

MONTGOMERY COLLEGE
Department of Mathematics
Rockville Campus

MA 103 KATIRAIE QUIZ #6B Part I SECTIONS (5.5 - 5.6) FALL 2006

NAME _____

SCORE: _____ / 10

*** RETAIN ALL GRADED PAPERS FOR YOUR RECORDS ***

1) Factor the following:

a) $81 - (n+3)^2$

$$\begin{aligned} &= (9 - (n+3))(9 + (n+3)) \\ &= (9 - n - 3)(9 + n + 3) \\ &= (6 - n)(12 + n) \end{aligned}$$

b) $3t^2 - 5t - 8$

$$\begin{aligned} &\cancel{(3t - 4)(t + 2)} \\ &= (3t - 8)(t + 1) \end{aligned}$$

c) $16y^4 - 24y^3 + 9y^2$

$$\begin{aligned} &y^2(16y^2 - 24y + 9) \\ &y^2(4y - 3)(4y - 3) \\ &= y^2(4y - 3)(4y - 3) \end{aligned}$$

d) $9z^2 + 64$

Not factorable

e) $3x^2 + 14x + 8$

$$= (3x + 2)(x + 4)$$

2) Solve the following algebraically:

a) $2x^3 - 6x^2 = 20x$

b) $2x^2 - 3x = 2$

$$2x^3 - 6x^2 - 20x = 0$$

$$2x^2 - 3x - 2 = 0$$

$$2x(x^2 - 3x - 10) = 0$$

$$(2x + 1)(x - 2) = 0$$

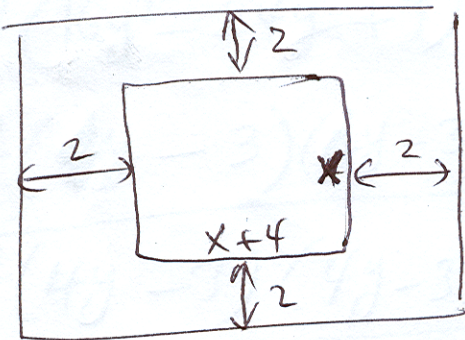
$$2x(x - 5)(x + 2) = 0$$

$$x = -\frac{1}{2}$$

$$x = 2$$

$$x = 0 \quad x = 5 \quad x = -2$$

3) A rectangular frame surrounding a picture is made from boards that are 2 inches wide. The picture inside the frame is 4 inches wider than it is high. If the overall area of the picture and frame is 525 square inches, find the dimensions of the picture.



$$525 = (x+4)(x+8)$$

$$525 = x^2 + 12x + 32$$

$$x^2 + 12x - 493 = 0$$

$$(x+29)(x-17) = 0$$

$$x = 17 \text{ inches}$$

$\rightarrow x+4 = 17+4 = 21$ inches
So, the picture is

17 by 21 inches

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MA 103 KATIRAIIE QUIZ #6A Part I SECTIONS (5.5 - 5.6) FALL 2006

NAME _____

SCORE: ____ / 10

*** RETAIN ALL GRADED PAPERS FOR YOUR RECORDS ***

1) Factor the following:

a) $4x^4 + y^4$

Not factorable

b) $100 - (n-4)^2$

$$= (10 - (n-4))(10 + (n-4))$$

$$= (10 - n + 4)(10 + n - 4)$$

$$= (14 - n)(6 + n)$$

c) $4y^4 + 4y^3 + y^2$

$$y^2(4y^2 + 4y + 1)$$

$$= y^2(2y+1)(2y+1)$$

$$= y^2(2y+1)^2$$

e) $64x^2 + 16x + 1$

$$= (8x+1)(8x+1)$$

$$= (8x+1)^2$$

d) $15t^2 - 11t + 2$

$$= 15t^2 - 6t - 5t + 2$$

$$= 3t(5t-2) - 1(5t-2)$$

$$= (3t-1)(5t-2)$$

$$(15)(2) = 30$$



2) Solve the following algebraically:

a) $3x^3 + 15x^2 + 12x = 0$

$$3x(x^2 + 5x + 4) = 0$$

$$3x(x+4)(x+1) = 0$$

$$\boxed{x=0} \quad \boxed{x=-4} \quad \boxed{x=-1}$$

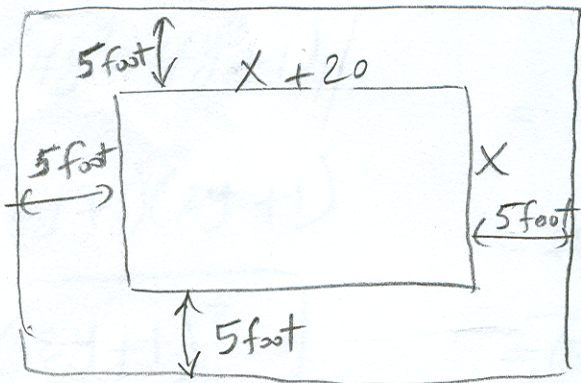
b) $4x^2 + 25 = 20x$

$$4x^2 - 20x + 25 = 0$$

$$(2x-5)(2x-5) = 0$$

$$\boxed{x = \frac{5}{2}}$$

3) A 5-foot wide sidewalk around a rectangular swimming pool has a total area of 900 square feet. Find the dimensions of the swimming pool if the pool is 20 feet longer than it is wide.



$$\text{Aside walk} = A_{\text{yard}} - A_{\text{pool}}$$

$$900 = (x+30)(x+10) - x(x+20)$$

$$= x^2 + 40x + 300 - x^2 - 20x$$

$$900 = 20x + 300$$

$$600 = 20x$$

$$\boxed{30 \text{ feet} = x}$$

and length of the Pool is 50 feet

So, the Pool is 30 feet x 50 feet

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MA 103 KATIRAI QUIZ #6C Part I SECTIONS (5.5 - 5.6) FALL 2006

NAME Solution

SCORE: / 10

*** RETAIN ALL GRADED PAPERS FOR YOUR RECORDS ***

1) Factor the following:

a) $81 - (n+3)^2$

$$\begin{aligned} & (9 - (n+3))(9 + (n+3)) \\ & (9 - n - 3)(9 + n + 3) \\ & \boxed{= (6 - n)(12 + n)} \end{aligned}$$

c) $16y^4 - 24y^3 + 9y^2$

$$y^2(16y^2 - 24y + 9)$$

$$\boxed{= y^2(4y - 3)(4y - 3)}$$

e) $3x^2 + 14x + 8$

$$\begin{aligned} & 3x^2 + 12x + 2x + 8 = \\ & = 3x(x+4) + 2(x+4) \end{aligned}$$

$$\boxed{= (3x+2)(x+4)}$$

b) $3t^2 - 5t - 8$

$$\begin{aligned} & = 3t^2 - 8t + 3t - 8 \\ & = t(3t-8) + 1(3t-8) \\ & \boxed{= (t+1)(3t-8)} \end{aligned}$$

$$\begin{aligned} & (3)(-8) = -24 \\ & (-8)(3) = -24 \\ & (-8) + (3) = -5 \end{aligned}$$

d) $9z^2 + 64$

Not factorable

$$(3)(8) = 24$$

$$\begin{aligned} & (12)(2) = 24 \\ & (12) + (2) = 14 \end{aligned}$$

2) Solve the following algebraically:

a) $2x^3 - 6x^2 = 20x$

$$2x^3 - 6x^2 - 20x = 0$$

$$2x(x^2 - 3x - 10) = 0$$

$$2x(x-5)(x+2) = 0$$

$$\boxed{x=0} \quad \boxed{x=5} \quad \boxed{x=-2}$$

b) $2x^2 - 3x = 2$

$$2x^2 - 3x - 2 = 0$$

$$(2x+1)(x-2) = 0$$

$$\boxed{x = -\frac{1}{2}} \quad \boxed{x = 2}$$

3) The height in feet reached by a batted baseball after t seconds is given by $h(t) = -16t^2 + 66t + 2$

Determine when the baseball is 70 feet in the air.

$$70 = -16t^2 + 66t + 2$$

$$16t^2 - 66t - 2 + 70 = 0$$

$$16t^2 - 66t + 68 = 0$$

$$2(8t^2 - 33t + 34) = 0$$

$$2(8t^2 - 16t - 17t + 34) = 0$$

$$2(8t(t-2) - 17(t-2)) = 0$$

$$2(t-2)(8t-17) = 0$$

$$\boxed{t = 2 \text{ seconds}}$$

$$\boxed{t = \frac{17}{8} \text{ seconds}}$$

$$(8)(34) = 272$$

$$\begin{array}{r} \swarrow \quad \searrow \\ -16 \quad -17 \end{array}$$