Chapter 1: Linear Functions

? What is a linear function ?

Section 1.1: Slopes & Equations of Lines

We can model some real world situations using "mathematical models" to examine trends & make predictions in situations where 2 quantities are related.

ex) A Bank account pays 6% simple interest per year. How much interest do you make in 1 year?

We graph these pairs on a "Cartesian Co-ordinate System":

Slope of a Line: represents "steepness"

? How do we find the slope of a line ?

ex) Find the slope of the line through

ex// graph the line passing 'gh (2, 1) with slope $\frac{1}{2}$

Equations of a Line:

1) Slope-Intercept Form:

ex// Find the eqn' of the line w/ slope 1 & y int. 7

2) Point-slope Form:

ex// Find the eqn' of the line w/ slope 2 & going through (1, -1)

Section 1.2: Linear Functions & Applications

In situations such as we have been discussing, we say that y is a "linear function" of x.

y is the dependent variable
x is the independent variable

Defn!: a LINEAR FUNCTION is a relationship f defined by $y = f(x) = mx + b$ for real numbers m & b

ex Suppose an economist has studied the supply & demand for vinyl siding & has determined that the price per square yard P & the quantity demanded monthly q are related by the linear function $P = D(q) = 60 - \frac{3}{4}q$ (DEMAND)

While the price P & supply S are related by $P = S(q) = \frac{3}{4}q$ (SUPPLY)

a) Find the demand at a price $45 & $18.

b) Find supply at a price of $60, & $12.

c) Graph both fcn's on the same axis
Look at the ordered pairs:

? What happens where the supply & demand curves cross ?

This is called the "equilibrium", it is when the supply & demand are equal.

So our "equilibrium price" is

& our "equilibrium quantity" is

ex find the equilibrium from the previous example without graphing

Cost: The cost of manufacturing consists of a "fixed cost" & a "cost per item"

ex) The marginal cost to make x units of feed is $20 & the company charges $24. The cost to produce 10 units is $300.

a) find the cost fcn' $C(x)$

b) how many units must be sold for the firm to break even?