MA 152   EXAM 2   FALL, 2001

NAME: _____

Place your answers in the spaces provided. You must show your work to receive credit.

(16 pts) 1) Factor completely.

(8 pts) a) $16z^3 + 48z^2 + 36z$

$4z(4z^2 + 12z + 9)$

$4z(2z + 3)(2z + 3)$

$4z(2z + 3)^2$

$$\boxed{\begin{array}{c} 4z(2z + 3)(2z + 3) \\[6pt] 4z(2z + 3)^2 \end{array}}$$

(8 pts) b) $5n^2 + 5n - mn - m$

$5n(n + 1) - m(n + 1)$

$(5n - m)(n + 1)$

$$\boxed{(5n - m)(n + 1)}$$

(8 pts) 2) Perform the indicated operation and simplify.

$$\frac{x}{x - 6} - \frac{2}{x + 1}$$

$$\frac{(x + 1)x}{(x + 1)(x - 6)} - \frac{(x - 6)2}{(x - 6)(x + 1)}$$

$$\frac{x^2 + x}{(x + 1)(x - 6)} - \frac{2x - 12}{(x - 6)(x + 1)}$$

$$\frac{x^2 + x - 2x + 12}{(x + 1)(x - 6)}$$

$$\frac{x^2 - x + 12}{(x + 1)(x - 6)}$$

$$\boxed{\frac{x^2 - x + 12}{(x + 1)(x - 6)}}$$

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(10 pts) 3) Perform the indicated operation and simplify.

$$\frac{\dfrac{5a+5b}{a^2-2ab}}{\dfrac{a^2-b^2}{a-2b}}$$

$$\frac{5a+5b}{a^2-2ab} \div \frac{a^2-b^2}{a-2b}$$

$$\frac{5a+5b}{a^2-2ab} \cdot \frac{a-2b}{a^2-b^2}$$

$$\frac{5(a+b)}{a(a-2b)} \cdot \frac{a-2b}{(a+b)(a-b)}$$

$$\frac{5}{a(a-b)}$$

$$\boxed{\begin{array}{c} \dfrac{5}{a(a-b)} \\[2mm] \dfrac{5}{a^2-ab} \end{array}}$$

(8 pts) 4) Solve for x.

$$\frac{3}{4}x+\frac{1}{6}=\frac{5}{12}x-1$$

$$12\left[\frac{3}{4}x+\frac{1}{6}\right] = \left[\frac{5}{12}x-1\right]12$$

$$9x+2 = 5x-12$$

$$4x = -14$$

$$x = -\frac{14}{4} = -\frac{7}{2}$$

$$x = \boxed{\begin{array}{c} -\dfrac{7}{2} \\[2mm] -3.5 \end{array}}$$

(10 pts) 5) Solve the following system for a and b.

$$2a+3b = 11$$

$$3a-5b = 7$$

$3(2a + 3b = 11)$

$-2(3a - 5b = 7)$

$6a + 9b = 33$

$-6a + 10b = -14$

$19b = 19$

$b = 1$

$a = 4$

$5(2a + 3b = 11)$

$3(3a - 5b = 7)$

$10a + 15b = 55$

$9a - 15b = 21$

$19a = 76$

$a = 4$

$b = 1$

$a=$

| 4 |

$b=$

| 1 |

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(10 pts) 6) Bethany and Heather are building a sand castle at the beach. Bethany can build one by herself in 45 minutes. Heather can build the same sand castle by herself in only 30 minutes. How long will it take them if they work together? (Name a variable, set up an equation, and solve.)

$x=$ length of time it takes them to work together

$$\frac{x}{45} + \frac{x}{30} = 1$$

$$1350 \left(\frac{x}{45} + \frac{x}{30} \right) = 1 \cdot 1350$$

$$30x + 45x = 1350$$

$$75x = 1350$$

$$x = \frac{1350}{75} = 18$$

| 18 minutes |

(10 pts) 7) Solve for x. Simplify your answer.

$$x^2 + 6x + 10 = 0$$

$$x = \frac{-6 \pm \sqrt{6^2 - 4(1)(10)}}{2}$$

$$= \frac{-6 \pm \sqrt{36 - 40}}{2}$$

$$= \frac{-6 \pm \sqrt{-4}}{2}$$

$$= \frac{-6 \pm 2i}{2}$$

$$= -3 \pm i$$

$x=$

| $-3 \pm i$ |

3

(8 pts) 8) Solve for x. Simplify your answer.

$$2x^2 + 2x - 12 = x^2 + 3x$$

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

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

$$x = 4, -3$$

$$x = \frac{1 \pm \sqrt{1 - 4(1)(-12)}}{2}$$

$$= \frac{1 \pm \sqrt{1 + 48}}{2}$$

$$= \frac{1 \pm 7}{2} = \frac{8}{2}, \frac{-6}{2} = 4, -3$$

$x=$ | -3 or 4 |

ANSWER KEY

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(10 pts) 9) A rectangular swimming pool is twice as long as it is wide. There is a
3-foot wide deck all around the pool. If the area of the deck is 234 square feet,
what are the dimensions of the swimming pool? (Draw and label a sketch,
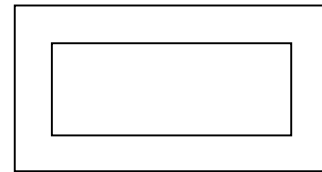set up an equation, and solve.)

$$(x+6)(2x+6) - 2x^2 = 234$$

$$2x^2 + 18x + 36 - 2x^2 = 234$$

$$18x + 36 = 234$$

$$18x = 198$$

$$x = 11$$

2x+6

length of pool = | 22 feet |

width of pool = | 11 feet |

(10 pts) 10) Sarah received an inheritance of $15,000. She put some of the money in an
account at First Federal that paid 4% interest. She put the rest in an account at
National City Bank that paid 3% interest. How much did she put in each if the
total amount of interest for one year was $575? Hint: $I=Prt$ (Name the
variable(s), set up an equation(s), and solve.)

x=amount at FF y=amount at NC

or x=amount at FF
and 15,000-x =
amount at NC

4

$x + y = 15,000$

$.04x + .03y = 575$

$4x + 4y = 60,000$

$-4x - 3y = -57500$

$y = 2,500$

$x = 12,500$

$.04x + .03(15,000 - x) = 575$

amount at
First Federal
=$12,500

amount at
National City
=$2,500