EXAMPLES 4 and 5 on pp. 684–685 for Exs. 5–9

EXERCISES

5. **PHOTOGRAPHY** You are placing 12 pictures on separate pages in an album. How many different ways can you order the 12 pictures in the album? How many different ways can 4 of the 12 pictures be placed on the first 4 pages?

Find the number of permutations.

6. ${}_9P_1$ 7. ${}_5P_5$ 8. ${}_6P_3$ 9. ${}_{10}P_2$

10.2 Use Combinations and the Binomial Theorem *pp. 690–697*

EXAMPLE

Use the binomial theorem to expand $(x + 5y)^4$.

$$(x + 5y)^4 = {}_4C_0x^4(5y)^0 + {}_4C_1x^3(5y)^1 + {}_4C_2x^2(5y)^2 + {}_4C_3x^1(5y)^3 + {}_4C_4x^0(5y)^4$$
$$= (1)(x^4)(1) + (4)(x^3)(5y) + (6)(x^2)(25y^2) + (4)(x)(125y^3) + (1)(1)(625y^4)$$
$$= x^4 + 20x^3y + 150x^2y^2 + 500xy^3 + 625y^4$$

EXAMPLES 3, 5, and 6 on pp. 691–693 for Exs. 10–14

EXERCISES

Use the binomial theorem to write the binomial expansion.

10. $(t + 3)^6$ 11. $(2a + b^2)^4$ 12. $(w - 8v)^4$ 13. $(r^3 - 4s)^5$

14. **ICE CREAM** An ice cream vendor sells 15 flavors of ice cream. You want to sample *at least* 4 of the flavors. How many different combinations of ice cream flavors can you sample?

10.3 Define and Use Probability *pp. 698–704*

EXAMPLE

You roll a standard six-sided die. Find the probability of rolling a number less than 3.

Two outcomes correspond to rolling a number less than 3: rolling a 1 or 2.

$$P(\text{rolling less than 3}) = \frac{\text{Number of ways to roll less than 3}}{\text{Number of ways to roll the die}} = \frac{2}{6} = \frac{1}{3}$$

EXAMPLES 1 and 4 on pp. 698–700 for Exs. 15–19

EXERCISES

You have an equally likely chance of choosing any integer from 1 through 30. Find the probability of the given event.

15. An even number is chosen.
16. A multiple of 5 is chosen.
17. A factor of 60 is chosen.
18. A prime number is chosen.
19. **COMMUTING** Out of 250 work days, a commuter arrived at work on time 47 times on Mondays, 43 times on Tuesdays, 48 times on Wednesdays, 39 times on Thursdays, and 40 times on Fridays. For a randomly selected work day, what is the probability that the commuter arrived at work on time?