Instructions: Show all work. Answers without work can only be graded all or nothing. Partial credit is available only when work is shown.

1. Consider the following probability distribution.

x	0	1	2	3	4	5	6	7	8
$P(x)$	0.05	0.1	0.08	0.14	0.09	0.2	0.12	0.09	0.13

   a. If you know that $P(x = 4) = P(x = 7)$, complete the probability distribution table.

   b. What is $P(x = 4)$?

   0.09

   c. What is $P(x \leq 3)$?

   0.37

   d. What is $P(x \text{ is even})$?

   0.47

   e. What is $P(x \neq 5)$?

   0.8

2. Evaluate each of the following counting problems.
   a. A soccer team has 12 players all aged 5-6. The coach wants to choose an initial team of five players for a practice demonstration. How many teams of 5 could be chosen if, for the initial demonstrations, all the selected players will be doing the same thing?

   12C5 = $\binom{12}{5}$ = 792

   b. After practice, the coach has to select an initial line-up for the scrimmage game against another team, so he has to select 5 players and assign them a position. How many different ways can he select that first team?

   12P5 = 95,040

   c. A traveler takes two pairs of pants, four shirts, two pairs of shoes, and three jackets with them on vacation. How many different outfits can the traveler put together if they must choose one of each item to wear?

   $$2 \times 4 \times 2 \times 3 = 48$$

   d. Draw a tree diagram to illustrate the solution to problem 2c.

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                    ┌───────────────┴───────────────┐
                    ▼                               ▼
                  Pants1                          Pants2
            ┌───────┴───────┐               ┌───────┴───────┐
            ▼               ▼               ▼               ▼
         Shoes1          Shoes2          Shoes1          Shoes2
       ┌───┼───┐       ┌───┼───┐       ┌───┼───┐       ┌───┼───┐
       ▼   ▼   ▼       ▼   ▼   ▼       ▼   ▼   ▼       ▼   ▼   ▼
   Jacket1 Jacket2 Jacket3  Jacket1 Jacket2 Jacket3  Jacket1 Jacket2 Jacket3  Jacket1 Jacket2 Jacket3
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Jacket1 Jacket2 Jacket3   Jacket1 Jacket2 Jacket3   Jacket1 Jacket2 Jacket3   Jacket1 Jacket2 Jacket3

Shirt1 Shirt1 Shirt1 Shirt1 Shirt1 Shirt1 Shirt1 Shirt1 Shirt1 Shirt1 Shirt1 Shirt4 Shirt1 Shirt1 Shirt1 Shirt4

Shirt4 Shirt4 Shirt4 Shirt4 Shirt4 Shirt4 Shirt4 Shirt4 Shirt4 Shirt4 Shirt3 Shirt4 Shirt4 Shirt2

Shirt1 Shirt2 Shirt2 Shirt2 Shirt2 Shirt2 Shirt2 Shirt2 Shirt2 Shirt3 Shirt2 Shirt2 Shirt3

Shirt2 Shirt3 Shirt3 Shirt3 Shirt3 Shirt3 Shirt3 Shirt3 Shirt2 Shirt3 Shirt3

Shirt3