

If you've mastered arithmetic, fractions, and the basic algebraic concepts illustrated in the problems below, you are ready for the Art of Problem Solving's **Introduction to Counting & Probability** book.

1. **Solving linear equations.** Sample questions:

(a) Find x : $31x + 24 = 365$.

(b) Find n : $7n - 4 = 2n + 16$.

2. **Simplifying fractions containing algebraic expressions.** Reduce the following fractions:

(a) $\frac{3x+6}{3}$.

(b) $\frac{n(n-1)}{n(n+1)(r-1)}$.

3. **Addition and subtraction of quotients with different algebraic denominators.** Write each of the following as a single fraction in simplest terms:

(a) $\frac{1}{mn} + \frac{1}{m(2n-2)}$.

(b) $\frac{r}{r-1} - \frac{r-1}{r}$.

4. **Multiplication of polynomials and binomials.** Expand each of the following:

(a) $(x + 2)(x + 3)$.

(b) $(x + y)(x^2 + 2xy + y^2)$.

(c) $(x - 1)^4$. (Hint: $(x - 1)^4 = (x - 1)(x - 1)^3$.)

Don't look at the next page until you've attempted all the problems!

The answers to Are You Ready for **Introduction to Counting & Probability** are below.

1. (a) $x = 11$
(b) $n = 4$.
2. (a) $x + 2$.
(b) $\frac{n-1}{(n+1)(r-1)}$ or $\frac{n-1}{nr+r-n-1}$.
3. (a) $\frac{3n-2}{mn(2n-2)}$ or $\frac{3n-2}{2mn^2-2mn}$.
(b) $\frac{2r-1}{r(r-1)}$ or $\frac{2r-1}{r^2-r}$.
4. (a) $x^2 + 5x + 6$.
(b) $x^3 + 3x^2y + 3xy^2 + y^3$.
(c) $x^4 - 4x^3 + 6x^2 - 4x + 1$.