

Consider the cost of gas being \$3.50 per gallon.

Come up with a model for the cost to fill a tank of gas.

Definition: For two variables,  $x$  and  $y$ , we say that  $y$  is proportional to  $x$  if there is a constant value  $k$  so that:

$$y = k \cdot x$$

$k$  is called the constant of proportionality

If you drop an object and let it hit the ground, the time it takes for the object to hit the ground is proportional to the square root of the height it was dropped from.

$t$  = time for the object to hit the ground

$h$  = height from which the object is dropped

$$t = k \cdot \sqrt{h}$$

Suppose we drop a water balloon from 100 feet high and it takes roughly 2.5 seconds to hit the ground.

What is  $k$ ?

How long would it take if we dropped it from 400 feet?

Note: We can re-write  $\sqrt{h} = h^{.5}$

Definition: A function  $f(x)$  is called a power function if  $f$  is proportional to a power of  $x$ .

A function that is a sum of power functions is called a polynomial.

Example: