PRE-ALGEBRA

Notes about Month 7

Ch. 9 (Sections 1 through 7) AND Ch. 10 (Sections 1 through 3)
AND Review From Prior Chapters

Handout for this unit: For sections 9-1, 9-2, and 9-3 (This handout only lists the vocabulary words, but students can then write the definitions and/or draw small diagrams to help themselves identify and memorize all the terms.): ***http://members.cox.net/jimgr/PreAlgCh9VocabForm.pdf***

Spelling note: Spelling is important as part of effective communication. Therefore, students should correctly spell any of the words that are part of this month's lessons. On the test, I will excuse the first word that is spelled incorrectly, but will mark off for other incorrect words from these chapters. The most common errors in the past have been "congruent," "equilateral," and "isosceles."

CHAPTER 9, SECTION 1:
Intro to Geometry: Points, Line, and Planes

1. Memorize the terms (and correct spelling)!
2. Remember to ALWAYS put the correct symbol above the segment, line, or ray. Students will not earn full credit for answers on the test if they do not put the line without arrows, line with arrows, or line with one arrow (facing the correct direction) above the letters of the segment, line, or ray.
3. "Skew" has often been confusing for many students. Remember that two lines that are skew are not in the same plane; that means they must meet these two conditions:
    i. The two lines **do not intersect** each other;
    ii. The two lines **are not parallel** to each other.

CHAPTER 9, SECTION 2:
Angle Relationships and Parallel Lines

1. Memorize the terms (and correct spelling)!
2. Remember the difference between complementary and supplementary angles. Here's one possible way: 90° comes before 180°. C comes before S. Match up the ones that come first and last. 90° goes with c (complementary) and 180° goes with s (supplementary). Use a different way of remembering, if you prefer, but you must remember.

3. The implications of vertical and supplementary angles make it essential to recognize these angles when you see, them, and how to use them. When you see vertical angles, you know immediately they are equal to each other. When you see supplementary angles, you know immediately they add up to 180°. Don't forget this! You'll also see it a lot in your Geometry course two years from now.

CHAPTER 9, SECTION 3:
Classifying Polygons

1. Memorize the terms (and correct spelling)!
2. The triangles and quadrilaterals are defined by their sides and/or their angles. Compare and contrast these, so that you can better remember them. Notice these points:
    a. Triangles:
        i. Acute, right, and obtuse have to do with the angles.
        ii. Equilateral, isosceles, and scalene have to do with the sides.
    b. Quadrilaterals: only rectangles and squares require a specific type of angle.
    c. "Regular" polygons: special type, because all sides and all angles are congruent.

CHAPTER 9, SECTION 4:
Reasoning Strategy: Draw a Diagram

Students are not required to draw a diagram, but it's the whole point of this section, that a diagram of some sort can help make sense of the information and thus lead to the answer. The main problem in problems solving, especially word problems, is knowing where to start. Students, this is where you just try different things that make sense, until you get something that makes the most sense and answers the problem. You're not tied to only one way to solve a problem—you can be imaginative, and you can try numerous things. Trust yourself, that you have learned enough in your years of life and school to be able to make sense of a problem. I suggest to do as many problems as possible in this section, and then check the answer key booklet to see the methods used there, so that you can learn different methods that you can try on different types of problems. That would be sort of like putting different problem-solving tools in your mental box of math tools, which you can then pull out when you see similar problems.

CHAPTER 9, SECTION 5:
Congruence

1. Notice that for SAS and ASA that the three things are in a row. The order is essential. In SAS, the angle MUST be between the two sides. In ASA, the side MUST be between the two angles.

2. Understand the main point, that if you can prove just those three things (SSS, SAS, or ASA), that really does mean that all the other parts of the two triangles also are congruent. You don't need to prove all 6 things (the three angles and the three sides), just three of them total—but only in these three ways: SSS, SAS, or ASA. There are indeed other ways to prove two triangles congruent; you will learn those ways in your Geometry course two years from now.
3. Notice the format of the congruence statement. You must use "≅" and the word, "by." The symbol "≅" means, "is congruent to." So, as you see in example 2a on page 465 of your textbook, the answer is, "Triangle MNO is congruent to triangle RPO by SAS."
4. Listing the congruent parts of the pair of triangles is not normally required in order to write the congruence statement, but I highly recommend that you do it (and you ARE required to do it on one of the test questions this month). It's one of those things which are worth doing so that you don't get mixed up or lose the order of the congruent parts, which is essential for deciding on the correct proof of determining that the triangles are congruent.

CHAPTER 9, SECTION 6:
Circles

1. Don't get the circumference of a circle mixed up with the area of a circle.
    a. Circumference of a circle: $C = \pi d$ or $C = 2\pi r$.
    b. Area of a circle: $A = \pi r^2$.
2. Making a circle graph from original data is the most difficult of this month's material, primarily because there are many steps, and some require radically different skills.
    a. Students must make central angles from given data. Remember that your goal is to get the number that would be over 360, since that would be the angle measurement inside the circle (360 is the number of degrees going around a circle one full time).
        i. If given percents, making proportions are relatively easy: it's always: (the percent number over 100) = (x/360). See example 2 on page 470 in the textbook.
        ii. If given data numbers, not percents, you have to first add the total of the data. That will be the denominator of your first fraction, instead of 100. See example 3 on page 471 in the textbook, and the worked-out answer to questions 15 and 16 in this month's practice test.
    b. The central angles allow you to measure and draw angles around a circle. See the worked-out answer to questions 15 and 16 in this month's practice test for one way to do this. If you haven't done this before, get help from your parent or come to see me at one of the math help/tutoring times.
    c. Don't forget labeling! I want the circle graph pie-pieces to show the words explaining what that part of the pie represents, and the degree of the central angle. The actual amount from the original data is also valuable information, and in reality is more important than the degree of the central angle, so I'm willing to accept both, or just the original data amount.

CHAPTER 9, SECTION 7:
Constructions

1. Students must use a compass in order to do this section. Compasses (especially blunt compasses) are readily available at office supply stores and most department stores. Students are welcome to borrow a compass from me at school, but I only have the sharp-point compasses.
2. The examples in the textbook (pages 475 and 476) are good step-by-step instructions on doing constructions. Please follow those instructions EXACTLY.
3. Students MUST show the arcs, as shown in the examples. Those arcs are the only way I can tell that the student really used the compass, instead of just estimating by eye and hand. I can normally tell if a student is just carefully drawing instead of using the compass, so make sure you do it right.

SPECIAL NOTES FOR ALL OF CHAPTER 10:

1. When you multiply amounts to make an area, you are also multiplying the units, so you get units squared. This is just like 4 • 4, which is 4 squared, or 4^2. So, inches • inches is "inches squared," or $in.^2$, or square inches. Therefore, 7 cm • 3 cm = 21 cm^2.
2. You will not get full credit for an answer if you do not include the units (this includes identifying them as square units if applicable).

CHAPTER 10, SECTION 1:
Area: Parallelograms

1. Memorize the formula for area of a parallelogram: A = bh.
2. Notice that this is similar to what you learned in past years about the area of a rectangle (A = lw) but NOT the same. You could think of base as length, but DO NOT think height is the same as width. Notice from the diagrams in the green box on page 505 of your textbook, that you must have a line which meets the base at a right angle, in order to know the height. You can consider the width of a rectangle to be that height, as long as you look for the line and right angle on other parallelograms that aren't rectangles.
3. Remember to pay close attention to the units you're given. You may only multiply units together if they are the same units. This means you might have to change some units, such as shown in example 1 on page 504 of your textbook. The two measurements are 1 yard and 7 feet. You must

change the 1 yard into feet. You may instead choose to change the 7 feet into yards, but this makes your calculations harder, since you'll have to work with decimals. There's no need to do it the hard way.

CHAPTER 10, SECTION 2:
Area: Triangles and Trapezoids

1. Memorize:
    a. Area of a triangle: $A = (1/2)bh$
    b. Area of a trapezoid: $A = (1/2)h(b_1+b_2)$

2. Note the method of figuring out the area of a combined figure (one that has two or more parts). Figure out the area of one section, figure out the area of the other section, then add the two areas.

CHAPTER 10, SECTION 3:
Area: Circles

1. Memorize:
    a. Area of a circle: $A = \pi r^2$.
    b. Do not get it mixed up with the circumference of a circle ($C = \pi d$ or $C = 2\pi r$).

2. Note the method of figuring out the area of a combined figure (one that has two or more parts). Figure out the area of one section, figure out the area of the other section, then add the two areas. See example 3 on page 516 in your textbook. Note that you're only going to use half the area of the circle.

3. Note that some combined figures are actually one figure with a part taken out of it (such as the Try This problem, #9, on page 516 in your textbook). In this case, you will have to subtract the smaller area from the larger, instead of adding.
