

## Algebra RH

### Mini-Review Sheet - Unit 3: Expressions and Polynomials

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#### A. Dimensional Analysis - Convert the following into an equivalent measurement

- a)  $f$  feet to yards                      b)  $y$  years to days                      c)  $h$  hours to years  
d) Jules Verne is the author of a book called *Twenty Thousand Leagues Under the Sea*.

Use the conversion factors listed below, and the ones you know, to convert 20,000 leagues into feet.

$$1 \text{ fathom} = 2 \text{ yards}$$

$$1 \text{ statute mile} = 5280 \text{ feet}$$

$$1 \text{ nautical mile} = 6080 \text{ feet}$$

$$1 \text{ league} = 3 \text{ nautical miles}$$

#### B. Operations with Polynomials. For each example below, simplify the expression and write it in standard form. Name the degree and leading coefficient of each.

a)  $-5x(2x + 7) - (3x^4 - 5x^2 + 7) + (8x - 2 + 4x^2)$

b)  $2(9x - 3)^2$

c)  $(6x^2 - 4x + 2)(5x^3 + 8)$

d)  $\frac{6x^4 - 12x^3 + 8x - 2}{2}$

#### C. Writing Expressions - For questions (a) and (b): Represent the cost of:

- a) A day at the amusement park with a \$12 admission fee and rides that are \$4 each  
b) A taxi ride where  $m$  is the total number of minutes and \$3.60 is what is spent on the first 4 minutes of the ride with \$.75 charged for each additional minute

**For questions (c), (d) and (e): Write the expression in simplest form**

- c) The perimeter of a rectangle whose width is 5 more than twice its length  
d) The volume of a rectangular prism whose height and length are the same and are two less than three times the width  
e) A shirt that costs  $x$  dollars is discounted 30% and then an 8% tax is added.

## Mini-Review Sheet Answer Key - Unit 3: Expressions and Polynomials

**A. Dimensional Analysis**

$$\text{a) } f \text{ feet} \cdot \frac{1 \text{ yard}}{3 \text{ feet}} = \frac{f}{3} \text{ or } \frac{1}{3} f \text{ yards} \quad \text{b) } y \text{ years} \cdot \frac{365 \text{ days}}{1 \text{ year}} = 365y \text{ days}$$

$$\text{c) } h \text{ hours} \cdot \frac{1 \text{ day}}{24 \text{ hours}} \cdot \frac{1 \text{ year}}{365 \text{ days}} = \frac{h}{8760} \text{ or } \frac{1}{8760} h \text{ years}$$

$$\text{d) } 20,000 \text{ leagues} \cdot \frac{3 \text{ nautical miles}}{1 \text{ league}} \cdot \frac{6080 \text{ feet}}{1 \text{ nautical mile}} = 364,800,000 \text{ feet}$$

**B. Operations with Polynomials**

$$\begin{aligned} \text{a) } & -5x(2x + 7) - (3x^4 - 5x^2 + 7) + (8x - 2 + 4x^2) \\ & -10x^2 - 35x - 3x^4 + 5x^2 - 7 + 8x - 2 + 4x^2 \\ & -3x^4 - x^2 - 27x - 9 \quad \text{degree: 4 leading coefficient: -3} \end{aligned}$$

$$\begin{aligned} \text{b) } & 2(9x - 3)^2 \longrightarrow (9x - 3)(9x - 3) \quad \text{Do the double distribute first!} \\ & 2(81x^2 - 27x - 27x + 9) \\ & 2(81x^2 - 54x + 9) \quad \text{degree: 2} \quad \text{leading coefficient: 162} \\ & 162x^2 - 108x + 18 \end{aligned}$$

$$\begin{aligned} \text{c) } & (6x^2 - 4x + 2)(5x^3 + 8) \\ & 30x^5 + 48x^2 - 20x^4 - 32x + 10x^3 + 16 \\ & 30x^5 - 20x^4 + 10x^3 + 48x^2 - 32x + 16 \quad \text{degree: 5 leading coefficient: 30} \end{aligned}$$

$$\begin{aligned} \text{d) } & \frac{6x^4 - 12x^3 + 8x - 2}{2} \longrightarrow 3x^4 - 6x^3 + 4x - 1 \\ & \text{degree: 4 leading coefficient: 3} \end{aligned}$$

**C. Writing Expressions**

$$\text{a) } r = \text{cost of one ride} \quad 12 + 4r$$

$$\text{b) } m = \text{the total number of minutes} \quad 3.60 + .75(m - 4)$$

$$\begin{aligned} \text{c) } x = \text{length} \quad 2x + 5 = \text{width} \quad & 2(x) + 2(2x + 5) \\ & 2x + 4x + 10 \\ & 6x + 10 \text{ units} \end{aligned}$$

$$\begin{aligned} \text{d) } w = \text{width} \quad \text{height} = 3w - 2 \quad \text{length} = 3w - 2 \quad & w(3w - 2)(3w - 2) \\ & w(9w^2 - 12w + 4) \\ & 9w^3 - 12w^2 + 4w \text{ units}^3 \end{aligned}$$

$$\text{e) } (0.70x)(1.08) = 0.756x$$