Math 5e, Fall 2024 Homework 7

Homework #7 is due November 6

Instructions: Some of the problems we solved in class, and some are new. Please try to solve all problems, do your best, and show your work. Write on separate sheets of paper, not between the lines of this handout!

1. Convert the following fractions into decimals: (a) $\frac{6}{7}$ (b) $\frac{1}{5}$ (c) $\frac{8}{13}$ (d) $\frac{4}{9}$

2. Open the brackets:
   (a) $(a+1)^2 = (a+1)(a+1) =$
   (b) $(a-5)^2 =$
   (c) $(2a+2b)^2 =$

3. One can measure temperature using either the Fahrenheit scale (common in the US and Britain) or the Celsius scale (in most other countries). The relation between the two is given by:

$$\boldsymbol{C} = \frac{5}{9}(\boldsymbol{F} - 32)$$

   (C in the temperature in Celsius, F in Fahrenheit)
   (a) Is there a temperature which gives the same value on both scales? (set $F = C$)
   (b) Is there a temperature which in Fahrenheit scale is twice as large as in Celsius? (set $F = 2C$)

4. Solve the following expressions:

   (a) $2 \div \frac{1}{3} + \frac{1}{3} \div 2 + \frac{5}{6} =$

   (b) $\frac{3}{8} \div \left(5\frac{11}{28} - 3\frac{1}{7}\right) =$

   (c) $-3.2 - (-1.2 - 3.2) + (5.8 - 0.17) =$

5. Find the unknown x in the following proportions
   (a) $\frac{3}{x} = \frac{15}{4}$ (b) $\frac{x}{7} = \frac{9}{84}$ (c) $\frac{y}{7} = \frac{65}{91}$

6. Books on a bookshelf
   (a) One bookshelf has 70 books and a second has 36. How many books should you move from the first to the second shelf to have an equal number of books on each shelf?
   (b) Can you solve the same problem with 70 books on the first shelf and 35 books on the second?

7. A car costs $12,000 more than a motorbike. The same car is 4 times as expensive as the motorbike. How much do the motorbike and the car cost together?

8. In a factory with 30 machines, one client's order would take 12 days to fulfill. One day, 20% of the machines broke. How many days will it take to fulfill the order using only the working machines?

9. Two secretaries, Barbara and Mary, need to type a 100-page document. Barbara can type it in 4 hours, but Mary types slower, so it would take her 5 hours to do this. If they divide the work between the two of them in the most efficient way, how fast can they type it together?
   Hint: how many pages does each secretary type in 1 h?