Monday February 23rd, 2015 Name: SOLUTIONS

ID #:

Math 102-001 Winter 2015 Quiz #3

1. An indie rock band is selling their CDs at concerts. They find that they can sell 30 CDs a night at a price of \$15 each. Raising the price to \$18 lowers sales to 22 CDs a night.

[10 marks]

a) Find an equation for the price of the CDs in terms of the quanity sold, assuming it is linear. Give your final answer in the form $p = mx + b$

USE POINTS $(x, p) = (30, 15)$ AND $(22, 18)$

FIND SLOPE $m = \frac{\text{RISE}}{\text{RUN}} = \frac{-3}{8}$ $\left(\text{OR } -0.375\right)$

FIND INTERCEPT:

$$p = mx + b$$

$$15 = \left(-\tfrac{3}{8}\right)(30) + b$$

$$b = 15 + \tfrac{90}{8}$$

$$= 26\tfrac{1}{4} \quad (\text{OR } 26.25)$$

THE EQUATION IS

$$p = -3/8\, x + \frac{105}{4}$$

$$(\text{OR} \quad = -0375\, x + 26.25)$$

b) What price would they need to charge if they wanted to sell 34 CDs a night?

LET $x = 34$ TO GET PRICE

$$p = -3/8\,(34) + \frac{105}{4} = 13.5$$

THEY NEED TO CHARGE \$13.50 PER CD.

c) If they charged \$18.75 per CD, how many CDs could they expect to sell a night?

LET $p = 18.75$, SOLVE

$$18.75 = -\frac{3}{8}x + \frac{105}{4}$$

FOR $x = 20$

THEY WOULD SELL 20 CDs A NIGHT.

2. Consider two lines: $y = 2 - 3x$ and $y = \frac{1}{3}x + 1$ *[10 marks]*

a) At what point (x,y) will the two lines intersect?

SOLVE $2 - 3x = \frac{1}{3}x + 1$

$1 = \frac{10}{3}x \Rightarrow x = \frac{3}{10}$

AND $y = 2 - 3\left(\frac{3}{10}\right) = \frac{11}{10}$

THEY INTERSECT AT $(x, y) = \left(\frac{3}{10}, \frac{11}{10}\right)$

OR $= (0.3, 1.1)$

b) At what angle will the two lines intersect? Why?

AT 90° SINCE SLOPES $m = -3$ AND $m = +\frac{1}{3}$ ARE NEGATIVE RECIPROCALS

c) Sketch and label both lines on the given axis.