EXAMPLES 4 and 5 on p. 709 for Exs. 44–46

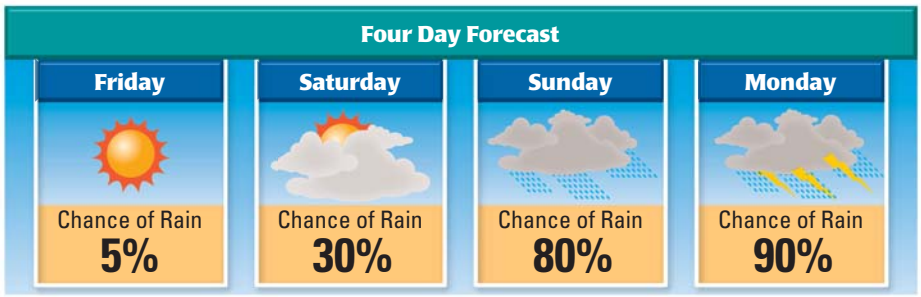
44. TAKS REASONING Refer to the chart below. Which of the following probabilities is greatest?

(A) P(rains on Sunday)

(B) P(does not rain on Saturday)

(C) P(rains on Monday)

(D) P(does not rain on Friday)



45. DRAMA CLUB The organizer of a cast party for a drama club asks each of 6 cast members to bring one food item from a list of 10 items. What is the probability that at least 2 of the 6 cast members bring the same item?

46. HOME ELECTRONICS A development has 6 houses with the same model of garage door opener. Each opener has 4096 possible transmitter codes. What is the probability that at least 2 of the 6 houses have the same code?

47. TAKS REASONING Use the given information about a farmer's tomato crop to complete parts (a)–(c).

a. 40% of the tomatoes are partially rotten, 30% of the tomatoes have been fed on by insects, and 12% are partially rotten *and* have been fed on by insects. What is the probability that a randomly selected tomato is partially rotten *or* has been fed on by insects?

b. 20% of the tomatoes have bite marks from a chipmunk and 7% have bite marks *and* are partially rotten. What is the probability that a randomly selected tomato has bite marks *or* is partially rotten?

c. Suppose the farmer finds out that 6% of the tomatoes have bite marks *and* have been fed on by insects. Do you have enough information to determine the probability that a randomly selected tomato has been fed on by insects *or* is partially rotten *or* has bite marks from a chipmunk? If not, what other information do you require?

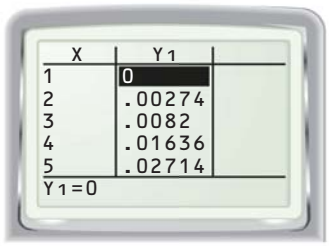
48. MULTI-STEP PROBLEM Follow the steps below to explore a famous probability problem called the *birthday problem*. (Assume that there are 365 possible birthdays.)

a. Calculate Suppose that 6 people are chosen at random. Find the probability that at least 2 of the people share the same birthday.

b. Calculate Suppose that 10 people are chosen at random. Find the probability that at least 2 of the people share the same birthday.

c. Model Generalize the results from parts (a) and (b) by writing a formula for the probability $P(x)$ that at least 2 people in a group of x people share the same birthday. (*Hint:* Use ${}_nP_r$ notation in your formula.)

d. Analyze Enter the formula from part (c) into a graphing calculator. Use the *table* feature to make a table of values. For what group size does the probability that at least 2 people share the same birthday first exceed 50%?



= WORKED-OUT SOLUTIONS on p. WS1

= TAKS PRACTICE AND REASONING