1. Write down algebraic expression for the following:

   (a) Twice the sum of x and y.

   (b) The total cost of b books at x dollars each and 3 books at y dollars each.

   (c) The next even number after the even number b.

2. Evaluate these expressions if $a = -2$, $b = \frac{2}{3}$ and $c = 11$:

   (a) $a + c$,

   (b) $a^2 + c^2$,

   (c) $\dfrac{1}{c} - \dfrac{1}{a}$,

   (d) $\dfrac{c}{a} \times b$.

3. Expand and simplify these expressions:

   (a) $3x(4x - 5)$,

   (b) $x(2x + 3) - x$,

   (c) $7(x - 3) + 3(5 - 2x)$,

   (d) $(x + 7)(x - 7)$,

   (e) $(3x + 4)^2$,

   (f) $(2x - 5)^2 - (2x + 5)^2$,

   (g) $(2x - 5)(3x + 7)$,

   (h) $(5a - 3b)(5a + 3b)$.

4. Simplify these fractions:

   (a) $\dfrac{3a}{5} + \dfrac{2a}{10}$,

   (c) $\dfrac{6ac}{5b} \times \dfrac{15b}{2a}$,

   (b) $\dfrac{4}{9x} - \dfrac{1}{6x}$,

   (d) $\dfrac{abc^2}{2} \div \dfrac{ab}{6}$.

5. (a) Simplify:

   (i) $\dfrac{x - 2}{-x} \div \dfrac{(x - 2)(x + 2)}{x(x + 2)}$,

   (ii) $\dfrac{x + 1}{x(x - 1)} - \dfrac{3 - x}{(x - 1)(x + 3)}$.

6. (a) Expand and simplify $(3x - 2)(2x - 3) - (2x + 3)(2x - 3)$.

   (b) Expand and simplify $(x - 4)^2 + (x - 2)^2 + x^2 + (x + 2)^2 + (x + 4)^2$.

   (c) Expand and simplify $3x^2 - (x - 4)[3(x - 5) - 4(2 + x)]$,

   (d) Simplify $\dfrac{x}{2} \times \dfrac{2^2}{x^2} \times \dfrac{x^3}{2^3} \times \dfrac{2^4}{x^4} \times \dfrac{x^5}{2^5} \times \dfrac{2^6}{x^6} \times \dfrac{x^7}{2^7} \times \dfrac{2^8}{x^8}$.

1. (a) Twice the sum of x and y is $2(x + y)$ (or $2x + 2y$).

   (b) The total cost of b books at x dollars each and 3 books at y dollars each is $bx + 3y$ dollars.

   (c) The next even number after the even number b is $b + 2$.

2. If $a = -2$, $b = \frac{2}{3}$ and $c = 11$:

   (a) $a + c = -2 + 11$
   $$= 9.$$

   (b) $a^2 + c^2 = (-2)^2 + 11^2$
   $$= 4 + 121$$
   $$= 125.$$

   (c) $\dfrac{1}{c} - \dfrac{1}{a} = \dfrac{1}{11} - \dfrac{1}{-2}$
   $$= \tfrac{2}{22} + \tfrac{11}{22}$$
   $$= \tfrac{13}{22}.$$

   (d) $\dfrac{c}{a} \times b = \dfrac{11}{-2} \times \dfrac{2}{3}$
   $$= -\tfrac{11}{3} \quad (\text{or } -3\tfrac{2}{3}).$$

3. (a) $3x(4x - 5) = 12x^2 - 15x.$

   (b) $x(2x + 3) - x = 2x^2 + 3x - x$
   $$= 2x^2 + 2x.$$

   (c) $7(x - 3) + 3(5 - 2x) = 7x - 21 + 15 - 6x$
   $$= x - 6.$$

   (d) $(x + 7)(x - 7) = x^2 - 49.$

   (e) $(3x + 4)^2 = 9x^2 + 24x + 16.$

   (f) $(2x - 5)^2 - (2x + 5)^2 = 4x^2 - 20x + 25 - (4x^2 + 20x + 25)$
   $$= 4x^2 - 20x + 25 - 4x^2 - 20x - 25$$
   $$= -40x$$

   (g) $(2x - 5)(3x + 7) = 6x^2 + 14x - 15x - 35$
   $$= 6x^2 - x - 35.$$

   (h) $(5a - 3b)(5a + 3b) = 25a^2 - 9b^2.$

4. (a) $\dfrac{3a}{5} + \dfrac{2a}{10} = \dfrac{3a}{5} + \dfrac{a}{5}$
   $$= \dfrac{4a}{5}.$$

   (b) $\dfrac{4}{9x} - \dfrac{1}{6x} = \dfrac{8}{18x} - \dfrac{3}{18x}$
   $$= \dfrac{5}{18x}.$$

   (c) $\dfrac{6ac}{5b} \times \dfrac{15b}{2a} = 9c.$

   (d) $\dfrac{abc^2}{2} \div \dfrac{ab}{6} = \dfrac{abc^2}{2} \times \dfrac{6}{ab}$
   $$= 3c^2.$$