

## SM2 Unit 1 Extra Practice

1.1- Simplify and justify your process for each problem.

1)  $x^6 \cdot x^7$   
 $x^{13}$

2)  $x^{-1}x^2$   
 $x$

3)  $(x^2)^3$   
 $x^6$

4)  $\frac{2a^3}{4a^7}$   
 $-\frac{1}{2a^4}$

5)  $(3r^4)(-6r^2)$   
 $-18r^6$

6)  $\frac{3t^9}{6t^{18}}$   
 $-\frac{1}{2a^4}$

7)  $(y^2)^4$   
 $y^8$

8)  $2x^2 \cdot (x^2)^5$   
 $2x^2 \cdot x^{10}$   
 $2x^{12}$

9)  $(-3u^8)(-2u^2)$   
 $6u^{10}$

10)  $a^3b^4 \cdot ab^6(ab)^0$   
 $a^4b^{10}$

11)  $\frac{8t^{-3}}{-2t^{-5}}$   
 $\frac{8t^5}{-2t^3} = -4t^2$

12)  $(-2t^5)^3$   
 $-8t^{15}$

13)  $y^{-3}y^5$   
 $y^2$

14)  $\frac{w^{-4}}{w^6}$   
 $\frac{1}{w^6 w^4} \rightarrow \frac{1}{w^{10}}$

15)  $(y^2)^6 \cdot 3y^5$   
 $y^{12} \cdot 3y^5$   
 $3y^{17}$

16)  $\frac{(t^2)^5}{(t^3)^4}$   
 $\frac{t^{10}}{t^{12}} \rightarrow \frac{1}{t^2}$

17) Put an "X" in the column with the most appropriate unit of measure for each scenario.

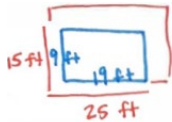
		in	in <sup>2</sup>	in <sup>3</sup>
a)	The amount of flat space on a table top.		X	
b)	The amount of land covered by grass in your neighbor's yard.		X	
c)	The amount of pudding it would take to fill a swimming pool.			X
d)	The distance you walked to school.	X		
e)	The amount of space on a wall to paint.		X	
f)	You are making a sand box and you need to fill it with sand.			X
g)	You are late for class and you need to run the distance from your car to your first period.	X		
h)	The amount of space inside a dog kennel.			X

Write 3 paragraphs, one for each column, explaining why the scenarios you placed into each column belong in that column.

in. column are all distances/lengths, one-dimensional  
 in.<sup>2</sup> column are all area, two-dimensional  
 in.<sup>3</sup> column are all volume, three-dimensional

1.2- Find the measure of each quantity. Include units.

- 18) A rectangular garden is 15 ft by 25 ft. They want to decrease the garden and put in a 3 ft wide walkway completely around it. What is the new perimeter of the garden?



$$P = 2l + 2w$$

$$P = 2(19) + 2(9)$$

$$= 56 \text{ ft}$$

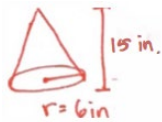
- 19) The radius of the Earth is about 3959 mi. What is the surface area of the Earth?

$$SA = 4\pi r^2$$

$$= 4\pi(3959)^2$$

$$= 196,961,284.3 \text{ mi}^2$$

- 20) You are filling a conic shaped balloon with helium. When it is full, the radius of the base of the cone is 6 in and the balloon is 15 in tall. How many cubic inches of helium are in the balloon?



$$V = \frac{1}{3} B \cdot h$$

area of base (circle)

$$B = \pi r^2$$

$$= \pi(6)^2 = 36\pi$$

$$V = \frac{1}{3} 36\pi \cdot 15 = 565.5 \text{ in}^3$$

- 21) The tiny home movement is in full swing. You see some plans for a tiny house that is shaped like a cube with a square pyramid (with the same sized base as the cube) placed on top for a roof. The sides of the cube all measure 10 ft and the pyramid on top is 5 ft tall. How much space is inside this tiny home?



$$V_{\text{cube}} = 10 \cdot 10 \cdot 10 = 1000 \text{ ft}^3$$

$$V_{\text{pyramid}} = \frac{1}{3}(10 \cdot 10) \cdot 5 = 166.7 \text{ ft}^3$$

$$V_{\text{house}} = 1000 + 166.7 = 1166.667 \text{ ft}^3$$

- 22) What is the surface area of a yield sign if the top is 36 in wide and the height is 31.2 in? (Ignore the curved edges.)



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

$$= \frac{1}{2} (36)(31.2)$$

$$= 561.6 \text{ in}^2$$

- 23) What is the distance around a circular fountain if the radius is 16 ft?



$$C = 2\pi r$$

$$= 2\pi(16)$$

$$= 100.531 \text{ ft}$$

1.3- Put each polynomial in standard form. Identify the lead coefficient and name based on degree and number of terms.

24)  $-4k + 7k^4$

Standard Form:  $7k^4 - 4k$   
 LC: 7  
 Name: fourth degree binomial

26)  $4x - 8 + \frac{1}{2}x^2$

Standard Form:  $\frac{1}{2}x^2 + 4x - 8$   
 LC:  $\frac{1}{2}$   
 Name: quadratic trinomial

28) 10

Standard Form: 10  
 LC: 10  
 Name: constant monomial

Perform the indicated polynomial operations.

30)  $(4m^4 + 8m^2) - (m^4 + 4m^2 + m^3)$

$$3m^4 + 4m^2 - m^3$$

32)  $(-7x^2 - 8x) - (-5x - 6x^2)$

$$-x^2 - 3x$$

25)  $-3x^2$

Standard Form:  $-3x^2$   
 LC: -3  
 Name: quadratic monomial

27)  $-a^2 - 5 - 10a^3 + 7a$

Standard Form:  $-10a^3 - a^2 + 7a - 5$   
 LC: -10  
 Name: cubic poly. w/ four terms

29)  $3x - 4$

Standard Form:  $3x - 4$   
 LC: 3  
 Name: linear binomial

31)  $(6n - 2n^2 + 7n^3) + (5n^3 + 8n^5 - 5n)$

$$8n^5 + 12n^3 + n - 2n^2$$

33)  $(4v - 3)(8v - 5)$

$$32v^2 - 20v - 24v + 15$$

$$32v^2 - 44v + 15$$

34)  $6x(x - 7)$

$$6x^2 - 42x$$

35)  $(2n - 6)(n - 1)$

$$2n^2 - 2n - 6n + 6$$

$$2n^2 - 8n + 6$$

36)  $(2x - 5)(2x + 5)$

$$4x^2 + 10x - 10x - 25$$
$$4x^2 - 25$$

37)  $(4b + 3)^2$

$$(4b+3)(4b+3)$$
$$16b^2 + 12b + 12b + 9$$
$$16b^2 + 24b + 9$$

38)  $8h^3(2h^4 - 3h)$

$$16h^7 - 24h^4$$

1.4- Use the following functions for problems 39-44:

$$f(x) = \frac{1}{2}x - 2, \quad g(x) = 2x^2 - 3x + 5, \quad h(x) = -|x + 2| - 3$$

Evaluate each function.

39)  $f(8)$

$$\frac{1}{2}(8) - 2$$
$$4 - 2 = \boxed{2}$$

40)  $g(-1)$

$$2(-1)^2 - 3(-1) + 5$$
$$2 + 3 + 5$$
$$\boxed{10}$$

41)  $h(6)$

$$-|6+2| - 3$$
$$-|8| - 3$$
$$-8 - 3 = \boxed{-11}$$

42)  $g(3)$

$$2(3)^2 - 3(3) + 5$$
$$2(9) - 9 + 5$$
$$18 - 9 + 5$$
$$9 + 5 = \boxed{14}$$

43)  $h(-5)$

$$-|-5+2| - 3$$
$$-|-3| - 3$$
$$-3 - 3$$
$$\boxed{-6}$$

44)  $f(9)$

$$\frac{1}{2}(9) - 2$$
$$4.5 - 2 = \boxed{2.5} \text{ or } \boxed{\frac{5}{2}}$$

Given  $f(x) = -3x + 7$  and  $g(x) = 5x - 2$ , simplify the expressions. Explain what each one means:

45)  $(f + g)(x)$

$$(-3x+7) + (5x-2)$$
$$2x + 5$$

46)  $(f - g)(x)$

$$(-3x+7) - (5x-2)$$
$$-3x+7 - 5x+2$$
$$-8x + 9$$

47)  $(fg)(x)$

$$(-3x+7)(5x-2)$$
$$-15x^2 + 6x + 35x - 14$$
$$-15x^2 + 41x - 14$$

48)  $(f + g)(2)$

$$2(2) + 5$$
$$= \boxed{9}$$

OR

$$f(2) + g(2)$$
$$(-3(2)+7) + (5(2)-2)$$
$$(-6+7) + (10-2)$$
$$(1) + (8)$$
$$= \boxed{9}$$

49)  $(f - g)(0)$

$$-8(0) + 9$$
$$= \boxed{9}$$

OR

$$f(0) - g(0)$$
$$(-3(0)+7) - (5(0)-2)$$
$$(7) - (-2)$$
$$= \boxed{9}$$

50)  $(fg)(3)$

$$-15(3)^2 + 41(3) - 14$$
$$= \boxed{-26}$$

OR

$$f(3) \cdot g(3)$$
$$(-3(3)+7) \cdot (5(3)-2)$$
$$(-9+7) \cdot (15-2)$$
$$(-2) \cdot (13) = \boxed{-26}$$