

Review of Prerequisite Skills

If you need help with any of the skills listed in purple below, refer to Appendix A.

- Fractions, percents, decimals** Express each decimal as a percent.
 - 0.35
 - 0.04
 - 0.95
 - 0.008
 - 0.085
 - 0.375
- Fractions, percents, decimals** Express each percent as a decimal.
 - 15%
 - 3%
 - 85%
 - 6.5%
 - 26.5%
 - 75.2%
- Fractions, percents, decimals** Express each percent as a fraction in simplest form.
 - 12%
 - 35%
 - 67%
 - 4%
 - 0.5%
 - 98%
- Fractions, percents, decimals** Express each fraction as a percent. Round answers to the nearest tenth, if necessary.
 - $\frac{1}{4}$
 - $\frac{13}{15}$
 - $\frac{11}{14}$
 - $\frac{7}{10}$
 - $\frac{4}{9}$
 - $\frac{13}{20}$
- Tree diagrams** A coin is flipped three times. Draw a tree diagram to illustrate all possible outcomes.
- Tree diagrams** In the game of backgammon, you roll two dice to determine how you can move your counters. Suppose you roll first one die and then the other and you need to roll 9 or more to move a counter to safety. Use a tree diagram to list the different rolls in which
 - you make at least 9
 - you fail to move your counter to safety
- Fundamental counting principle (section 4.1)** Benoit is going skating on a cold wintry day. He has a toque, a watch cap, a beret, a heavy scarf, a light scarf, leather gloves, and wool gloves. In how many different ways can Benoit dress for the cold weather?
- Additive counting principle (section 4.1)** How many 13-card bridge hands include either seven hearts or eight diamonds?
- Venn diagrams (section 5.1)**
 - List the elements for each of the following sets for whole numbers from 1 to 10 inclusive.
 - E , the set of even numbers
 - O , the set of odd numbers
 - C , the set of composite numbers
 - P , the set of perfect squares
 - Draw a diagram to illustrate how the following sets are related.
 - E and O
 - E and C
 - O and P
 - E , C , and P

10. Principle of inclusion and exclusion (section 5.1)

- a) Explain the principle of inclusion and exclusion.
- b) A gift store stocks baseball hats in red or green colours. Of the 35 hats on display on a given day, 20 are green. As well, 18 of the hats have a grasshopper logo on the brim. Suppose 11 of the red hats have logos. How many hats are red, or have logos, or both?

11. Factorials (section 4.2) Evaluate.

- a) $6!$ b) $0!$
- c) $\frac{16!}{14!}$ d) $\frac{12!}{9! 3!}$
- e) $\frac{100!}{98!}$ f) $\frac{16!}{10! \times 8!}$

12. Permutations (section 4.2) Evaluate.

- a) ${}_5P_3$ b) ${}_7P_1$
- c) $P(6, 2)$ d) ${}_9P_9$
- e) ${}_{100}P_1$ f) $P(100, 2)$

13. Permutations (section 4.2) A baseball team has 13 members. If a batting line-up consists of 9 players, how many different batting line-ups are possible?

14. Permutations (section 4.2) What is the maximum number of three-digit area codes possible if the area codes cannot start with either 1 or 0?

15. Combinations (section 5.2) Evaluate these expressions.

- a) ${}_6C_3$ b) $C(4, 3)$
- c) ${}_8C_8$ d) ${}_{11}C_0$
- e) $\binom{6}{4} \times \binom{7}{5}$ f) $\binom{100}{1}$
- g) ${}_{20}C_2$ h) ${}_{20}C_{18}$

16. Combinations (section 5.2) A pizza shop has nine toppings available. How many different three-topping pizzas are possible if each topping is selected no more than once?

17. Combinations (section 5.3) A construction crew has 12 carpenters and 5 drywallers. How many different safety committees could they form if the members of this committee are

- a) any 5 of the crew?
- b) 3 carpenters and 2 drywallers?

18. Matrices (section 1.6) Identify any square matrices among the following. Also identify any column or row matrices.

a) $\begin{bmatrix} 3 & 4 \\ 0 & 1 \end{bmatrix}$ b) $[0.4 \ 0.3 \ 0.2]$

c) $\begin{bmatrix} 1 & 0 \\ 0.5 & 0.5 \\ 0.8 & 0.6 \end{bmatrix}$ d) $\begin{bmatrix} -2 & 3 & 9 \\ 0 & 11 & -4 \\ 3 & 6 & -1 \end{bmatrix}$

e) $\begin{bmatrix} 49 & 63 \\ 25 & 14 \\ 72 & 9 \end{bmatrix}$ f) $\begin{bmatrix} 8 \\ 16 \\ 32 \end{bmatrix}$

19. Matrices (section 1.7) Given $A = [0.3 \ 0.7]$

and $B = \begin{bmatrix} 0.4 & 0.6 \\ 0.55 & 0.45 \end{bmatrix}$, perform the

following matrix operations, if possible. If the operation is not possible, explain why.

- a) $A \times B$ b) $B \times A$
- c) B^2 d) B^3
- e) A^2 f) $A \times A^t$