



ACHIEVE ACADEMY

GCSE Maths — Higher Tier

Surds · Practice Booklet

NAME: _____

CLASS: _____

DATE: _____

☐ Developing

☒ Secure

☐ Greater Depth

Answer every question in the working space provided. Method marks are available for correct working even if the final answer is wrong. Check the time allowed with your tutor before you start.

Surds

Total marks available: 103

● Surds

Q1

[4 marks]

Expand and simplify $(5 + 4\sqrt{7})(3 + 4\sqrt{7})$.

Q2

[3 marks]

Expand and simplify $\sqrt{5}(8 + 3\sqrt{5})$.

Q3

[4 marks]

Expand and simplify $(4 + 3\sqrt{7})(4 + 2\sqrt{7})$.

Q4

[4 marks]

Expand and simplify $(1 + 4\sqrt{11})(3 + 5\sqrt{11})$.

Q5

[4 marks]

Expand and simplify $(1 + 4\sqrt{10})(4 + 5\sqrt{10})$.

Q6

[3 marks]

Expand and simplify $\sqrt{10}(2 + 6\sqrt{10})$.

Q7

[4 marks]

Expand and simplify $(2 + 3\sqrt{10})(2 + 5\sqrt{10})$.

Q8

[4 marks]

Expand and simplify $(5 + 5\sqrt{7})(5 + 4\sqrt{7})$.

Q9

[4 marks]

Expand and simplify $(3 + 4\sqrt{13})(5 + 2\sqrt{13})$.

Q10

[3 marks]

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

Q11

[3 marks]

Rationalise the denominator of $12/\sqrt{11}$, giving your answer in its simplest form.

Q12

[3 marks]

Rationalise the denominator of $8/\sqrt{2}$, giving your answer in its simplest form.

Q13

[3 marks]

Rationalise the denominator of $\frac{4}{\sqrt{14}}$, giving your answer in its simplest form.

Q14

[3 marks]

Simplify $(5 + 15\sqrt{11}) / 5$.

Q15

[3 marks]

Simplify $(12 + 9\sqrt{3}) / 3$.

Q16

[3 marks]

Rationalise the denominator of $3/\sqrt{2}$, giving your answer in its simplest form.

Q17

[3 marks]

Simplify $(12 + 8\sqrt{3}) / 4$.

Q18

[3 marks]

Simplify $(6 + 8\sqrt{2}) / 2$.

Q19

[3 marks]

Rationalise the denominator of $\frac{3}{\sqrt{3}}$, giving your answer in its simplest form.

Q20

[3 marks]

Simplify $(8 + 6\sqrt{11}) / 2$.

Q21

[4 marks]

Rationalise the denominator of $1/(2 + 3\sqrt{3})$.

Q22

[4 marks]

Rationalise the denominator of $1/(1 + 2\sqrt{5})$.

Q23

[4 marks]

Rationalise the denominator of $1/(3 + 4\sqrt{3})$.

Q24

[3 marks]

A triangle has three sides of length $3\sqrt{6}$ cm, $6\sqrt{6}$ cm and $3\sqrt{6}$ cm. Calculate the perimeter of the triangle, giving your answer in the form $k\sqrt{6}$.

Q25

[3 marks]

A triangle has three sides of length $3\sqrt{7}$ cm, $3\sqrt{7}$ cm and $3\sqrt{7}$ cm. Calculate the perimeter of the triangle, giving your answer in the form $k\sqrt{7}$.

Q26

[3 marks]

A triangle has three sides of length $3\sqrt{7}$ cm, $5\sqrt{7}$ cm and $2\sqrt{7}$ cm. Calculate the perimeter of the triangle, giving your answer in the form $k\sqrt{7}$.

Q27

[3 marks]

A triangle has three sides of length $4\sqrt{10}$ cm, $6\sqrt{10}$ cm and $5\sqrt{10}$ cm. Calculate the perimeter of the triangle, giving your answer in the form $k\sqrt{10}$.

Q28

[4 marks]

Rationalise the denominator of $1/(4 + 3\sqrt{10})$.

Q29

[4 marks]

Rationalise the denominator of $1/(1 + 4\sqrt{2})$.

Q30

[4 marks]

Rationalise the denominator of $1/(5 + 3\sqrt{6})$.