Problem 1: Factor $ac + bc$. What is this property called? Name one other property of addition or multiplication.

- $c \times (a + b) = ac + bc$ this is called the distributive property of multiplication over addition and justifies factoring in common calculations.
- Another property could be the associative property of addition $(a + b) + c = a + (b + c)$.

Problem 2: Why can you not divide by zero?

Many of you correctly talked about not being able to divide a number of objects among zero people. This is right on point. Have a look at the web page http://www.mathsisfun.com/numbers/dividing-by-zero.html

Problem 3: What is special about the number zero? What is special about the number one?

- Zero is the additive identity.
- One is both the building block of the integers and the multiplicative identity.

Problem 4: What is the remainder when 5 is divided by 3?

$$5 = 1 \times 3 + 2$$

Since $2 < 3$ this means that 2 is the remainder.

Problem 5: What is one third of one half? Name a fraction between one third and one half.

- One third of something means that 3 times the new thing gives the old thing. So $\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$ since $3 \times \frac{1}{6} = \frac{1}{2}$.
- How about $\frac{3}{8}$ or $\frac{5}{12}$ or $\frac{2}{5}$.

Problem 6: Express as a single fraction in lowest terms:

$$\frac{\frac{5}{3}}{\frac{12}{9}} = \frac{7}{9}$$

The thing to understand about division is that dividing by a number is the same as multiplying by its reciprocal.

Problem 7: What is the largest integer less than $\sqrt{145}$? Since $12^2 = 144$ the answer is 12.

Problem 8: State the pythagorean theorem. $a^2 + b^2 = c^2$ where $a$ and $b$ are the lengths of two legs of a right triangle and $c$ is the length of the hypotenuse.

Problem 9: What is the difference between similar triangles and congruent triangles? Name at least one way of proving each. Congruent triangles are the same except for their placement in space. So they differ by no more than a rotation or a translation. Similar triangles also differ in that one is a dilation(scaling) of the other. Many of you said that congruent triangles share the same angles but have different or proportional sides. This is a solid answer.
Problem 10: Suppose you are traveling at a constant speed of \( \frac{2 \text{ mi}}{\text{hr}} \). How many minutes will it take you to travel 1000 yards?

Now many of you did very well on this problem. Some not so much. This is exactly the kind of problem we will be practicing in groupwork. For full credit you want to show all your hard work.

\[
1000 \text{ yards} \times \left( \frac{60 \text{ min}}{1 \text{ hr}} \right) \times \left( \frac{1 \text{ ft}}{2 \text{ min}} \right) \times \left( \frac{1 \text{ mile}}{5280 \text{ ft}} \right) \times \left( \frac{3 \text{ ft}}{1 \text{ yard}} \right) \approx 17 \text{ min}
\]