1 Quadratic equations

Write down the quadratic formula to solve the following equation: $ax^2 + bx + c = 0$.

Can we use a part of this formula to find how many solutions a quadratic equation has? Explain.

Exercise 1.1. Solve for x, including any complex solutions.

1. $3x^2 = 27$

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

3. $(2x + 3)(x + 4) = 1$

4. $2x^2 - 7x = 0$

2 Radical equations

Exercise 2.1. Solve for x.

1. $\sqrt{3x + 18} = x$

2. $\sqrt{x + 2} + \sqrt{3x + 7} = 1$
   (Can we just square each side or do we have to do something before?)

3 Lines

Write down the formula for the **distance** between the points (x_1, y_1) and (x_2, y_2).

Write down the formula for the **midpoint** between the points (x_1, y_1) and (x_2, y_2).

Exercise 3.1. Find the distance between the points $(0, 1)$ and $(3, 5)$. What is the midpoint between the points? Simplify your answer.

How can you algebraically find out if two lines are perpendicular or parallel?

Exercise 3.2. Find the slope of the line given by the equation: $3x + y = 4$. Find the slope-intercept form of a line that is perpendicular to this line and passes through the point (9,2).

4 Circles

What is the difference between the general form and the standard form of the equation of a circle?

Exercise 4.1. Write the standard form of the equation of the circle with the given center and radius.

1. Center (0,0), r=3

2. Center (0,2), r=5

Exercise 4.2. Convert the general form of a circle's equation to standard form and vice versa. Find the center and radius of the circle.

1. $(x+3)^2 + (y-1)^2 = 4$

2. $x^2 + y^2 + 8x - 2y - 8 = 0$