10th Grade Assignment – Week #20

Group Assignment for either Tuesday or Thursday

- Work on any of the problems from the **Mensuration** unit, **Problem Set #5** – these are all great problems! Or work on problems that you didn't get from last week's group assignment.
- Help each other out with some of the problems from the **Algebra Review** *Individual Work* (see below).

Individual Work

- Do what you can!

  From Algebra Review "Section A" Choose problems to do from the following:
  - **Problem Set #5**: Pr #1-5, 7-16a, 17(a-e), 20, 22-28, 31, 32
  - **Problem Set #6**: Pr #1-22, 27-31, 26
  - If you still have the time and desire, then choose problems from **Problem Set #7.**

  From Algebra Review "Section B" Choose problems to do from the following:
  - **Problem Sets #4-6**: Any of these problems!

Problem Set #5

Section A

1) If a rectangle's length and width is enlarged in a photocopier by 72%, then how much greater is its area?

2) If the edge of one cube is 5 times longer than the edge of another, then how much greater is its volume?

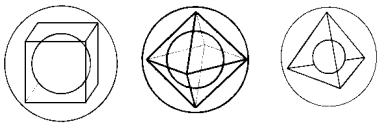
3) Find the volume of a tetrahedron with 12cm edges.

4) One cube has twice the volume of another cube. The larger cube's edge is what percent longer than the edge of the smaller cube?

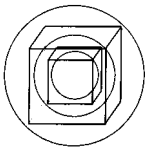
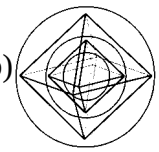
Section B

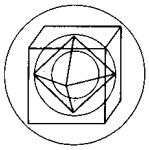
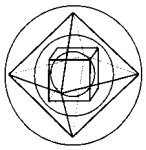
5) In the below drawings we have a cube, an octahedron and a tetrahedron with inscribed and circumscribed spheres. For each case, find the ratio of the radii of the two spheres.

a) b) c)



6) Each drawing shows spheres, cubes and octahedra circumscribed and inscribed within one another. Find the ratio of the radius of the largest sphere to the smallest sphere.

a)  b) 

c)  d) 

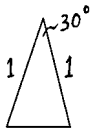
7) What is the ratio of the volume of a cube to a cone that fits perfectly in it?

8) What is the ratio of the surface area of a cube to a cone (disregarding the circular base) that fits in it?

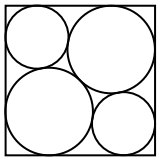
9) What is the ratio of the volume of a cube to a sphere that fits perfectly in it?

10) What is the ratio of the surface area of a cube to a sphere that fits in it?

11) Find the area of this triangle.



12) While sitting at a restaurant, Mr. York noticed that the condiment tray (which holds four small bottles) is arranged as four tangent circles inscribed in a square with 7.3cm edges (as shown here).



a) Find the ratio of the radii of the circles.

b) Find the ratio of the areas of the circles.

Problem Set #5

Simplify.

1) $-7x^3 + 3x^7$
2) $6x^3 \cdot 5x^4$
3) $4x^3 + 5x^2 + 7x - x^3$
4) $(6x^3)^2$
5) $(6x^3)^{-2}$
6) $(3 + \sqrt{2})^2$

Factor.

7) $x^2 + 17x + 60$
8) $x^2 - 17x + 60$
9) $x^2 + 17x - 60$
10) $x^2 - 17x - 60$
11) $x^2 - 49$
12) $x^4 - 1$
13) $x^9 - 1$
14) $7x^6 - 28$
15) $2x^5 + 16x^4 + 24x^3$
16) Solve by both factoring and the Quadratic Formula:
    a) $x^2 - 10x + 24 = 0$
    b) $6x^2 + 5x + 1 = 0$
17) Solve by the easiest method (factoring, completing the square, or the quadratic formula) Remember to simplify all answers as much as possible:
    a) $x^2 - 13x + 42 = 0$
    b) $x^2 + 9x = 2$
    c) $5x^2 + 1 = -7x$
    d) $-18x + 9 = -9x^2$
    e) $\frac{1}{x^2 - 5} = \frac{1}{4x}$
    f) $(x + 1)(2x + 3) = (x - 4)(x - 7)$

Solve for X in terms of Y

18) $4X + 3Y = 2$
19) $Y = 6X - 12$

Find the Common Solution.

20) $5x + y = 3$
    $2x - 3y = 8$
21) $6p + 7q = -2$
    $q = 4 - 3p$

Solve.

22) $10 - 4(x - 1) = 5(2 - 5x)$
23) $x^2 + 400 = 50x$
24) $5 - (3x + 1) = 14 - 2x$
25) $x^2 + x - 12 = 0$
26) $\frac{6}{5} = -\frac{7}{8}x - 10$
27) $3x^2 + 1 = -4x$
28) $x^2 + 7x = 0$
29) $\frac{1}{2}x - 5\frac{1}{3} = \frac{4}{3} - \frac{1}{2}(x - 2)$
30) $3x^2 + 5x - 1 = x^2 + 4$
31) $x^2 + 11x = 60$
32) $\frac{3x}{4x + 1} = x$
33) If it takes Bob 40 minutes to get to work and his work is 35 miles away, how long does it take him to get home if he's travelling at 40 mph?

Problem Set #6

Factor.

1) $x^2 + 10x + 24$
2) $x^2 – 10x + 24$
3) $x^2 + 10x – 24$
4) $x^2 – 10x – 24$
5) $x^6 – 25$
6) $x^6 + 25$
7) $x^{25} – 25$
8) $x^8 – 16y^6$
9) $x^8 – 16y^4$
10) $x^8 + 16y^4$
11) $x^2 + 12x + 20$
12) $3x^6 – 300$
13) $x^2 – 8x + 7$

Solve by using the quadratic formula:

14) $4x^2 – 7x – 2 = 0$
15) $x^2 + 12x + 27 = 0$
16) $2x^2 – 13x + 15 = 0$
17) $x^2 + 3x – 17 = 0$
18) $x^2 + 3x + 17 = 0$
19) $x^2 – 49 = 0$
20) $4x^2 + 3x = 0$
21) Solve problems 19 and 20 <u>without</u> using the quadratic formula.
22) Solve by factoring and by using the Quadratic Formula:

$x^2 – 6x – 27 = 0$

Solve for A in terms of B

23) $B = 5A – 15$
24) $6 = 6B + 4A$

Find the Common Solution.

25) $y + 7 = 8$
$x – 9 = y$
26) $5x + 4y = 1$
$4x + 3y = 2$

Solve.

27) $x^2 – 10x = -21$
28) $x^2 – 10x = 21$
29) $2x^2 + 12 = 5x$
30) $\frac{x}{4-x} = \frac{3}{x}$
31) $(x + 1)(3x – 4) = 8$
32) $(x + 2)(x – 5) = 20$
33) $x^2 + 3x + 40 = 0$
34) $4x^2 + 16x = -64$
35) Bob travels to work at an average speed of 30 mph. He returns home along the same route averaging 40 mph.

a) Does it take longer for Bob to travel to work or to travel home?
b) If Bob's total roundtrip time is 1 hour, what was his traveling distance to work?

Problem Set #7

Factor.

1) $x^2 + 13x + 30$
2) $x^2 – 13x + 30$
3) $x^2 + 13x – 30$
4) $x^2 – 13x – 30$
5) $x^2 – 1$
6) $x^4 – 9y^{10}$
7) $x^4 – 81y^{12}$
8) $x^4 – 8$
9) $x^2 + 5x –14$
10) $4x^5 + 36x^4 + 80x^3$
11) Solve the following by both factoring and the Quadratic Formula:
$x^2 + 20x – 44 = 0$

Solve for Y in terms of X.

12) $4X + 3Y = -12$
13) $6Y – 5 = -3X$

Find the Common Solution.

14) $3x – 4y = 1$
$6x + 5y = 54$
15) $x + y = ¾$
$40x = 60y$

Solve.

16) $4 – 3(x + 1) = 2$
17) $54x – 3(15x – 2) = 4(6x)$
18) $\frac{1}{3}(4 – x) – 5¾ = 1 – 4(\frac{6}{5} – x)$
19) $x^2 – 7x = 18$
20) $x^2 + 2 = 4x$
21) $9x + 8 = -x^2$
22) $5x^2 + 40 = -45x$
23) $6x^2 + 11x = 10$
24) $2x^2 = x$
25) $(3x + 1)(x – 2) = 0$
26) $(2x – 1)(3x + 4) = 5$
27) $(x + 1)(x – 3) = (x + 2)(x – 7)$
28) $\frac{x}{4 – x} = \frac{1}{x + 2}$
29) $x^2 + 9x = -18$
30) $x^2 + 9x = 18$
31) $x^2 + 9x = -81$
32) $x^3 – x = 0$
33) $x^3 + 100x = 20x^2$
34) $-4x^2 + 24x = -108$
35) $(3x + 2)^2 = (4x – 5)^2$
36) $x^4 + 7x^3 = 30x^2$
37) $\frac{x – 3}{x^2 – 1} = \frac{4}{2x + 1}$
38) The product of two numbers is 24 and one number is 6 less than 3 times one the other number. Find all sets of numbers that fit this description
(Hint: There are two pairs).
39) A circle has an area equal to a square with a diagonal of length 4. Find the radius of the circle.

Problem Set #4

Simplify.

1) $3x^3 + 5x^3$
2) $3x^2(5 + x^2)$
3) $(3 + x^2)(5 + x^2)$
4) $3x^2(x^2 + 2x – 5)$
5) $(x – 5)(x + 6)$
6) $3x^4(x – 5)(x + 6)$
7) $(x – 8)^2$
8) $(x – 2)(x + 1)(x – 3)$
9) $\left(\frac{2}{3}\right)^{-2}$
10) $\left(\frac{2x^{-3}}{3}\right)^{-3}$
11) $\frac{8x^5y^2}{6x^3y^6z^2}$
12) $\sqrt{75}$
13) $(6 + \sqrt{5})(3 + \sqrt{5})$
14) $(3 – \sqrt{2})(5 + 3\sqrt{2})$
15) $\frac{3}{4\sqrt{5}}$
16) $\frac{15x^2}{5x^5}$
17) $\frac{2x^3 – 8x^2 – 24x}{2x}$
18) $\frac{2x^3 – 8x^2 – 24x}{x + 2}$
19) $\frac{x^2 – 4x – 5}{x^2 – 25}$
20) $\frac{6}{x} + \frac{2}{x–3}$

Evaluate each expression
given that $x = 3$; $y = –½$.

21) $5y – 6x + 3$
22) $y^2 – xy + 4 – \left(\frac{x}{y}\right)^3$

Solve for X in terms of Y.

23) $2X + Y = 3$

Factor.

24) $x^2 + 25x + 84$
25) $x^2 – 25x – 84$
26) $x^2 + 25x – 84$
27) $x^2 – 25x + 84$
28) $15x^2 – 17x + 4$

Find the Common Solution.

29) $2x – y = 8$
$4x – 2y = 5$

Solve.

30) $8+2(3X–5)=5–(2X–7)$
31) $\frac{2}{5}(2X – \frac{1}{2}) = \frac{2}{3}X – \frac{1}{4}$
32) $x^2 + 2x + 3 = 0$
33) $(x + 5)(x + 6) = 6$
34) $(x + 5)(x + 6) = 0$
35) $11 = x^2 + 5x$
36) $\frac{5}{2x} = \frac{7}{2x–8}$
37) $\frac{2}{x+4} + \frac{3}{x–4} = \frac{24}{x^2–16}$
38) $5x^5+200x^3=80x^3–50x^4$
39) Find two numbers such that their product is 84, and one number is two less than twice the other.

Problem Set #5

Simplify.

1) $6x^5 - 3x^3 + 2x^2(x^3 - 4)$

2) $(\frac{1}{2}x^3y)(5x^2y^5)(8x)$

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

4) $(x + 8)(x - 8)$

5) $(3x^4 + 2)^2$

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

7) $(x - 10)^3$

8) $\sqrt{28}$

9) $\sqrt{50} + \sqrt{18}$

10) $\frac{7}{\sqrt{7}}$

11) $(2 - 3\sqrt{7})(4 - \sqrt{7})$

12) $(5 - 3\sqrt{5})^2$

13) $(5 - 3\sqrt{5})(5 + 3\sqrt{5})$

14) $\frac{\sqrt{3}}{2 + \sqrt{3}}$

15) $\frac{3 + 2\sqrt{3}}{1 - 3\sqrt{3}}$

16) $\sqrt{100x^{16}}$

17) $\frac{4x^{-4}y^8z^{-7}}{20x^2y^3z^{-2}}$

18) $\frac{2}{x-2} + \frac{3}{x^2 - 4}$

19) $\frac{x^3 - 6x^2 + 9x}{4x^2 + 8x - 60}$

20) $\frac{20x^3y^4 - 15x^4y^7 + 10x^2y^2}{5xy^2}$

Factor.

21) $3x^9 - 27x^5$

22) $x^3 - 9x^2 + 20x$

Evaluate given that $x = -\frac{1}{2}$ and $y = \frac{3}{4}$

23) $x^2 - \frac{y}{x} + 8y$

Solve for X in terms of Y.

24) $Y = \frac{2}{3}X + \frac{1}{3}$

25) $3Y + 7X = -8$

Solve.

26) $2x^2 - 5x = 3x^2 - x - 60$

27) $2x^2 - 5x = 2x^2 - x - 60$

28) $(x+3)(3x-1) = 3x^2 + 8x - 3$

29) $(x + 1)^2 = 10x + 21$

30) $7x^2 + 8x - 3 = 0$

31) $10x^2 + 40x + 20 = 0$

32) $19x - 10 = 6x^2$

33) $19x - 10 = 6x$

34) $x^2 - 3x + 5 = 0$

35) $\frac{x}{x+1} + 1 = \frac{3}{3-x}$

36) $\frac{x+3}{x-3} = \frac{11x+3}{x^2-9} + \frac{5x-1}{x+3}$

37) Tina leaves home jogging at 8mph at 9:32a.m. 30 minutes later Bill leaves the same house on a bike to catch Tina. If Bill is biking 18 mph, then what time does he catch Tina?

Problem Set #6

Simplify.

1) $5x^2(3x^4y)^2$

2) $(-3x^3y^4)^3$

3) $(4x - 3)(2x + 5)$

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

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

6) $(x^2 - 6)^2$

7) $\sqrt{54}$

8) $\sqrt{540}$

9) $\sqrt{5400}$

10) $\sqrt{54000}$

11) $\sqrt{128} + \sqrt{12} - \sqrt{18}$

12) $(3 - 2\sqrt{7})(2 + 3\sqrt{7})$

13) $(4 + \sqrt{3})^2$

14) $\frac{3 - \sqrt{5}}{\sqrt{5}}$

15) $\left(\frac{3x^{-2}y^{-3}}{5x^{-4}y^5}\right)^{-2}$

16) $\frac{8x^4y^2 - 6x^3y^3}{2xy^2}$

17) $\frac{x^2 - 4}{x^2 + 6x - 16}$

18) $\frac{4x^2 + 5x - 6}{4 - x^2}$

19) $\frac{4}{4 - \frac{4}{4 - \frac{4}{x}}}$

Factor.

20) $6x^5y - 8x^4y^2$

21) $x^6 - 8x^3 + 12$

22) $2x^3 - x^2 - 10x$

Solve for x in terms of y.

23) $y = \frac{1}{2}x + 5$

Find the Common Solution.

24) $4x - 5y = 10$
$3x + 10y = 18\frac{1}{2}$

Solve.

25) $7x - 5 = x(x + 7) - 105$

26) $7x - 5 = 7(x + 7) - 105$

27) $5x^2 + 3x^3(x-3) = 5x^2(3x-8)$

28) $3x + 16 = x^2 + 3x$

29) $3x^2 + 4x = 5$

30) $3x^2 + 4x = -5$

31) $2x = 35 - x^2$

32) $x^2 + 5 = -8x$

33) $\frac{5}{x+4} - \frac{x}{3x+12} = -\frac{20}{3}$

34) $\frac{x+5}{x-7} = \frac{2x}{x-3}$

35) Barb has a handful of coins consisting of quarters and nickels only. How many of each coin does she have if there are a total of 18 coins worth $1.90?