

Know the following identities:

- (1) Difference of Squares: $a^2 - b^2 = (a + b)(a - b)$
- (2) Difference of Cubes: $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
- (3) Sum of Cubes: $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
- (4) $(a + b)^2 = a^2 + 2ab + b^2$
- (5) $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

1. Factor into linear factors whenever possible. Then solve.

(a) $x^2 + 2x + 1 = 0$

(b) $x^2 + 6x + 8 = 0$

(c) $x^2 - 2x - 24 = 0$

(d) $3x^2 + x - 2 = 0$

(e) $2x^2 + x - 3 = 0$

(f) $x^2 - 4 = 0$

(g) $9x^2 - 16 = 0$

(h) $x^3 + 8 = 0$

(i) $x(x - 3) + 4x - 12 = 0$

2. Solve.

(a) $\frac{1}{x - 3} = 2$

(b) $\frac{2x - 1}{2} + \frac{-1}{x - 2} = 0$

(c) $\frac{1}{x + 1} + \frac{2}{x - 1} = -1$