Surname	
Other Names	
Candidate's Signature	

GCSE 9 - 1 Questions

Surds

Calculator Not Allowed

INSTRUCTIONS TO CANDIDATES

Write your name in the space provided.

Write your answers in the spaces provided in this question paper.

Answer ALL questions.

Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

You should have a ruler, compass and protractor where required.

Total Marks :

1) **(a)** Express $\sqrt{50}$ in its simplest form.

Answer _____ [1]

(b) Rationalise the denominator of $\frac{6}{5\sqrt{3}}$

Answer _____ [2]

(c) Simplify $9\sqrt{27} - 4\sqrt{3}$

Answer _____ [2]

(d) Expand and simplify $\left(\sqrt{5} - \sqrt{2}\right)^2$

Answer _____ [2]

2) **(a)** Rationalise the denominator of $\frac{8}{\sqrt{2}}$

Answer _____ [2]

(b) Evaluate $\sqrt{3} \times \sqrt{12}$

Answer _____ [2]

(c) Expand and simplify $(\sqrt{7} + \sqrt{21})^2$

Answer _____ [2]

(d) Evaluate $(2 - \sqrt{5})(2 + \sqrt{5})$

Answer _____ [1]

3) **(a)** Show that $(\sqrt{8} + 3\sqrt{2})^2 = 50$

[2]

(b) Rationalise the denominator of $\frac{20}{\sqrt{5}}$

Answer _____ [2]

(c) Given that $p = \sqrt{3}$, $q = \sqrt{6}$ and $r = \sqrt{24}$

simplify $\frac{qr}{p}$

Answer _____ [2]

(d) Expand and simplify $\left(5 - \sqrt{3}\right)^2$

Answer _____ [2]

4) *(a)* Evaluate $\frac{8\times\sqrt{5}\times\sqrt{3}\times\sqrt{3}}{2\times\sqrt{5}}$. [2]

(b) Simplify $(3\sqrt{5}-\sqrt{2})(3\sqrt{5}+\sqrt{2})$ and state whether your answer is rational or irrational.

[3]

(c) Evaluate $\left(\sqrt{75}-\sqrt{3}\right)^2$. [3]

5) *(a)* Express $\sqrt{75}$ in the form $a\sqrt{b}$, where a and b are whole numbers. [2]

(b) Simplify $\left(\pi\sqrt{20} - \pi\sqrt{5}\right)^2$, leaving your answer in terms of π.

[3]

(c) Evaluate $\dfrac{\left(7-\sqrt{3}\right)\left(7+\sqrt{3}\right)}{2}$.

State clearly whether your answer is rational or irrational. [2]

6) Rationalise the denominator of $\frac{10}{\sqrt{2}}$

Answer _____ [2]

(b) Simplify $(7-5\sqrt{2})^2$ and state whether your answer is rational or irrational. [3]

(c) Simplify $\left(\sqrt{20}-\sqrt{5}\right)^2$. [2]

7) Evaluate $\left(\sqrt{50}-3\sqrt{2}\right)^2$. [3]

(b) Simplify $\left(\sqrt{18}+\sqrt{2}\right)^2$. [2]

(c) Simplify $\left(5-3\sqrt{2}\right)\left(5+3\sqrt{2}\right)$. [2]

8) Rationalise the denominator in $\frac{6}{\sqrt{3}}$

Answer _____ [2]

9) Given that $p = \sqrt{5}$ and $q = \sqrt{20}$,

(i) find the value of p^2,

Answer _____ [1]

(ii) show that $(p + q)^2 = 45$.

[2]

10) Simplify $(\sqrt{8})^2$

Answer _____ [1]

11) Expand $(7-\sqrt{3})^2$ giving your answer in the form $a+b\sqrt{3}$

Answer _____ [2]

12) Simplify

$$\frac{\left(5\sqrt{3}\right)^2-\frac{2\sqrt{18}}{\sqrt{2}}}{\sqrt{32}\times\sqrt{2}}$$

and state whether your answer is rational or irrational. [5]

13) Given that $f = \sqrt{2}$, $g = \sqrt{5}$ and $h = \sqrt{10}$, find, in its simplest form,

(i) $\frac{fg}{h}$,

.....

.....

.....

[1]

(ii) $fg + h$,

.....

.....

[1]

(iii) fh.

.....

.....

[1]

14) Simplify $\left(3-\sqrt{5}\right)^2$. [2]

.....

.....

.....

.....

.....

.....

15) Simplify $(4+\sqrt{3})^2$. [2]

16) Simplify $\sqrt{288}$.
Write your answer in surd form. [2]

17) Simplify $\sqrt{3}(5+\sqrt{3})-\sqrt{3}(5-2\sqrt{3})$. [2]