DeBakey High School For Health Professions
Mathematics Department

Summer review assignment for rising freshmen who will take Geometry

Parents: Please read this page, discuss the instructions with your child, before handing it off to your child. This is an assignment for rising freshmen who will be taking Geometry in their first year at DeBakey. These problems cover most of the concepts taught in Algebra 1 in which students are expected to know well. It is very important for the student to master those skills because they will be applied throughout the Geometry course, as well as all four years of high school.

DeBakey's math curriculum is rigorous because all of our students must take AP Calculus AB in order to graduate with a DeBakey Health Science Diploma. Your child must begin the first year already proficiently trained in middle school math. Please do not rely on the math class grades that your child received in middle school to determine how ready he or she is for this high school, as grades may be inflated. This assignment packet will actually give you a better idea of his/her readiness as he/she work through it. Students will be given a quiz during the first or second week of the school year. **This review quiz will be based on the concepts covered in this packet.** Students will have the opportunity to ask questions before they are given the quiz.

Parents are requested to see that this assignment is completed properly and seriously. Your child's success in the first semester depends on the correct completion of this packet and on understanding of the concepts covered.

IMPORTANT: Absolutely **NO CALCULATOR** or electronic device is to be used on the **ENTIRE** packet. If your child feels he or she cannot do this packet without one, it indicates that he or she will have to work on those fundamental skills during summer vacation. Your child should show organized work with detailed steps; if necessary, additional worksheets can be attached. Again, this is to demonstrate readiness for this school. **We do not allow the use of a calculator in-class when students are asked to do these types of problems. Please plan accordingly in the summer.** Answer key will be available on http://debakeyhigh.weebly.com/ or http://www.houstonisd.org/Page/114414 after May 31, 2017. If you realize later that you need another packet or a different packet, you can just download a copy from this link.

Part 1: Solve each equation (no calculator)

1. $3x - 12 = 24$	2. $\dfrac{3}{4}(x - 4) = 12$
3. $\dfrac{8r + 5 - 3r}{4} = 10$	4. $\dfrac{6}{2w} = -24$
5. $3(x - 5) = 12$	6. $0 = x^2 + x$

7. $6x^2 = 216$	8. $x^2 - 7x + 12 = 0$
9. $3x^2 - 6x - 2 = 4 + 5x - 7x^2$	10. $x^2 = 2x + 24$
11. $\frac{1}{2}(10 - 2a) = 2$	$-4 = 6n - 6$

Part 2: Simplifying and Evaluating Expressions (no calculator)

1. Evaluate: $f(a,b) = ab^2 + \frac{1}{2}a - 3ac$ for $a = 10$, $b = -6$, $c = -4$	2. Evaluate: $f(a, y, z) = 2.5x^3 + x^{-2}y - xz$ for $x = 4$, $y = 8$, $z = -3$
3. Simplify: $5x^3y^4 + 7x^2y^4 - 2x^3y^4$	4. Simplify: $(5y - 6)^2$
5. Simplify: $(5x^2 - 4y^3)(3x^3 + 6y)$	6. Simplify: $8\sqrt{3} + 3\sqrt{27} - \sqrt{300}$
7. Simplify: $10\sqrt{6} \bullet 2\sqrt{2} \bullet 3\sqrt{3}$	8. Simplify: $2\sqrt{2} \bullet 3\sqrt{3} \bullet 5\sqrt{2} + 4\sqrt{3} \bullet 2\sqrt{3}$
9. Simplify: $(3x^2 - 5y)^2$	10. Simplify: $(2x - 3y)^3$

Part 3: Exponents and Radicals (no calculator)

Simplify the following radical expressions, no decimal answers allowed.

1. $\sqrt{50}$	2. $4\sqrt{32}$
3. $6\sqrt{72}$	4. $2\sqrt{28}+\sqrt{63}$
5. $6\sqrt{8}-\sqrt{98}$	6. $2\sqrt{10}\cdot3\sqrt{6}$
7. $\dfrac{6\sqrt{48}-2\sqrt{27}}{\sqrt{12}}$	8. $\left(2\sqrt{2}\right)^{2}$
9. $\left(5\sqrt{8}\right)^{2}$	10. $\left(\sqrt{20}\right)^{3}$

Part 4: Working with Like and Unlike Terms (no calculator)

Combine any like terms to simplify each of the following expressions.

1. $\left(6x^{2}+1\right)+\left(3x^{2}-4\right)$	2. $\left(2x^{3}+11x+2\right)-\left(x^{3}+2x+7\right)$
3. $\left(x^{2}-3x+3\right)-\left(x^{2}+x-1\right)$	4. $\left(14-12x\right)+\left(10x+5\right)$
5. $\left(8x^{3}-1\right)-\left(20x^{3}+2x^{2}-x-5\right)$	6. $6x-\left(22x+3-36x^{2}+x^{3}\right)$

7. $\left(4x^2 - 15x + 16\right) + \left(2x - 20\right)$	8. $\left(7x^3 - 2 + x^2 + 13x\right) - \left(4x^3 + 10\right)$

Part 5: Solving or Factoring (no calculator)

Factor each expression or equation, if possible. Solve for *x* if you are working with an equation.

Solve for *x*, find the roots, find the solution, find zeros, and find x intercept mean the same.

1. Factor $4x^3 + 20x^2$	2. Solve $x^2 + 10x = -21$
3. Solve $x^2 - x - 6 = 0$	4. Solve $x^2 - 49 = 0$
5. Solve $x^2 + 2x - 1 = 0$	6. Solve $2x^2 - 5x = 3$
7. Factor $3x^2 - 19xy + 20y^2$	8. Factor $25x^2 - 16y^2$

9. Factor $10x^2 + 17xy + 3y^2$	10. Solve $-4x = 10x^2 - 24x^3$ (careful – there are 3 answers here!)

Part 6: Pythagorean Theorem   (no calculator, as radical simplification is a vital skill)

Use the Pythagorean Theorem to find **n**. Express n as a radical in simplest form. Show your work.
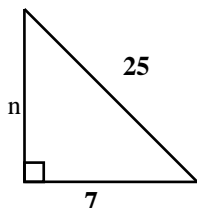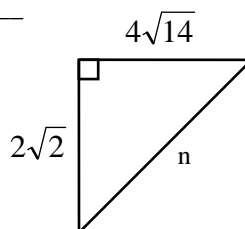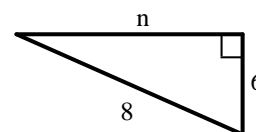
1. _____	2._____	3. _____
5, n, 3	n, 9, 5	$2\sqrt{7}$, n, 8

4. _____	5. _____	6. _____
25, n, **7**	$4\sqrt{14}$, $2\sqrt{2}$, n	n, 8, 6

7. _____	8. _____
5, n, 4	n, $2\sqrt{14}$, 9
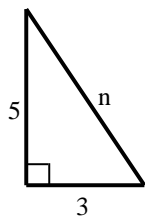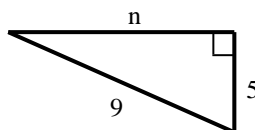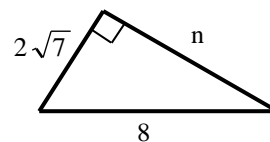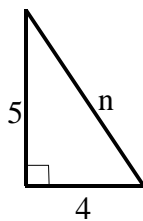
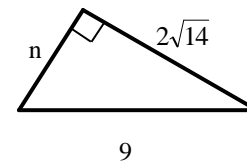## Part 7: Word Problems (no calculator is allowed as your child need to be proficient in multiplying decimal numbers)

1. A book costs $7.95 with a sales tax rate of 8%. What is the total cost of the book?	2. A car rental agency charges a fee of $35 per day plus $.20 for each mile driven. How much will it cost to rent the car for 6 days and drive 800 miles?
3. A chef cooks 1 ½ potatoes for each serving of mashed potatoes. How many servings can he make from 18 potatoes?	4. Suppose you are selling stuffed animals for $6 each to raise money for your club. You sold six more rabbits than monkeys. If you sold $120 worth of stuffed animals, how many of each type did you sell?
5. Suppose a video store charges non-member $4 to rent a video. A membership costs $21 and then videos cost only $2.50 to rent. How many videos would you need to rent in order to justify a membership?	6. Suppose you decide to make and sell silk flower arrangements. You spend $220.00 on materials. You sell each flower arrangement for $10.50 each. How much profit would you make if you sold 23 silk flower arrangements?

|	
7. The new parking lot has spaces for 450 cars. The ratio of spaces for full sized cars to compact cars is 11 to 4. How many spaces are for full-sized cars? How many spaces are for compact cars?	8. You are designing a cylindrical storage container for compost. You want it to hold 110π ft^3 and be 8 ft high. Use the formula V=$\pi r^2 h$ to find the radius of the storage container.
9. A ladder is 25 ft long. The ladder needs to reach to a window that is 24 ft above the ground. How far away from the building should the bottom of the ladder be placed?	10. There is a large building on fire. Fire trucks from two different stations respond to the fire. One station is 1 mile east and 2 miles north of the fire. The other station is 2 miles west and 1 mile south of the fire. How far apart are the two fire stations?

Part 8: Graphing (absolutely no calculator is allowed here)

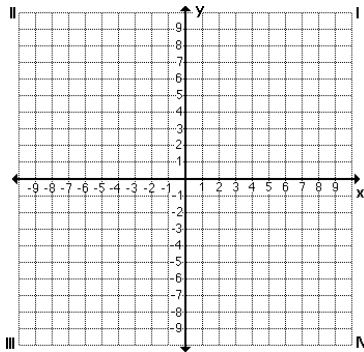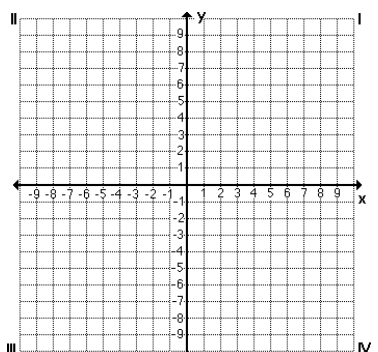Graph each of the following equations or inequalities.
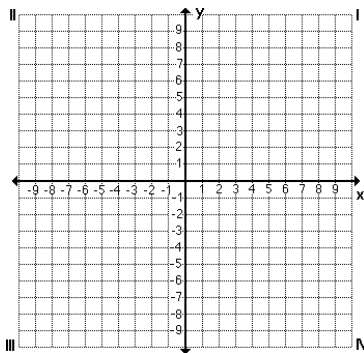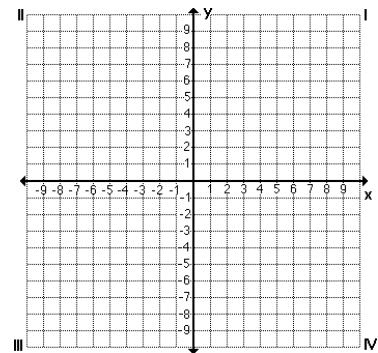
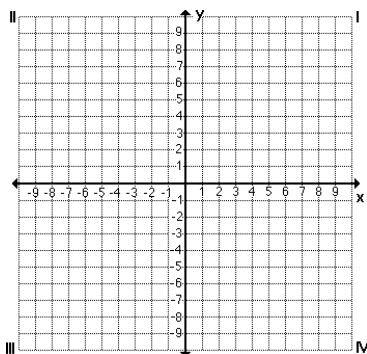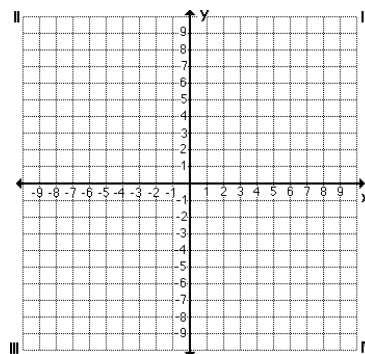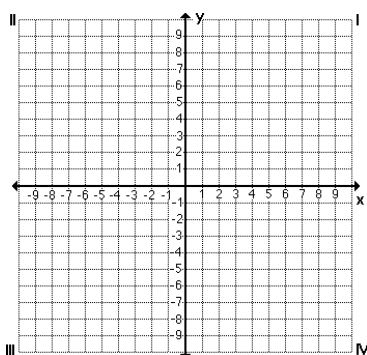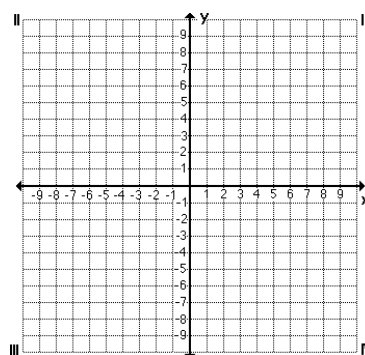|	
1. $x + y = 6$	2. $y < -3$
3. $x \geq 5$	4. $2x - 6 = 3y$

5. $y \leq -\dfrac{1}{3}x + 3$

6. $\dfrac{1}{2}x = -y + 8$

7. $y = -\dfrac{3}{4}x$

8. $3 - y = \dfrac{1}{2}$

Part 9: Systems of Equations (no calculator)

Find the solution to each system of equations using either substitution or elimination.

1. $\begin{aligned} x + y &= 12 \\ x &= y + 2 \end{aligned}$ $M(10,2) \ and \ W(10,-5)$	2. $\begin{aligned} 3x + 2y &= 7 \\ -x + 3y &= 8 \end{aligned}$
3. $\begin{aligned} x &= 3y + 1 \\ 6x &= y + 6 \end{aligned}$	4. $\begin{aligned} x + y &= 7 \\ x - y &= 9 \end{aligned}$
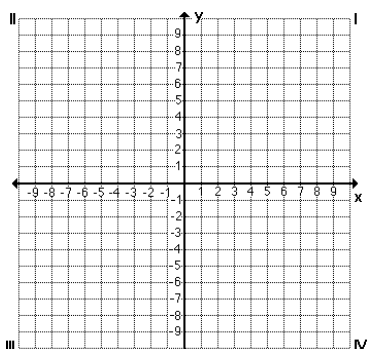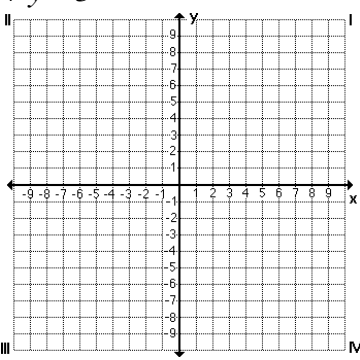
5. $\begin{array}{l} y = 2x \\ 3x + y = 5 \end{array}$	6. $\begin{array}{l} x = 4 \\ y = 3x - 5 \end{array}$
7. $\begin{array}{l} 3y = 2 - x \\ 2x = 7 - 3y \end{array}$	8. $\begin{array}{l} 2x + 3y = -1 \\ 3x + 5y = -2 \end{array}$

Find the solution to each system by graphing (no calculator)

1. $\begin{array}{l} y = 2x + 1 \\ -4x + y = 7 \end{array}$	2. $\begin{array}{l} 2x = y \\ x + y = 3 \end{array}$

Part 10: Working with Formulas (Distance, Midpoint, Slope) (no calculator)

Find the distance between each of the following pairs of points. Put all answers in reduced radical form.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

1. $B(3,-8)$ and $C(9,-2)$	2. $X(-5,3)$ and $Z(4,1)$

3. $M(8,4)$ and $N(-2,28)$	4. $E(-4,4)$ and $F(0,-4)$

Find the coordinates of the midpoint between each pair of points. $M = \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2} \right)$

|	
5. $A(5,4)$ and $B(3,2)$ M = _____	6. $C(3,3)$ and $D(-2,-1)$ M = _____
$T(3,-4)$ and $R(-5,-7)$ M = _____	7. $S(-1,0)$ and $V(5,-5)$ M = _____

Find the slope of the line between each pair of points. $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

8. $A(2,8)$ and $B(-10,-8)$ m = _____	9. $T(0,-8)$ and $R(10,-8)$ m = _____
10. $B(8,1)$ and $R(-2,5)$ m = _____	11. $M(10,2)$ and $W(10,-5)$ m = _____

Free Response Question:

A tank is filled with water up to a height of 10 meters. The tap at the top is opened and water is filled in the tank at the rate of 3 meters per minute for 1/2 hour. Then the tap at the top is closed. After 5 minutes the tap at the bottom of the tank is opened and water is drained out at the rate of 5 meters per minute till the tank is completely empty.

A) Model the above events in terms of a graph of the level (height) of water in the tank vs. time. Does this graph represent case of Direct Variation?

0
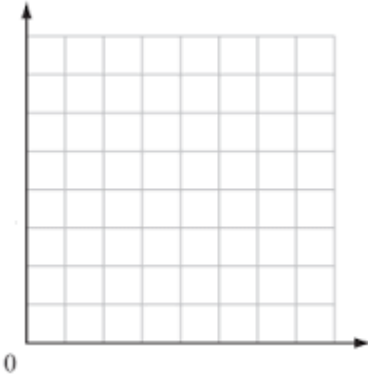
B) What is the slope of the graph when water is being filled in and when it is being drained out of the tank?

C) What is the significance of positive and negative slope in this situation?

D) Write equations indicating the relation between level (height) of water in the tank and time when:

      a)   Water is being filled in the tank from time 0 minutes to 30 minutes.

      b)   The top tap is closed and the bottom tap is opened from time 30 minutes to 35 minutes.

      c)   Water is being drained out of the tank from the time 35 minutes until the tank is empty.

10 m