

## Session 1.1: Where are you in math?

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By the end of the summer you'll master the material well enough to answer these questions confidently. Just take a breath, relax, and do you thing – I don't expect everyone to get everything right. I'm excited to meet you tomorrow!

Please write your answers on a separate sheet of paper and turn that in. Partial answers are useful for me – you don't need to be 100% right. Please include work, even if it is ugly scratch work. No calculators are allowed. Skip around because problems vary in difficulty.

**Problems**

1. To pass a course, a student must have on three examinations an average of at least 60. If a student scores 42 and 74 on the first two tests, what must be earned on the third test to pass the course?
2. Solve for  $x$ :  $8 - 3(2x + 7) = 9x - 2x - 4$
3. Given the line  $y = -2x + 3$ 
  - (a) What is the slope of the line?
  - (b) Find the y-intercept, and two more points with integer coordinates?
  - (c) Draw a coordinate plane and plot the graph and label the points from (b)
4. Find the slope between the two points  $(6, 7)$ ,  $(3, 8)$ . Find the equation of the line containing both points.
5. Denote all values of  $x$  that satisfy  $|x - 2| \leq 4$
6. Graph  $y = |x - 4| - 1$
7. Plot each of these equations on the same graph. *Extra*: find the  $(x, y)$  point that satisfies both equations.

$$\begin{cases} 4x + y = 8 \\ 5x + 2y = 13 \end{cases}$$

8. The formula  $N = (t^2 - t)/2$  describes the number of football games,  $N$ , that must be played in a league with  $t$  teams if each team is to play every other team once. Use this information to find the number of teams that belong to a league which has 36 games scheduled, assuming that each team plays every other team once.
9. For each of the following functions, factor them into linear terms, which means they look like  $(x - a)(x - b)$  or  $(x - a)^2(x - b)$  or  $(x - a)^2 + b$  or  $(x^2 + ax + b)^2(x - c)$  or anything similar. Find the **(i)** factorization if relevant, **(ii)** x-intercepts, and **(iii)** general shape (quick sketch).
  - (a)  $f(x) = x^2 - 25$
  - (b)  $f(x) = x^2 + 25$
  - (c)  $f(x) = x^2 - 8x - 2$

(d)  $f(x) = 8x^2 - 18$

(e)  $f(x) = 4x^2 - 36 + 24$

10. Consider a room with  $n$  people, and each person wants to shake every other person's hand exactly once. How many handshakes,  $h$ , are there in a room of  $n$  people?