9th Grade Assignment – Week #21

<u>Reminder</u>: For the "Midyear Review" unit, you need a unit conversion table. This conversion table was included with last week's assignment.

<u>Group Assignment</u>:

For Tuesday

1) *The Seating Chart Problem.* In today's lecture, we found that there were 6 possible ways to seat 3 people in 3 seats. Determine how many possible seating charts there are for a class of 18 students.

2) *The Menu Problem.* If a restaurant's menu has 5 different appetizers, 10 different main courses, and 3 different desserts, how many possible three-course meals can be ordered?

For Thursday

3) *The License Plate Problem.* In Colorado, one type of license plate has three letters followed by three digits. How many possible license plates of this type are there?

4) *The Seating Chart Problem, revisited.* If there is a new seating chart every second, then how long will it take before all of the possibilities will be exhausted, but none repeated, for a class of 13 students? for 18 students? for 25 students?

<u>Individual Work</u>

- *Take the Word Problem test*, which is found at the end of this document.

- *Midyear Review*. From the *Midyear Review* unit of the workbook, look over the problems in **Problem Set #1** and **Problem Set #2**, and do the ones you need the most practice with.

- *Main Lesson Book pages*. Below are suggestions for main lesson book pages. Do what you can.

  - *Independent Thinking*. Reflecting upon what I said in today's lecture, write an essay that includes some of these themes: the need for independent thinking, not succumbing to negativity and fear, and my thought: "*Don't just believe what you're told. Believe it only when you know – in your own thinking – that it's true.*"

  - Write a page for each of the "problems" mentioned in either the lecture or the group assignment, which are: **Street Problem, Wardrobe Problem, Menu Problem, License Plate Problem, Seating Chart Problem, and Prize Problem**. For each page, you should include the following elements:

    1) A clear statement of the question.
    2) A description of what you did to solve the problem, even if your solution was not correct.
    3) A clear explanation of the correct solution.
    4) Drawings and/or illustrations are helpful and should be done neatly and with color.
    5) Additional commentary, as needed.

Midyear Review

Problem Set #1

Notes:
- In this unit, a calculator is permitted for the sections on *Percents* and *Proportions & Dimensional Analysis* (PDA).
- A unit conversion table will be necessary.

Section A

Solve for x in terms of y.

1) $y = 5x + 6$

2) $y = \frac{1}{5}x - 3$

Simplify.

3) $y^3 + y^3$

4) $(y^3)(y^3)$

5) $6w^5 - 2w^5$

6) $5x^3 + 2x^5$

7) 6^{-2}

8) $5x^3y^2 - x^3y^2$

9) $(5x^3y^2)(-x^3y^2)$

10) $(5x^3y^2)^2$

11) $(5x^3 - y^2)^2$

Multiply.

12) $5x^2(x + 3)$

13) $(x + 5)(x + 3)$

14) $(x - 5)(x - 1)$

15) $(x + 6)(x - 6)$

16) $(2x + 5)(x - 3)$

Factor.

17) $x^2 + 10x + 16$

18) $x^2 + 5x + 6$

19) $x^2 + 5x - 6$

20) $x^2 - 5x + 6$

21) $x^2 - 5x - 6$

22) $x^2 - 25$

23) $x^2 + 25$

24) $x^2 - 100$

25) $x^2 - 10$

26) $x^2 + 10x + 25$

27) $x^2 - 11x + 18$

28) $x^2 - 49$

29) $x^{12} - 81$

30) $3x^7 + 12x^3$

31) $x^3 - 10x^2 - 24x$

Solve.

32) $5x - 6 = 2x + 21$

33) $8 - 3(x + 7) = x + 7$

34) $x^2 + 6x + 8 = 0$

35) $x^2 + 6x = 40$

36) $13x = x^2 + 30$

37) $\frac{8}{x+2} = \frac{2}{x-4}$

38) $6 - 5(x - 4) = 3(2x + 5) - x$

39) $4x^2 + 3x = 5x^2 + 3x - 1$

Percent Review

40) What is 7% of 5000?

41) 9 is what percent of 43?

42) 23 is what percent of 50?

43) 38 is what percent of 810?

44) What is 450 increased by 80%?

45) What is 180% of 450?

46) What percentage increase is it going from 25 up to 31?

47) What percentage decrease is it going from 31 down to 25?

48) What is 72 decreased by 60%?

49) What is 7000 increased by 3%?

PDA Review

50) Unit Conversions
   (Round to 3 significant digits)

   a) 24 yd = _____ ft

   b) 26 m = _____ cm

   c) 15 kg ≈ _____ lb

   d) 921 ft ≈ _____ m

   e) 2'9" ≈ _____ mm

Section B

Solve for x in terms of y.

51) $7x + 3y = 5$

52) $\frac{2}{3}x - 2y = \frac{3}{4}$

Percent Review

53) 75 is 35% more than what?

54) A bike is on sale for $450. What is the regular price if that sale price is a 20% discount?

PDA Review

55) Unit Conversions

   a)   2500 yd $\approx$ _____ km

   b)   2½ cups $\approx$ _____ mℓ

   c)   15 g $\approx$ _____ oz

   d)   900 cm $\approx$ _____ ft

   e)   74mm $\approx$ _____ in

56) A farmer figures that planting a 90-hectare field will produce 225 m^3 of wheat. Calculate his yield both in m^3/hectare and ft^3/acre.

Problem Set #2

Section A

Simplify.

1) $7x^3y^4 + 2x^3y^4$

2) $(4x^{-5})^{-2}$

3) $\dfrac{9x^3z^7}{15x^8y^5z^4}$

4) $5x^6 + 2x^6$

5) $(5x^6)(2x^6)$

6) $6x^3 + 2x^2$

7) $(10x^4)^3$

Multiply.

8) $(x + 8)(x - 10)$

9) $(2x + 1)(3x + 4)$

10) $3x^4(2x^5 - 7x)$

11) $(x + 4)^2$

12) $(x + 9)(x - 9)$

13) $(x - 9)(x - 9)$

14) $(3x - 4)(x^2 - 3x + 7)$

Factor.

15) $x^2 - 15x + 44$

16) $x^2 + 10x + 24$

17) $x^2 - 10x + 24$

18) $x^2 + 10x - 24$

19) $x^2 - 10x - 24$

20) $x^6 - 16$

21) $x^5 - 16$

22) $x^2 - 7$

23) $20y^5 + 30y^3$

Solve.

24) $9x + 50 = 4x$

25) $8 - 2(x + 7) = 6x - 3$

26) $x^2 - 13x + 40 = 0$

27) $3x = x^2 - 70$

28) $x^2 + 3x = 28$

29) $(x-7)^2 = 2x^2 + 89$

30) $(x-7)^2 = x^2 + 21$

31) $8x + 9 = 1 + 2(x + 4)$

32) $2x + 9 = 1 + 2(x + 4)$

33) $2x + 5 = 1 + 2(x + 4)$

34) $\dfrac{5x}{3x-1} = \dfrac{2x}{x+4}$

Percent Review

35) What is 18% of 62?

36) What is 1.8% of 62?

37) 18 is what percent of 20?

38) 18 is what percent of 200?

39) 18 is what percent of 2000?

40) What percentage increase is it going from 40 up to 70?

41) What percentage increase is it going from 40 up to 80?

42) What percentage increase is it going from 40 up to 120?

43) What percentage increase is it going from 60 up to 135?

44) 135 is what percent of 60?

45) Jim bought some stock for $3,000 and then sold it for $3,600 one year later. What is the profit as a percentage?

46) Jim bought some stock for $3,600 and then sold it for $3,000 one year later. What is the loss as a percentage?

PDA Review

47) Unit Conversions

a) 0.87ℓ = _____ mℓ

b) 10 lb = _____ oz

c) 900mg = _____ kg

d) 0.79mm = _____ cm

e) 400 fl oz = _____ qt

f) 0.05km = _____ m

g) 0.62mℓ = _____ ℓ

h) 49m = _____ mm

i) 1½ ton = _____ oz

j) $5.8\ell \approx$ _____ gal

k) 8000 ft $\approx$ _____ km

Section B

Factor.

48) $10x^7 - 120x^6 + 270x^5$

49) $90x^2y^2 - 250x^2y$

PDA Review

50) Unit Conversions

a) $12 \frac{yd}{s} \approx$ _____ $\frac{km}{h}$

b) 26 mph $\approx$ _____ $\frac{m}{s}$

c) 8 lb $\approx$ _____ g

d) 850 cm $\approx$ _____ yd

e) 2.8 yd^3 $\approx$ _____ gal

51) What is the density (in lb/ft^3) of a block that weighs 78 lbs and has a volume of 1.3 cubic feet?

52) What is the weight of a block that has a density of 125 lbs/ft^3 and a volume of 0.72 ft^3?

53) What is the volume of a block that weighs 90 lbs and has a density of 230 lbs/ft^3?

Word Problem Test

Choose four out of the five problems to solve. Cross out the one you don't wish to do. (You can do the fifth one for extra credit.)

You must show work with equations in order to receive full credit.

1) Two consecutive odd integers are such that three times one of the numbers is seven more than twice the other number. Find the two numbers.

2) The product of two numbers is 90, and one of the numbers is three more than three times the other number. Find the two numbers.

3) Jeff's age is three years less than twice Kate's age. Four years from now, Kate's age will be ⅔ of Jeff's. Find both of their ages.

4) Jeff biked from his house to his uncle's house averaging 18mph and then returned home averaging 15mph. If the return trip took 16 minutes longer, then how far is it from Jeff's house to his uncle's house?

5) Maria has 32 coins worth $4.55. How many of each type of coin are there if she has only quarters and dimes?