Methods to Find x-intercepts of Quadratic Functions

The x-intercepts of a function are the points where the graph crosses the x-axis. This means that $f(x)=0$.

Examples:

$f(x) = x^2 - 13x - 30$

Easily factorable so use

FACTORING and Zero Product Property

$0=x^2-13x-30$

$0=(x-15)(x+2)$ (−30: +2, −15, −13)

$x-15=0 \quad x+2=0$

$x=15,-2$

x-int: $(15,0)$ & $(-2,0)$

$g(x) = 2x^2 - 12x - 6$

$2(x^2-6x-3)$

Not factorable, $\frac{b}{a}$ is an even integer, so

COMPLETE the SQUARE and root to solve.

$0=(2x^2-12x)-6$

$0=2(x^2-6x+(-3)^2)-6-2(-3)^2$

$0=2(x-3)^2-6-18$

$0=2(x-3)^2-24$

$+24 \quad +24$

$\frac{2(x-3)^2}{2}=\frac{24}{2}$

$(x-3)^2=12$

$x-3=\pm\sqrt{12}$

$x=3\pm2\sqrt{3}$

$x\approx -0.46, 6.46$

x-int: $(3+2\sqrt{3},0)$ & $(3-2\sqrt{3},0)$

or $\approx (6.46,0)$ & $(-0.46,0)$

$h(x) = 5x^2 + 4x - 10$

Not factorable, $\frac{b}{a}$ is $\frac{4}{5}$, so don't want to have to complete the square, so

QUADRATIC FORMULA

$0=5x^2+4x-10$

$a=5 \quad b=4 \quad c=-10$

$x=\frac{-b}{2a}\pm\frac{\sqrt{b^2-4ac}}{2a}$

$x=\frac{-4}{10}\pm\frac{\sqrt{16-4(5)(-10)}}{10}$

$x=-\frac{2}{5}\pm\frac{\sqrt{16+200}}{10}$

$x=-\frac{2}{5}\pm\frac{\sqrt{216}}{10}$

$x=-\frac{2}{5}\pm\frac{6\sqrt{6}}{10}$

$x=-\frac{2}{5}\pm\frac{3\sqrt{6}}{5}$

$x\approx -1.87, 1.07$

x-int: $\left(\frac{-2+3\sqrt{6}}{5},0\right)$ & $\left(\frac{-2-3\sqrt{6}}{5},0\right)$

or $\approx (1.07,0)$ & $(-1.87,0)$

$216 = 4 \cdot 54 = 6 \cdot 9$