Real Zeros

The height of this motorcyclist is modeled by $h(t) = -20t^2 + 40t$ where t is the amount of time in seconds since he started his jump.

1. Find the x-intercepts of the function discussed above by solving $-20t^2 + 40t = 0$. Then interpret your answers. What do they mean in this scenario?

X-intercepts are so important they have more than one name. They are also called **real zeros**, **solutions** and **roots**. We call them "zeros" because they are the values of x that make $f(x) = 0$.

Solving Polynomial Equations

Since the quadratic formula only works for quadratic equations, factoring is the only method we have of solving polynomials with higher degrees. We can use the same principles.

2. Find the real zeros of $p(x) = 2x(x-3)^2(x+5)^3(x^2-1)(x^2+25)$

Big idea #1:   If $(x - 3)$ is a **factor** of $f(x)$,   then $x = 3$ is a **zero** of $f(x)$

It works the other way, too. If $x = -2$ is a **zero** of $f(x)$, then $(x - (-2)) = (x + 2)$ is a **factor** of $f(x)$.

3. Write the equation of a function with zeros at $x = -1$, $x = 2$ and $x = 3$.

Factoring by grouping

Find the x-intercepts	
$f(x) = x^3 - 4x^2 - x + 4$	$f(x) = 2x^3 + 6x^2 - 2x - 6$