Test - Surds and exact values

Year: Year 10 · Duration: 45 minutes · /20

Name:	Date:	**Mark: /20**

Question	1	2	3	4	5	Total
marks	4	4	4	4	4	**20**
Mark						

Show your working.

Question 1 (4 marks)

Question 1 – Exact circle answers

Non-calculator. Leave answers in terms of π.

a. A circle has diameter 10 cm. Find its area and circumference. (2 marks)
b. A sector has radius 6 cm and angle 60°. Find its area. (2 marks)

Question 2 (4 marks)

Question 2 – Pythagoras and surds

A right-angled triangle has shorter sides 5 cm and 10 cm. Give exact answers.

a. Find the hypotenuse in simplest surd form. (2 marks)
b. Find the area. (1 mark)
c. Find the perimeter in the form $15 + k\sqrt{5}$. (1 mark)

Question 3 (4 marks)

Question 3 – Higher: simplifying surds

Higher tier. Do not use a calculator.

a. Simplify $\sqrt{75} + \sqrt{27}$. (2 marks)
b. Expand and simplify $(4 + \sqrt{3})(4 - \sqrt{3})$. (1 mark)
c. Expand and simplify $(2 + \sqrt{5})^2$. (1 mark)

Question 4 (4 marks)

Question 4 – Higher: rationalising

Higher tier. Rationalise the denominator.

a. $\dfrac{14}{\sqrt{7}}$ (2 marks)

b. $\dfrac{6}{3-\sqrt{3}}$, giving your answer in the form $a+b\sqrt{3}$. (2 marks)

Question 5 (4 marks)

Question 5 – Problem: the cone

A cone has base radius 5 cm and vertical height 12 cm. Give answers in terms of π.

a. Find the slant height. (1 mark)
b. Find the volume. (1 mark)
c. Find the curved surface area. (1 mark)
d. Find the total surface area. (1 mark)