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. Solve: $8 - 3(2x + 7) = 9x - 2x - 4$
2. Solve: $3x^2 - 2x = 1$
3. Given the line $y = -2x + 3$
   (a) What is the slope of the line?
   (b) Find the x-intercept, 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. Suppose the ratio of fat (in lbs) and $length$ (in cm) of seals is 0.3. Give three reasonable sets of 5 data points that are consistent with this ratio and have different means.
5. You buy a guitar on Amazon for \$89 and pay an additional \$25 for shipping and handling. Later, you sell the guitar again on Amazon. Amazon charges you \$1.20 for placing the offer online. The guitar sells for \$140. Amazon charges you 2.5% of the selling price. How much profit do you make on the guitar?
6. Given the function $f(x) = x^2 - 4x + 3$
7. I bought two donuts and three coffees this morning at the local coffee shop but I only had \$3 with me, so I still owe them \$2.20. If a donut and a coffee cost \$2.05 together, what is the cost of a coffee? And how much does a donut cost?
8. 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?
9. 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.
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?
11. 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) $f(x) = 4x^2 - 36 + 24$
(f) $f(x) = x^3 + x^2 + 21x - 45$