



Chapter 1 Equations & Inequalities

Sections:

1.1 Linear Equations

Video 1 Solve

- a) $7 - 3m = 3m + 1$
- b) $5 - (6y + 9) + 2y = 2(y + 1)$

Video 2 Solve

- a) $\frac{x-1}{3} + \frac{2x}{5} = x + 2$
- b) $0.09t = 0.07 + 0.001t$

Video 3 Solve

- a) $\frac{3x}{x-5} = \frac{-6}{x-5} - 2$
- b) $\frac{6w-4}{15w-3} = \frac{2w+3}{5w+1}$

Video 4 Solve

- a) $\frac{-2}{3x+1} + \frac{5}{x-2} = \frac{1}{(3x+1)(x-2)}$
- b) $\frac{x+1}{x^2+2x} - \frac{x+4}{x^2-x} = \frac{-5}{x^2+x-2}$

Video 5 Solve

- a) $A = P(1 + rt)$ for t
- b) $S = \frac{a}{1-r}$ for r

1.2 Quadratic Equations

Video 1 Solve

- a) $18x^2 + 7 = 45x$
- b) $3\left(x^2 - \frac{5}{3}\right) = 2x$
- c) $\frac{3}{y-2} = \frac{5}{y+4} - 4$

Video 2 Solve using the square root method

a) $(2x-3)^2 = 25$

b) $(3x-2)^2 - 16 = 0$

Video 3 Solve by completing the square

a) $2r^2 + 3r - 9 = 0$

b) $y^2 + \frac{3}{4}y - \frac{5}{4} = 0$

Video 3 Derive the quadratic formula

$$ax^2 + bx + c = 0$$

Video 4 Solve using the quadratic formula

a) $3x^2 - 1 = 5x^2 - 3x - 5$

b) $\frac{2x}{x-5} + \frac{1}{x} = 4$

Video 5 Use the discriminant to determine the type of solutions for each of the quadratic equation below

a) $2x^2 + 4x + 7 = 0$

b) $16x^2 - 40x + 25 = 0$

c) $2x^2 - 3x - 9 = 0$

1.3 Complex Solutions

Video 1 Write each expression in the form $a+bi$

a) $(-9+4i) - (3+2i)$

b) $(-5+i)(5+i)$

c) $\frac{3-i}{-3i}$

d) $\frac{4+5i}{2-i}$

Video 2 Write each expression in the form $a+bi$

a) $(1-i)^2$

b) i^{17}

c) i^{-25}

d) $7i^3 - 3i^5$

e) $\sqrt{(2+3i)(3i-2)}$

Video 3 Solve

- a) $x^2 + 16 = 0$
- b) $x^2 + 5x + 7 = 0$
- c) $13x^2 + 1 = 7x$

Video 4 Solve

- a) $x^3 - 64 = 0$
- b) $x^4 + 5x^2 + 4 = 0$

1.4 Radical Equations

Video 1 Solve for all real solutions

- a) $\sqrt{5x-2} = -9$
- b) $\sqrt[3]{5-2x} - 2 = 0$
- c) $x = 4\sqrt{x}$

Video 2 Solve for all real solutions

- a) $\sqrt{2x-1} - \sqrt{x-1} = 1$
- b) $(2x+1)^{1/5} = -3$
- c) $x^{3/4} - 2x^{1/4} = 0$

Video 3 Solve

- a) $2p^4 + p^2 - 1 = 0$
- b) $(7w+5)^2 + 2(7w+5) - 15 = 0$
- c) $2x^{-2} - 5x^{-1} - 3 = 0$

Video 4 Solve

- a) $x - 3\sqrt{x} + 2 = 0$
- b) $x^2 - 3 - 4\sqrt{x^2 - 3} - 12 = 0$
- c) $3x^{2/3} - 7x^{1/3} - 6 = 0$
- d) $\left(\frac{x^2+1}{x}\right)^2 - 6\left(\frac{x^2+1}{x}\right) + 8 = 0$

Video 5 Solve

- a) $x^3 - 8x^2 - x + 8 = 0$
- b) $6x^3 + 36x = 2x^2 + 12$
- c) $13x(x^2 + 2x)^{1/2} - 2(x^2 + 2x)^{3/2} = 0$

1.5 Solving Inequalities

Video 1 Solve

- a) $2x + 6 > 1$
- b) $9 - 4(2 - x) \leq -2x$
- c) $5x + 4 > \frac{1}{3}(x - 2)$

Video 2 Solve

- a) $6 \leq 2x + 2 \leq 10$
- b) $0 < 1 - \frac{1}{2}x < 1$
- c) $x(9x - 5) \leq (3x - 1)^2$

Video 3 Solve

- a) $\frac{1}{3} < \frac{x+2}{2} \leq \frac{2}{3}$
- b) $0 < \frac{3}{x} < \frac{2}{5}$
- c) $0 < (2x+4)^{-1} < \frac{1}{2}$

Video 4 Solve for a and b

- a) If $-2 < x < 2$ then $a < 1 - 3x < b$
- b) If $2 < x < 4$ then $a < \frac{1}{x-8} < b$