MAT 1033 REVIEW FOR TEST 3

This review cover sections 4.5, 5.4, 5.5, 5.6, and 5.7.

1. Graph the solution set.

a.) $\begin{cases} x \geq -3 \\ x + 2y < 4 \end{cases}$ b.) $\begin{cases} x + y \geq -1 \\ x + 3y \leq 3 \end{cases}$

2. Divide by long division.

a.) $(6x^2 + 13x + 8) \div (2x + 1)$ b.) $\dfrac{x^4 + 2x^3 - x + 2}{x - 2}$

c.) $\dfrac{8 - 9x^3 + 3x + 4x^4}{x - 3}$ d.) $(5x^2 - 13x + 8) \div (x - 1)$

3. Factor completely.

a.) $6x^2 + 5x + 1$ b.) $12x^2 + 28x - 5$

c.) $16 - (x - 3)^2$ d.) $27x^3 - 8y^3$

e.) $2y^4 - 26y^3 - 96y^2$ f.) $8a^3 - 2a$

g.) $a^4 - 81$ h.) $a^4b^4 + 11a^2b^2 - 26$

i.) $9x^2 - 13x - 4$ j.) $5y^2 - 22y + 8$

k.) $12x^2 + 23x + 5$ l.) $2x^2 - 27x - 14$

4. Solve.

a.) $4x^2 + 5x - 6 = 0$ b.) $5y^2 - 22y + 8 = 0$

c.) $2x^2 - 27x = 14$ d.) $4x^2 - 16x = 0$

e.) $a(a + 7) = -12$ f.) $(x + 2)(x - 6) = 20$

g.) The sum of a number and its square is 72. Find the number.

h.) The height, *h*, in feet, an object will attain (neglecting air resistance) in *t* seconds is given by $h = vt - 16t^2$, where *v* is the initial velocity of the object in feet per second. A homerun ball leaves a bat with an initial velocity of 96 ft/s. How many seconds later will the ball hit the ground?

i.) The sum of a number and its square is 56. Find the number.

j.) An arrow is shot into the air with an upward velocity of 48 ft/s from a hill 32 feet high. How many seconds later will the arrow be 64 feet above the ground? Use the equation $h = 32 + 48t - 16t^2$, where *h* is the height in feet and *t* is the time in seconds.

k.) The length of a rectangle is 2 feet more than twice the width. The area of the rectangle is 84 ft^2. Find the length and width of the rectangle.

2. a. $3x + 5 + \dfrac{3}{2x + 1}$ b. $x^3 + 4x^2 + 8x + 15 + \dfrac{32}{x - 2}$ c. $4x^3 + 3x^2 + 9x + 30 + \dfrac{98}{x - 3}$ d. $5x - 8$

3. a. $(3x + 1)(2x + 1)$ b. $(6x - 1)(2x + 5)$ c. $(7 - x)(1 + x)$ d. $(3x - 2y)(9x^2 + 6xy + 4y^2)$
e. $2y^2(y - 16)(y + 3)$ f. $2a(2a - 1)(2a + 1)$ g. $(a - 3)(a + 3)(a^2 + 9)$
h. $(a^2b^2 - 2)(a^2b^2 + 13)$ i. Prime j. $(5y - 2)(y - 4)$ k. $(4x + 1)(3x + 5)$
l. $(2x + 1)(x - 14)$

4. a. $x = \frac{3}{4}, x = -2$ b. $y = \frac{2}{5}, y = 4$ c. $x = -\frac{1}{2}, x = 14$ d. $x = 0, x = 4$

e. $a = -3, a = -4$ f. $x = 8, x = -4$ g. -9, 8 h. 6 seconds i. -8, 7

j. between 1 and 2 seconds k. length =14 ft, width=6 ft