

## **WORD PROBLEMS**

### **Lesson 3 Counting Principle Word Problems**

Counting principle word problems provide several different choices in several different categories, and ask how many different combinations are possible. These problems almost always have some form of the word “combinations” in the question, so that is a good way to recognize them.

#### **Example 1**

Rahim is going to his favorite restaurant for their Friday night special. He can choose from 3 appetizers, 5 main courses, and 4 desserts for a bargain price of \$12.95. How many different meal combinations of one appetizer, one main course, and one dessert can Rahim choose?

- A. 12                  B. 60                  C. 19                  D. 24                  E. 120

Determine the number of choices in each category, and multiply.

First category is appetizer, with 3 choices.

Second category is main course, with 5 choices.

Third category is dessert, with 4 choices.

Multiply 3 (appetizer) x 5 (main course) x 4 (desserts) =  $3 \times 5 \times 4 = 60$  combinations.

**Answer: B. 60**

#### **Example 2**

Sadie is buying a new car and has several choices to make. She can choose her exterior color from red, silver, blue, or white. Her interior color choices are black or sand.

Finally, she must choose window tint from 20% tint, 35% tint, or no tint. How many different types of cars can Sadie choose if the car company allows buyers to combine any exterior color, interior color, and window tint?

- A. 10                  B. 18                  C. 16                  D. 24                  E. 12

This is a little harder than Example 1 because you are not given the actual number of choices for each category, but must read carefully to see how many categories there are, and how many choices are in each.

First category is exterior color, with 4 choices.

Second category is interior color, with 2 choices.

Third category is window tint, with 3 choices.

Multiply 4 (ext. colors) x 2 (int. colors) x 3 (tints) =  $4 \times 2 \times 3 = 24$  types of cars.

**Answer: D. 24**

### **Example 3**

The Sirloin Steak Special Deal at the Downtown Diner comes with 4 salad dressing choices, 6 side order choices, 4 drink choices, and 5 dessert choices. Which expression represents the number of different possible meal combinations?

- A.  $4 + 6 + 4 + 5$                       B.  $(4 \times 6) + (4 \times 5)$                       C.  $4 \times 6 \times 4 \times 5$   
D.  $4(6 + 4 + 5)$                       E.  $6 \times 4 \times 5$

In this problem, you are asked for an expression instead of a numerical answer. There are four categories, so four numbers will be multiplied.

Multiply 4 (salad dressing)  $\times$  6 (side order)  $\times$  4 (drink)  $\times$  5 (dessert).

**Answer: C.  $4 \times 6 \times 4 \times 5$**

### ***Practice – Counting Principle Word Problems***

*Answers – p. 4*

1. Grant's furniture store offers an inexpensive couch with limited choices. Customers can pick from 6 fabrics, 3 trims, and 2 pillow styles. How many different possible ways can the fabric, trim, and pillow style choices be combined?

- A. 11                      B. 36                      C. 20                      D. 24                      E. 72

2. The Pro-Line Workpad laptop comes with a choice of 3 screen sizes, 2 processors, 4 memory sizes, and 2 colors. Which expression shows how many different combinations of these features are available for purchasing a new laptop?

- A.  $3 + 2 + 4 + 2$                       B.  $(3 \times 2) + (4 \times 2)$                       C.  $3 \times 2 \times 4 \times 2$   
D.  $3(2 + 4 + 2)$                       E.  $3 \times 2 \times 4 + 2$

3. The Manning family is remodeling their kitchen. They can have black, white, or stainless steel appliances, and they also must decide on wall color from 12 color choices given to them by their contractor. Finally, they must choose cabinets from white laminate, natural pine, or dark stained pine. How many different types of kitchens could the Manning family choose if combination of any appliance, wall color, and cabinet is allowed by the contractor?

- A. 72                      B. 18                      C. 48                      D. 144                      E. 108

4. Gomez Print Shop offers a choice of 12 card colors, 7 fonts, and 6 ink colors when they print business cards. How many different combinations of card color, font, and ink color are possible at Gomez Print Shop?

- A. 504                      B. 25                      C. 90                      D. 54                      E. 405

**5.** Jamila is choosing classes for her first semester at college, and she must pick one course in each of four subject areas. There are 8 literature, 4 math, 6 science, and 12 history courses offered. Which expression below shows how many different combinations of literature, math, science, and history classes are possible?

- A.  $8 + 4 + 6 + 12$       B.  $8(4 + 6 + 12)$       C.  $(8 \times 4) + (6 \times 12)$   
D.  $8 \times 4 \times 6 \times 12$       E.  $(8 \times 4) - (6 \times 12)$

**6.** Liza is buying a custom made wedding gown. The color can be white, peach, or cream. She can choose lace, beads, or rhinestones for the trim, and she can choose a cap sleeve or sleeveless for her sleeve style. How many different types of dresses can be made if Liza can combine any color, trim, and sleeve style?

- A. 27      B. 18      C. 8      D. 36      E. 24

**7.** The breakfast special at a restaurant allows one choice from each of the following categories: 12 main dishes, 3 side orders, and 6 beverages. Choose an expression that shows the number of different possible combinations of main dish, side order, and beverage.

- A.  $12 + 3 + 6$     B.  $12(3 + 6)$     C.  $12 \times 3 \div 6$     D.  $12 \times 3 \times 6$     E.  $12 \times 3 + 6$

**8.** The Masters family is ready to choose the optional features for their new home. They must choose to have a small, medium, or large storage shed, and they can have 1 or 2 balconies. They also must pick a 2 or 3 car garage. How many different possible ways can the shed size, balcony number, and garage size choices be combined?

- A. 12      B. 18      C. 7      D. 9      E. 8

## ANSWER KEY Lesson 3 Counting Principle Word Problems

1. **B. 36**                      6 fabrics  
                                      3 trims  
                                      2 pillow styles       $6 \times 3 \times 2 = 36$
2. **C.  $3 \times 2 \times 4 \times 2$**         3 screen sizes  
                                      2 processors  
                                      4 memory sizes  
                                      2 colors                       $3 \times 2 \times 4 \times 2$
3. **E. 108**                      3 appliance types  
                                      12 wall colors  
                                      3 cabinet types       $3 \times 12 \times 3 = 108$
4. **A. 504**                      12 card colors  
                                      7 fonts  
                                      6 ink colors                 $12 \times 7 \times 6 = 504$
5. **D.  $8 \times 4 \times 6 \times 12$**         8 literature classes  
                                      4 math classes  
                                      6 science classes  
                                      12 history classes       $8 \times 4 \times 6 \times 12$
6. **B. 18**                      3 colors  
                                      3 trims  
                                      2 sleeve styles         $3 \times 3 \times 2 = 18$
7. **D.  $12 \times 3 \times 6$**                 12 main dishes  
                                      3 side orders  
                                      6 beverages                 $12 \times 3 \times 6$
8. **A. 12**                      3 shed size choices  
                                      2 balcony number choices  
                                      2 garage sizes             $3 \times 2 \times 2 = 12$