Friday, Sept. 21st

Name: SOLUTIONS

ID #:

Math 102-001 Fall 2012 Quiz #1

1. A cell phone company offers a service plan with a monthly $10 flat fee, and every minute of cell-phone use costs an additional five cents. *[6 marks]*

a) Define appropriate variables and units and state an equation that models the total monthly cost of this plan in terms of the number of minutes the cell-hone was used.

LET C BE COST PER MONTH (IN $)

x BE THE NUMBER OF MINUTES USED

THEN

$$C = 10 + 0.05x$$

(COST IN PENNIES IS ALSO ACCEPTABLE, IE $C = 1000 + 5x$)

b) Use the model to determine the number of minutes you could use a phone if you had a monthly budget of $35.

LET $C = 35$, SOLVE $35 = 10 + 0.05x$

FOR $x = 500$

YOU WOULD HAVE 500 MINUTES.

2. Evaluate and simplify: *[6 marks]*

a) $\dfrac{1}{8^{-\frac{2}{3}}}$ $= 8^{2/3} = \left(\sqrt[3]{8}\right)^2 = 2^2 = 4$

b) $\dfrac{\sqrt{16x^4y^8}}{2xy^2}$ $= \dfrac{4x^2y^4}{2xy^2} = 2xy^2$

c) $\dfrac{3x}{5} + \dfrac{x^2-1}{3x}$ $= \dfrac{9x^2 + 5x^2 - 5}{15x} = \dfrac{14x^2 - 5}{15x}$

3. Define the following expressions:

$$A = x^2 - x - 12$$
$$B = xy^2 + X$$
$$C = x^3y^2 - xy^2$$

a) Completely factor each of these three expressions. If an expression cannot be factored (relative to the integers), state that it is prime. *[8 marks]*

i) $A =$ $(x-4)(x+3)$

ii) $C =$ $xy^2(x^2-1)$

$= xy^2(x-1)(x+1)$

b) Evaluate and simplify (i.e. combine like terms) the expression for

i) ~~$B-2C$~~ $B-2C$ ~~$Bx-2xC$~~

$(xy^2+X) - 2(x^3y^2 - xy^2)$

$= xy^2 + X - 2x^3y^2 + 2xy^2$

$= 3xy^2 + X - 2x^3y^2$

ii) B^3

$= (xy^2)^3 + 3(x^2y^2)^2(x) + 3(x^2y^2)(x^2) + x^3$

$= x^3y^6 + 3x^5y^4 + 3x^4y^2 + x^3$

(OR $x^3(y^6 + 3x^2y^4 + 3xy^2 + 1)$)

$= (xy^2+x)^3 = (xy^2)^3 + 3(xy^2)^2(x) + 3(xy^2)(x)^2 + x^3$

$= x^3y^6 + 3x^2y^4x + 3xy^2x^2 + x^3$

$= x^3y^6 + 3x^3y^4 + 3x^3y^2 + x^3$

$= x^3(y^6 + 3y^4 + 3y^2 + 1)$