FOUNDATION & HIGHER

HIGHER EXTENDS

Name ..... Class .....

N8: Exact calculation and surds

Exact fractions, surds and multiples of π; simplify surds; rationalise denominators

20 marks · 25 minutes · Non-calculator

1) Simplify

(a) $\sqrt{50}$

.....

(1)

(b) $\sqrt{12} + \sqrt{27}$

.....

(2)

[Question 1: 3 marks]

2) Work out $\sqrt{3} \times \sqrt{12}$

.....

[Question 2: 1 marks]

3) Expand and simplify $(3 + \sqrt{2})(3 - \sqrt{2})$

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[Question 3: 2 marks]

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4) Expand and simplify $(2 + \sqrt{5})^2$. Give your answer in the form $a + b\sqrt{5}$

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[Question 4: 2 marks]

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5) Rationalise the denominator of $\frac{6}{\sqrt{3}}$. Simplify your answer.

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[Question 5: 2 marks]

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6) Rationalise the denominator of $\frac{4}{\sqrt{5} - 1}$. Simplify your answer.

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[Question 6: 3 marks]

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7) Work out $\frac{2}{3} + \frac{4}{5} \times \frac{1}{2}$. Give your answer as a fraction.

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[Question 7: 2 marks]

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8) A circle has radius 6 cm. Give each answer in terms of π.

(a) Find its area.

..... cm^2

(1)

(b) Find its circumference.

..... cm

(1)

[Question 8: 2 marks]

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9) A cylinder has radius 3 cm and height 5 cm. Find its volume in terms of π. (Volume = $\pi r^2 h$)

..... cm^3

[Question 9: 1 marks]

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10) Simplify $\frac{\sqrt{48}}{\sqrt{3}}$

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[Question 10: 1 marks]

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11) Simplify $\sqrt{8} \times \sqrt{18}$

.....

[Question 11: 1 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	(a) $5\sqrt{2}$ (b) $5\sqrt{3}$	(a) B1. (b) $2\sqrt{3} + 3\sqrt{3}$ (M1); A1.
2	6	B1.
3	7	$9 - 2$ (M1); A1.
4	$9 + 4\sqrt{5}$	Four terms (M1); A1.
5	$2\sqrt{3}$	$\frac{6\sqrt{3}}{3}$ (M1); A1.
6	$\sqrt{5} + 1$	Multiply by $\frac{\sqrt{5}+1}{\sqrt{5}+1}$ (M1); denominator 4 (M1); A1.
7	$\frac{16}{15}$	$\frac{2}{3} + \frac{2}{5}$ (M1); A1 (accept $1\frac{1}{15}$).
8	(a) 36π (b) 12π	B1 each.
9	45π	B1.
10	4	B1.
11	12	B1.