

2024 Specialist Maths Units 3 and 4

Course Pre-test

Name _____

This test will help us get to know more about how you do Maths.

It's not a test of Unit 1 and 2 Specialist knowledge (although you will need that for your course!).

Don't worry if you're not confident with every question. Some questions are considerably harder than others. Attempt as much as you can, and show all your working, even if it's not complete.

You MAY NOT use a calculator or any notes for this test.

1. Rearrange to make x the subject

$$\frac{1}{x} - \frac{1}{y} = \frac{1}{v}$$

2. Given that $x = 2^k$ and $\sqrt{\frac{4}{x}} = 2^c$, find c in terms of k .

4. Solve the equation

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

5. Put the following numbers in order of size, from smallest to largest:

$$8^{\frac{1}{2}}, 4^{\frac{2}{3}}, 2^{\frac{5}{6}}, 7^{\frac{1}{3}}, 36^{\frac{1}{6}}$$

6. Prove algebraically that the sum of the squares of any two consecutive even integers is never a multiple of 8.

7. Three circles of radius r are arranged so that each touches the other two. The three circles fit snugly inside an equilateral triangle ABC of side 1. Calculate r .