Finding x-intercepts in Quadratic Equations

An x-intercept is that point where the graph crosses the x-axis. This means $y=0$.

From Factored Form:

1. Substitute $y=0$.
2. Use Zero Product Property.
   If $a \cdot b = 0$, THEN $a=0$ OR $b=0$.
3. Solve the equations.
4. Put in coordinate form.

Example: $f(x) = 4(3x-2)(x+8)$

$0 = 4(3x-2)(x+8)$

$4 \neq 0$ OR $3x-2=0$ OR $x+8=0$

$+2 \quad +2 \qquad -8 \quad -8$

$\frac{3x}{3} = \frac{2}{3} \qquad x = -8$

$x = \frac{2}{3}$

$(\frac{2}{3}, 0)$ & $(-8, 0)$ are the x intercepts.

From Vertex Form:

1. Substitute $y=0$.
2. Solve the equation.
   i) Add 27 to both sides.
   ii) Divide both sides by 3.
   iii) Square root both sides.
   iv) There are TWO roots... one negative one positive
   v) Add 4 to both sides.
3. Put in coordinate form.

Example: $g(x) = 3(x-4)^2 - 27$

$0 = 3(x-4)^2 - 27$

$+27 \qquad +27$

$\frac{27}{3} = \frac{3(x-4)^2}{3}$

$\sqrt{9} = \sqrt{(x-4)^2}$

$\pm 3 = x-4$

$+4 \quad +4$

$x = 4 \pm 3$

$x = 4-3 \qquad x = 4+3$

$x = 1, 7$

$(1, 0)$ & $(7, 0)$ are the x intercepts.