FOUNDATION & HIGHER

HIGHER EXTENDS

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

N8: Exact calculation and surds

Solve problems using surds, exact fractions and multiples of π

20 marks · 25 minutes · Non-calculator

1) A rectangle has sides $(3 + \sqrt{2})$ cm and $(3 - \sqrt{2})$ cm. Find its area and its perimeter.

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[Question 1: 3 marks]

2) A square has an area of $72\,\text{cm}^2$. Find its perimeter in the form $a\sqrt{2}$.

..... cm

[Question 2: 3 marks]

3) A right-angled triangle has shorter sides $\sqrt{5}$ cm and $\sqrt{11}$ cm. Find the exact length of the hypotenuse.

..... cm

[Question 3: 2 marks]

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4) A circle has circumference 10π cm. Find its exact area.

..... cm^2

[Question 4: 2 marks]

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5) Work out $\dfrac{\sqrt{12}+\sqrt{27}}{\sqrt{3}}$

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[Question 5: 2 marks]

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6) A triangle has base $4\sqrt{3}$ cm and height $\sqrt{6}$ cm. Find its exact area in simplest surd form.

..... cm^2

[Question 6: 3 marks]

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7) $\sqrt{50} + \sqrt{k} = 7\sqrt{2}$. Find k.

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[Question 7: 3 marks]

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8) $\frac{6}{\sqrt{3}} = a\sqrt{3}$. Find a.

.....

[Question 8: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	Area $7\,\text{cm}^2$, perimeter $12\,\text{cm}$	$9 - 2$ (P1); area (A1); perimeter (A1).
2	$24\sqrt{2}$	Side $\sqrt{72}$ (P1); $= 6\sqrt{2}$ (P1); A1.
3	4	$5 + 11 = 16$ (P1); A1.
4	25π	Radius 5 (P1); A1.
5	5	$2\sqrt{3} + 3\sqrt{3}$ (P1); A1.
6	$6\sqrt{2}$	$\frac{1}{2} \times 4\sqrt{18}$ (P1); $\sqrt{18} = 3\sqrt{2}$ (P1); A1.
7	8	$5\sqrt{2}$ (P1); $\sqrt{k} = 2\sqrt{2}$ (P1); 8 (A1).
8	2	$\frac{6\sqrt{3}}{3}$ (P1); A1.