MAT 011, Exam #4 Review   Name ___KEY___

1. Factor each polynomial completely.

a. $x^2 + 11x + 28$ $(x+4)(x+7)$

b. $4(a+3) - y(a+3)$ $(4-y)(a+3)$

c. $9x^3 + 39x^2 + 12x$ $3x(3x^2+13x+4) = 3x(3x+1)(x+4)$

d. $y^2 - 8y - 48$ $(y-12)(y+4)$

e. $20x^2 + 12x$ $4x(5x+3)$

f. $10a^2 + 5ab + 7b^2 + 14ab$ $5a(2a+b) + 7b(b+2a) = (2a+b)(5a+7b)$

g. $x^2 + x + 2$ prime

h. $32 + 12x - 4x^2$ $-4x^2+12x+32 = -4(x^2-3x-8)$

i. $10a^3 - 110a^2 + 100a$ $10a(a^2-11a+10) = 10a(a-10)(a-1)$

j. $4x^2 - 81$ $(2x-9)(2x+9)$

k. $10y^3 + 25y^2 - 60y$ $5y(2y^2+5y-12) = 5y(2y-3)(y+4)$

l. $9t^2 - 25s^2$ $(3t+5s)(3t-5s)$

m. $x^3 - 8y^3$ $(x-2y)(x^2+2xy+4y^2)$

n. $54 + 2x^3y^3$ $2(27+x^3y^3) = 2(3+xy)(9-3xy+x^2y^2)$

o. $x^4 + 16$ prime

p. $m^2 - \frac{4}{25}$ $(m-\frac{2}{5})(m+2/5)$

q. $(x+7)^2 - y^2$ $(x+7-y)(x+7+y)$

2. Solve the equation.

a. $3x(x+1)(7x-2) = 0$ $x=0, \ x=-1, \ x=\frac{2}{7}$

b. $x^2 + 8x + 7 = 0$ $(x+7)(x+1)=0$ $x=-7, \ x=-1$

c. $x(x-10) = -16$ $x^2-10x+16=0$ $(x-2)(x-8)=0$ $x=2,8$

$S6.6=$

d. $56x^2 - 5x - 6 = 0$ $(7x+2)(8x-3)=0$ $x=-\frac{2}{7}, \ \frac{3}{8}$
$56x^2-21x+16x-6$ $7x(8x-3)+2(8x-3)$

e. $5x^3 + 20x^2 + 20x = 0$
$5x(x^2+4x+4) = 5x(x+2)^2 = 0$ $x=0, x=-2$

3. Find two consecutive positive integers whose product is 380.

$19, 20$

$$X(X+1)=380 \quad X^2 + X - 380 = 0 \quad (X+20)(X-19)=0 \quad X=-20 \text{ disregard} \quad \boxed{X=19}$$

4. An object is dropped from the top of the Woolworth Building on Broadway in New York City. The height h of the object t seconds is given by the equations $h = -16t^2 + 784$. How many seconds before the object reaches the ground?

$$-16t(t-49)=0 \quad t=0, \ t=49 \qquad 49 \text{ seconds}$$

5. The width of a rectangle is four inches less than its length. Its area is 12 square inches. Find the dimensions of the rectangle.

x

$x-4$
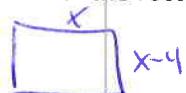
$6 \text{ and } 2$

$$X(X-4)=12 \quad (X-6)(X+2)=0$$
$$X^2 - 4X - 12 = 0 \quad \boxed{X=6} \quad X=-2 \text{ (disregard)}$$

6. Find the lengths of the sides of a right triangle if the hypotenuse is 10 cm longer than the shorter leg and 5 cm longer than the longer leg.

$25 = X+10$ $X+5 = 20$

$X = 15$
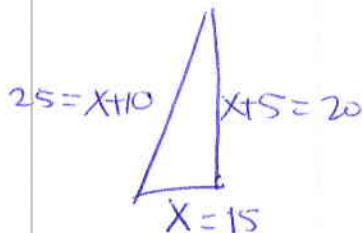
$$X^2 + (X+5)^2 = (X+10)^2$$

$$X^2 + X^2 + 10X + 25 = X^2 + 20X + 100$$

$$X^2 - 10X - 75 = 0$$

$$(X-15)(X+5)=0$$

$$X = 15, \ X = -5 \text{ disregard}$$