrac{25}{2}$

3. Find the vertex by **evaluating the function at the x value of the line of symmetry**

y-intercept:

$f(0) = 2(0-3)(0+2)$

$(0, -12) \quad = 2(-3)(2)$

$ = -12$

4. Find the y-intercept by **evaluating the function at x=0**.

extra point to fill in parabola...

$f(2) = 2(2-3)(2+2)$

$ = 2(-1)(4) \quad \boxed{(2, -8)}$

$ = -8$

5. You may need to plug in a few other inputs to fill in the parabola. Use the **line of symmetry** to help graph.