



















## PROBLEM SOLVING

### EXAMPLE 2

on p. 683  
for Exs. 62–63

62. **CLASS RINGS** You want to purchase a class ring. The ring can be made from 3 different metals. You can choose from 6 different side designs and 12 different stones. How many different class rings are possible?

Metal	Side Design		Stone					
Auralite	Academics	Literature						
Gold	Art	Music						
Silver	Athletics	Technology						

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63. **ENVIRONMENT** Since 1990, the Goldman Environmental Prize has been awarded annually to 6 grassroots environmentalists, one from each of 6 regions. The regions consist of 52 countries in Africa, 47 in Europe, 45 in Asia, 36 in island nations, 19 in South and Central America, and 3 in North America. How many different sets of 6 countries can be represented by the prize winners in a given year?

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### EXAMPLES 4, 5, and 6

on pp. 684–686  
for Exs. 64–66

64. **PHOTOGRAPHY** A photographer lines up the 15 members of a family in a single line in order to take a photograph. How many different ways can the photographer arrange the family members for the picture?

65. **SCHOOL CLUBS** A Spanish club is electing a president, vice president, and secretary. The club has 9 members who are eligible for these offices. How many different ways can the 3 offices be filled?

66. **MUSIC** The window of a music store has 8 stands in fixed positions where instruments can be displayed. In how many ways can 3 identical guitars, 2 identical keyboards, and 3 identical violins be displayed?

67. **MULTI-STEP PROBLEM** You are designing an entertainment center. You want to include three audio components and three video components.

- You want one of each audio component listed at the right. How many selections of audio components are possible?
- You want one of each video component listed at the right. How many selections of video components are possible?
- How many selections of all six audio and video components are possible?

Entertainment Center	
Audio Components	Video Components
5 receivers	7 TV sets
8 CD players	9 DVD players
6 speakers	4 game systems

68. **TX TAKS REASONING** To keep computer files secure, many programs require the user to enter a password. The shortest allowable passwords are typically 6 characters long and can contain both letters and digits.

- Calculate** How many 6-character passwords are possible if characters can be repeated?
- Calculate** How many 6-character passwords are possible if characters cannot be repeated?
- Draw Conclusions** Which type of password is more secure? *Explain.*