Review of Prerequisite Skills

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

1. Factorials (section 4.2) Evaluate.

a) $8!$ **b)** $\frac{8!}{5!}$

c) $\frac{24!}{22!}$ **d)** $3! \times 4!$

2. Permutations (section 4.2) Evaluate mentally.

a) ${}_5P_5$ **b)** ${}_{10}P_2$

c) ${}_{12}P_1$ **d)** ${}_7P_3$

3. Permutations (section 4.2) Evaluate manually.

a) ${}_{10}P_5$ **b)** $P(16, 2)$

c) ${}_{10}P_{10}$ **d)** $P(8, 5)$

4. Permutations (section 4.2) Evaluate using software or a calculator.

a) ${}_{50}P_{25}$ **b)** $P(37, 16)$

c) ${}_{29}P_{29}$ **d)** ${}_{46}P_{23}$

5. Organized counting (section 4.1) Every Canadian aircraft has five letters in its registration. The first letter must be C, the second letter must be F or G, and the last three letters have no restrictions. If repeated letters are allowed, how many aircraft can be registered with this system?

6. Applying permutations (Chapter 4)

a) How many arrangements are there of three different letters from the word *kings*?

b) How many arrangements are there of all the letters of the word *management*?

c) How many ways could first, second, and third prizes be awarded to 12 entrants in a mathematics contest?

7. Exponent laws Use the exponent laws to simplify each of the following.

a) $(-3y)^0$ **b)** $(-4x)^3$

c) $15(7x)^4(4y)^2$ **d)** $21(x^3)^2\left(\frac{1}{x^2}\right)^5$

e) $(4x^0y)^2(3x^2y)^3$ **f)** $\left(\frac{1}{2}\right)^4(3x^2)(2y)^3$

g) $(-3xy)(-5x^2y)^2$ **h)** $\left(\frac{1}{3}\right)^0(-2xy)^3$

8. Simplifying expressions Expand and simplify.

a) $(x - 5)^2$ **b)** $(5x - y)^2$

c) $(x^2 + 5)^2$ **d)** $(x + 3)(x - 5)^2$

e) $(x^2 - y)^2$ **f)** $(2x + 3)^2$

g) $(x - 4)^2(x - 2)$ **h)** $(2x^2 + 3y)^2$

i) $(2x + 1)^2(x - 2)$ **j)** $(x + y)(x - 2y)^2$

9. Sigma notation Rewrite the following using sigma notation.

a) $1 + 2 + 4 + 8 + 16$

b) $x + 2x^2 + 3x^3 + 4x^4 + 5x^5$

c) $\frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \ldots$

10. Sigma notation Expand.

a) $\sum_{n=2}^{5} 2n$

b) $\sum_{n=1}^{4} \frac{x^n}{n!}$

c) $\sum_{n=1}^{5} (2^n + n^2)$