Summer Math Review 2016

For Section 8 College Prep

- *You should not use a calculator for this work.*
- *Work on a separate sheet of paper, except for questions 15, 16a, 17c and 17d which you should complete on this sheet.*
- *Show all work.*

1. Simplify each expression:

    a. $a + a$
    b. $b \cdot b$
    c. $5 + d \cdot d \cdot d$
    d. $f \cdot f - g \cdot g \cdot g$
    e. $3m + m + m$
    f. $8k \cdot k$

2. Evaluate when $g = 4, h = 3, j = -4,$ and $k = 5$.

    Where applicable, write your final answer as a fraction in simplest form

    a. $3k^2 + 3$
    b. $\dfrac{2j^2}{h}$
    c. $\dfrac{(k+5)^2}{j}$
    d. $\dfrac{2}{5}g$

3. Use the distributive property to expand each expression.

    a. $5(x + 3)$
    b. $6(3 - m)$
    c. $-3(x - 2)$

4. Factor the GCF in of each expression:

    a. $5x + 15$
    b. $14r - 21$
    c. $8n^2 + 24n$

5. Simplify by combining like terms:

    a. $3x^2 + 2x - 5 - x^2 + 7$

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

6. Restate each number as a product of prime numbers, then as a product of power expressions if possible.

Example: $100 = 2 \cdot 2 \cdot 5 \cdot 5 = 2^2 \cdot 5^2$

    a. 8

    b. 54

    c. 96

7. Restate as a single power expression if possible, then evaluate if possible:

    a. $5^2 + 5^3$

    b. $5^2 \cdot 5^3$

    c. $3^2 \cdot 4^2$

    d. $3a^4 \cdot 5a^3$

    e. $\left(\frac{1}{3}\right)^2$

    f. $\left(\frac{2}{5}\right)^7 \cdot \left(\frac{5}{2}\right)^9$

    g. $\dfrac{x^7}{x^4}$

    h. $\dfrac{8^{10}}{8^{12}}$

    i. $(2^3)^2$

    j. $(x^7)^{\frac{1}{7}}$

8. Evaluate:

    a. $3 + (-8)$

    b. $-7 - 12$

    c. $27 - (-41)$

    d. $-72 + 93$

    e. $4.5 + (-3.5)$

    f. $\frac{1}{5} - \left(-\frac{3}{5}\right)$

    g. $2 + 3 \cdot 7$

    h. $(3 + 2)^2$

    i. $4 + 3^2$

    j. $\frac{1 + 2^3}{3^2}$

    k. $-4 \cdot 3 \cdot (-0.5)$

    l. $(-4)^2$

    m. -3^2

9. Which is greater? How do you know?

    a. -2^6 or $(-2)^6$

    b. $(-2)^7$ or -2^7

10. Rewrite as a single power expression without negative exponents, then simplify:

    a. 3^{-2}

    b. $2^5 \cdot 2^{-6}$
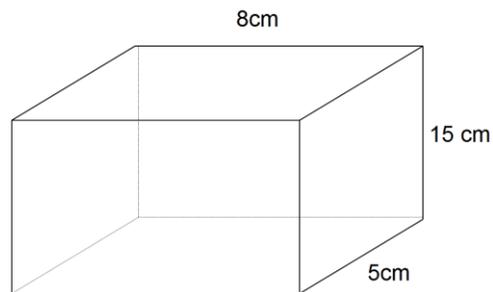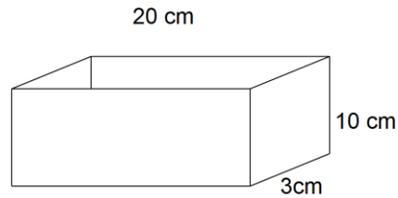
    c. $4^{-1} \cdot 2^4$

    d. $7^{23} \cdot 7^{-23}$

    e. -4^{-2}

    f. $(-3)^{-2}$

11.

    a. The prisms pictured below have the same volume. What is it?

    b. The prisms do not have the same surface area. Which has more surface area? How do you know?

20 cm

10 cm

3cm

8cm

15 cm

5cm

12. Mr. Rosenstein writes the letters of the word Maimonides on slips of paper and puts them in a bag. He removes one letter from the bag. What is the probability:

    a. He will remove an O from the bag?
    b. He will remove an M from the bag?
    c. He will remove a vowel from the bag?
    d. He will remove a Q from the bag?

13. After Mr. R. takes the first letter out of the bag (the same bag as in question 12, above), he sets it aside and draws another letter. What are the chances that he has removed both Ms from the bag?

14. The 8th grade can order black, blue or green sweatshirts with white or yellow lettering. Each student can choose her colors as well as size: S,M, L, or XL. How many possible sweater combinations are there?

15. This question is about rational numbers.
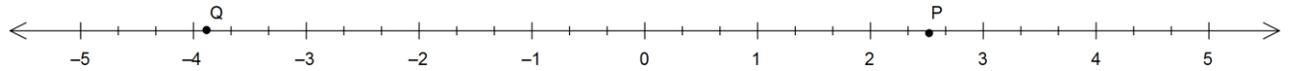
   a. What are the coordinates of points P and Q?

   b. Plot point V at -4.

   c. Plot point R at $-\frac{9}{4}$.

   d. Plot point S at $\frac{3}{2}$. Plot point T at the opposite of point S.

   e. Plot point U at the sum of points R and S. Is the coordinate for U positive or negative? Why?

16. Shlomo has $230 in the bank. He deposits $5 per month.

   a. Complete the table below to show his balance.

| m (months)	0	1	2	10	20	
b (money)	230					500

   b. Write an expression to show how much he will have, b, after m months.
   c. If Batya starts with only $100, but saves $10 per month, how long will it take until she has a greater balance than Shlomo?

17. The M Cats rent a basketball court for $150. They sell tickets for $7 per person.

   a. If x people attend the game, write an expression to show how much money they will have after paying the rent.
   b. How many people need to come to the game for them to break even?
   c. Complete the table below.

x (people)	0	10	20	30		100
y (profit)					95	

d. Graph the data below.
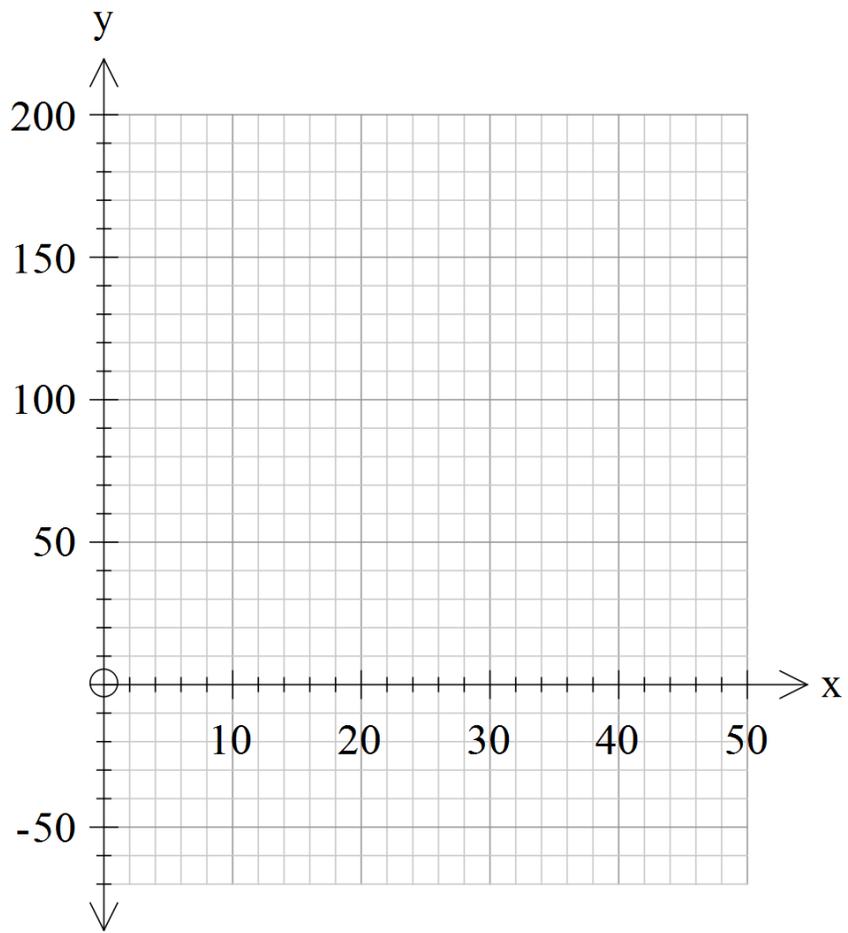
18. Sharona wrote the following three equations to describe different sweatshirt companies.

Joe's Sweatshirts	$y = 8x + 30$
Super Sweats	$y = 9x$
Stylin' Threads circa 1970	$y = 10x - 25; x > 20$

    a. Identify the slope and y-intercept of the first two equations.

    b. One company charges extra for shipping. Which is it, and how much does shipping cost?

    c. One company gives you a discount if you buy at least 20 sweatshirts. Which company is it, and how much is the discount?

    d. We plan to buy 45 sweatshirts. Which company should we use? Why?

    e. Sharona tells you that in part d., 75% of the class bought sweatshirts. How many students are in the class?

19. Solve these equations:

    a. $7x + 11 = 60$

    b. $-3(x + 2) = 2x$

    c. $\frac{3x+1}{4} = 7$

20. These questions are about proportions.

    a. If the cost of T-shirts is proportional to the number ordered, and we paid $180 for 36 T-shirts, how much will 9 T-shirts cost?

    b. In the same situation, how much will 90 T-shirts cost?

    c. Still the same scenario, how much will 1 T-shirt cost?

    d. Write a rule using the letters x and y that describes the total cost for any number of shirts ordered.