Unit 7 Day 3 Notes on Challenge and Application Problems

Why are these two examples different? Simplify both.

a) $(3x^4 - 2x) + (2x^2 - 5x + 3x^4)$ **Combine like terms**

$$-7x + 6x^4 + 2x^2$$

a) $\boxed{6x^4 + 2x^2 - 7x}$ (standard form!)

b) $(3x^4 - 2x)(2x^2 - 5x + 3x^4)$ **distribute first, then combine like terms**

$$6x^6 - 15x^5 + 9x^8 - 4x^3 + 10x^2 - 6x^5$$

b) $\boxed{9x^8 + 6x^6 - 21x^5 - 4x^3 + 10x^2}$

Simplify the polynomial. Then, <u>name the polynomial by degree and number of terms.</u>

1) $(2x - 4)(3x + 7)$

$$6x^2 + 14x - 12x - 28$$

$$\boxed{6x^2 + 2x - 28}$$

quadratic trinomial

2) $8y(y^2 - 2y + 1) + (y^3 - 5y)$

$$8y^3 - 16y^2 + 8y + y^3 - 5y$$

$$\boxed{9y^3 - 16y^2 + 3y}$$

cubic trinomial

3) $(3x - 2)(x + 1) + (x - 3)$

$$3x^2 + 3x - 2x - 2 + x - 3$$

$$\boxed{3x^2 + 2x - 5}$$

quadratic trinomial

4) $3(a + 1)(4a - 5) - (7 + a)$

$$(3a + 3)(4a - 5) - (7 + a)$$

$$12a^2 - 15a + 12a - 15 - 7 - a$$

$$\boxed{12a^2 - 4a - 22}$$

quadratic trinomial

5) What is the difference between Perimeter and Area?

distance around

space inside

6) What is the formula for the following:

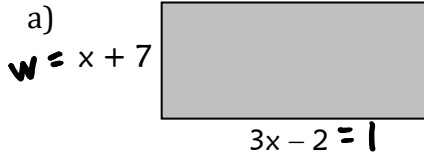a) Area of a Square = $s \cdot s$
$$= s^2$$

b) Area of a Rectangle = $l \cdot w$

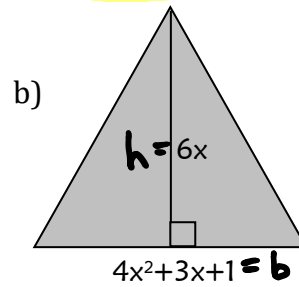c) Area of a Triangle = $\frac{1}{2} \cdot b \cdot h$

Applications

Example 1: Write a simplified polynomial that represents the **AREA** of the shaded region.
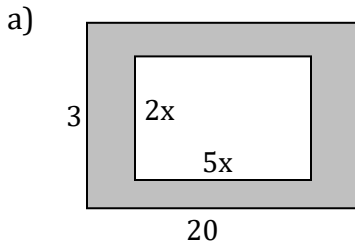*Note: Diagrams are not drawn to scale.*

a)

$w = x + 7$

$3x - 2 = l$

$A = l \cdot w$

$= (3x - 2)(x + 7)$

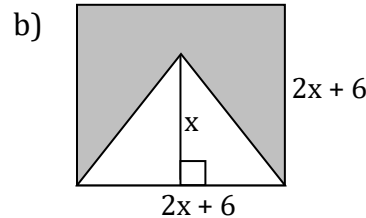$= 3x^2 + 21x - 2x - 14$

$= \boxed{3x^2 + 19x - 14}$

b)

$h = 6x$

$4x^2 + 3x + 1 = b$

$A = \frac{1}{2} \cdot b \cdot h$

$= \frac{1}{2}(4x^2 + 3x + 1)(6x)$

$= (2x^2 + 1.5x + .5)(6x)$

$= \boxed{12x^3 + 9x^2 + 3x}$

Example 2: Write a simplified polynomial for the **AREA** of the shaded region only.

$= \text{Area of the} \over \text{whole} - \text{Area of the unshaded}$

a)

3   2x

5x

20

$A(whole) - A(unshaded)$

$60 \quad - \quad 10x^2$

$\boxed{-10x^2 + 60}$

b)

2x + 6

x

2x + 6

$A(whole) - A(unshaded)$

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

$4x^2 + 24x + 36 - x^2 - 3x$

$\boxed{3x^2 + 21x + 36}$