

$3x^3 - 6x^2$  Expand  
Factor  $3x^2(x - 2)$

# Polynomials

## LESSON TWO - *Greatest Common Factor*

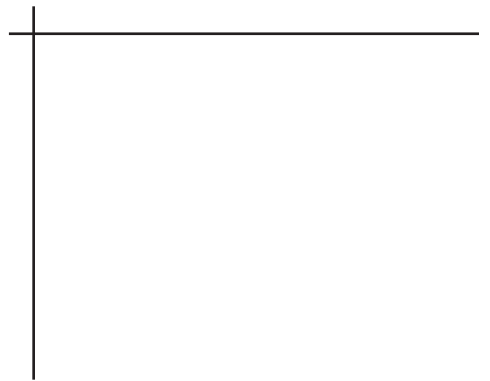
### Lesson Notes

### Introduction

Factor each expression using algebra tiles.



a)  $3x - 6$



b)  $x^2 + 4x$



c)  $2x^2 - 8x$



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$$\begin{array}{l} 3x^3 - 6x^2 \xleftarrow{\text{Expand}} \\ \text{Factor} \searrow 3x^2(x - 2) \end{array}$$

#### Example 1

Find the greatest common factor of each pair.

a) 36 and 48

d)  $3a^2b^3$  and  $6a^4b^3$

b) 15 and 45

e)  $\pi r^2$  and  $\pi rs$

c)  $16x^2$  and  $24x$

#### Example 2

Factor each binomial.

a)  $3x - 12$

c)  $15x^4 + 60x^2$

b)  $-4x^2 + 24x$

d)  $-12x^3 - 27x$

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$$3x^3 - 6x^2$$

Expand

Factor

$$3x^2(x - 2)$$

### Example 3

Factor each polynomial.

a)  $a^2b - a^2c + a^2d$

c)  $-13ab^2c^3 + 39bc^2 - 26ab^4$

b)  $6x^2y^2 + 18xy$

d)  $-xy^3 - x^2y^2$

### Example 4

Factor each polynomial.

a)  $3x(x - 1) + 4(x - 1)$

c)  $5ax - 15a - 3x + 9$

b)  $4x(2x + 3) - (2x + 3)$

d)  $4x^4 + 4x^2 - 3x^2 - 3$

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$$3x^3 - 6x^2 \xrightarrow{\text{Expand}} 3x^2(x - 2)$$

Factor

#### Example 5

The height of a football is given by the equation  $h = -5t^2 + 15t$ , where  $h$  is the height above the ground in metres, and  $t$  is the elapsed time in seconds.

a) Write the factored form of this equation.



b) Calculate the height of the football after 2 s.

$$3x^3 - 6x^2 \quad \text{Expand}$$

$$\text{Factor} \quad 3x^2(x - 2)$$

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#### Example 6

A pencil can be thought of as a cylinder topped by a cone.

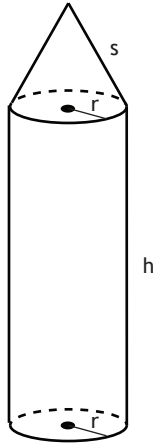
a) Write a factored expression for the total visible surface area.

From Formula Sheet:

$$SA_{\text{Cylinder}} = 2\pi r^2 + 2\pi rh$$

$$SA_{\text{Cone}} = \pi r^2 + \pi rs$$

Hint: The top of the cylinder (and the bottom of the cone) are internal to the pencil and do not contribute to the surface area.



b) Calculate the visible surface area if the radius of the pencil is 0.5 cm, the cylinder height is 9 cm and the slant height of the cone is 2 cm.

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$$3x^3 - 6x^2 \xrightarrow{\text{Expand}} 3x^2(x - 2)$$

Factor

#### Example 7

Laurel is making food baskets for a food drive. Each basket will contain boxes of spaghetti, cans of beans, and bags of rice.

Each basket must contain exactly the same quantity of items. (*example: all baskets have 2 spaghetti boxes, 3 cans of beans, and 2 bags of rice*).

If there are 45 boxes of spaghetti, 27 cans of beans, and 36 bags of rice, what is the maximum number of baskets that can be prepared? What quantity of each item goes in a basket?

