

MAT1033 Test 3  
(D. Howard 3-16)

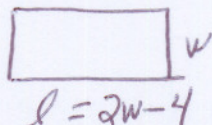
Name Key

1.  $f(x) = 6x^2 - 3x - 4$

- (3) a.) What is the degree of the polynomial?  $n = 2$
- (3) b.) How many terms does  $f(x)$  have?  $3$
- (3) c.) What is the coefficient of the second term?  $-3$

2. A rectangular pen has a length that is four less than twice its width.  
Write an expression describing the area of the rectangular pen.  
Simplify so that it is **not** in factored form.

(9)



$$A = lw$$

$$A = w(2w - 4)$$

$$A = 2w^2 - 4w$$

3. Factor completely  $xy - 7x + 8y - 56$  : grouping

(9)

$$x(y - 7) + 8(y - 7)$$

$$(x + 8)(y - 7)$$

4. Factor completely  $2m^3 - 6m^2 - 20m$  ; GCF

$$2m(m^2 - 3m - 10)$$
$$2m(m+2)(m-5)$$

5. Factor completely  $c^3 + 27t^3$  ; SOPS

$$c^3 + (3t)^3$$
$$(c + 3t)(c^2 - 3ct + 9t^2)$$

6. The height  $h(t)$ , in feet, of an airborne T-shirt  $t$  seconds after being launched can be approximated by  $h(t) = -15t^2 + 105t + 10$ .

**Algebraically** find the times when the T-shirt will reach 100 feet above the ground level.

$$100 = -15t^2 + 105t + 10$$
$$0 = \frac{-15t^2}{-15} + \frac{105t}{-15} - \frac{90}{-15}$$

$$0 = t^2 - 7t + 6$$

$$0 = (t - 1)(t - 6)$$

$$t - 1 = 0$$

$$t = 1$$

$$t - 6 = 0$$

$$t = 6$$

7. Determine the domain of  $f(x) = \frac{x^2-25}{x^2+7x-18} = \frac{(x+5)(x-5)}{(x+9)(x-2)}$

9

$$x+9 \neq 0 \quad x-2 \neq 0$$

$$x \neq -9 \quad x \neq 2$$

8. Simplify. Write solutions in factored form when possible.

9

$$\frac{x^2-4}{x^2+2x-3} \cdot \frac{x^2+7x+12}{x^2-4x+4}$$

$$\frac{(x+2)(x-2) \cdot (x+3)(x+4)}{(x+3)(x-1) \cdot (x-2)(x-2)} = \frac{(x+2)(x+4)}{(x-1)(x-2)}$$

9. Simplify. Write solutions in factored form when possible.

9

$$\frac{2}{x^2-9} - \frac{3}{x^2+4x+3}$$

$$(x+3)(x-3) \quad (x+3)(x+1)$$

$$\text{LCD} = (x+3)(x-3)(x+1)$$

$$\frac{2(x+1)}{(x+3)(x-3)(x+1)} - \frac{3(x-3)}{(x+3)(x+1)(x-3)}$$

$$\frac{2x+2-3x+9}{(x+3)(x+1)(x-3)}$$

$$\frac{-x+11}{(x+3)(x+1)(x-3)}$$

10. Solve the proportion by a method of your choice. Show work for credit. Four is to  $(x - 3)$  as  $x$  is to one.

9

$$\frac{4}{x-3} = \frac{x}{1}$$

$$4(1) = x(x-3)$$

$$4 = x^2 - 3x$$

$$0 = x^2 - 3x - 4$$

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

$$x+1=0 \quad x-4=0$$

$$\left( \begin{array}{cc} x = -1 & x = 4 \end{array} \right) \quad x \neq 3$$

11. Simplify. Write solutions in factored form when possible.

9

$$\frac{\frac{x^2-x-2}{x}}{\frac{x-2}{x^2}}$$

$$= \frac{(x+1)(\cancel{x-2})}{\cancel{x-2}} \cdot \frac{x^{\cancel{2}}}{(\cancel{x-2})}$$

$$= x(x+1)$$