

**Higher IGCSE (9 – 1) Revision Pack**

**Surds (Parts 1 and 2)**

**Name --------------------------------**

**PART 1**

**Q1.**

(a) Simplify

√32 + √18

giving your answer in the form *a*√2, where *a* is an integer.

**(2)**

b) Simplify



giving your answer in the form *b*√2 + *c*, where *b* and *c* are integers.

**(4)**

**Total 6 marks**

**Q2.**

Simplify



giving your answer in the form *p* + *q* √ 3, where *p* and *q* are rational numbers.

**(4)**

**(Total 4 marks)**

**Q3.**

Write



in the form *k* √*x*, where *k* and *x* are integers.

**(2)**

**(Total 2 marks)**

**Q4.**

1. Expand and simplify (7 + √5)(3 − √5)

**(3)**

(b) Express $\frac{7+\sqrt{5}}{3+\sqrt{5}}$ in the form *a* + *b*√5, where *a* and *b* are integers.

**(3)**

**(Total 6 marks)**

**Q5.**

Simplify

(a)  (3 √7)2

**(1)**

(b)  (8 + √5)(2 − √5)

**(3)**

**(Total 4 marks)**

**Q6.**

(i) Express

(5 − √ 8 )(1 + √ 2 )

in the form *a* + *b*√ 2 , where *a* and *b* are integers.

**(3)**

(ii) Express $\sqrt{80}+\frac{30}{\sqrt{5}}$

in the form *c*√ 5, where *c* is an integer.

**(3)**

**(Total 6 marks)**

**Q7.**

Simplify

(a)  (2√5)2

**(1)**

(b)  $\frac{\sqrt{2}}{2\sqrt{5}-3\sqrt{2}}$ giving your answer in the form *a* + √*b* , where *a* and *b* are integers.

**(4)**

**(Total for question = 5 marks)**

**Q8.**

Simplify



giving your answer in the form *a* + *b*√3, where *a* and *b* are integers.

**(4)**

**(Total 4 marks)**

**Q9.**

(a)  Simplify



giving your answer in the form $a\sqrt{2}$ , where *a* is an integer.

**(2)**

(b)  Hence, or otherwise, simplify



giving your answer in the form $b\sqrt{c}$ , where *b* and *c* are integers and *b* ≠ 1

**(3)**

**(Total for question = 5 marks)**

**Q10.**

1. Write √80 in the form *c*√5, where *c* is a positive constant.

**(1)**

A rectangle *R* has a length of (1 + √5) cm and an area of √80 cm2.

1. Calculate the width of *R* in cm. Express your answer in the form *p* + *q*√5, where *p* and *q* are integers to be found.

**(4)**

**(Total 5 marks)**

**PART 2**

**Q1.**

Show that (6 − √8)2 = 44 − 24√2

Show each stage of your working clearly.

**(Total for question = 3 marks)**

**Q2.**

(3 + √*a*)(4 + √*a*) = 17 + *k*√*a*) where *a* and *k* are positive integers.

Find the value of *a* and the value of *k*.

*a* = ...........................................................

*k* = ...........................................................

**(Total for question = 3 marks)**

**Q3.**

(a)   Expand (5 + 3√2)2

Give your answer in the form (*a* + *b*√2), where *a* and *b* are integers.
Show your working clearly.

...........................................................

**(2)**


(b)   where *p* and *q* are integers.

Find the value of *q*.

*q* = ...........................................................

**(3)**

**(Total for Question is 5 marks)**

**Q4.**

(a)  Show that (5 − √8)(7 + √2) = 31 − 9√2

Show each stage of your working.

**(3)**

Given that *c* is a prime number,

(b)  rationalise the denominator of

Simplify your answer.

...........................................................

**(2)**

**(Total for question = 5 marks)**

**Q5.**

Given that (5 − √*x*)2 = *y* − 20√2 where *x* and *y* are positive integers, find the value of *x* and the value of *y*.

*x* = ...........................................................

*y* = ...........................................................

**(Total for Question is 3 marks)**

**Q6.**

Given that *x* and *y* are positive integers such that (1 + √*x*)(3 + √*x*) = *y* + 4√5 find the value of *x* and the value of *y*.

*x* = ...........................................................

*y* = ...........................................................

**(Total for Question is 3 marks)**

**Q7.**

Show that $\frac{\sqrt{12}-1}{2-\sqrt{3}}$ can be written as $4+3\sqrt{3}$

Show your working clearly.

**(Total for question = 4 marks)**

**Q8.**

Show that $\frac{\sqrt{3}+\sqrt{27}}{\sqrt{2}}$ can be expressed in the form √*k* where *k* is an integer.

State the value of *k*.

*k* = ...........................................................

**(Total for question is 3 marks)**

**Q9.**

(3 + √*c*)(2√*c* − 3) = 1 + *k*√*c*

where *c* and *k* are prime numbers.

(a)  Find the value of *c* and the value of *k*.

*c* = ..............................   *k* = ..............................

**(3)**



(b)  Find the value of *m*.

*m* = ...........................................................

**(3)**

**(Total for question = 6 marks)**

**Q10.**



(a) Write down the value of

(i)  *p*

*p* = ...........................................................

(ii)  *q*

*q* = ...........................................................

(iii)  *r*

*r* = ...........................................................

**(3)**



(b)  Show that

You must write down each stage of your working.

**(2)**

(*e* − 2√3)2 = *f* − 20√3 where *e* and *f* are integers.

(c)  Find the value of *e* and the value of *f*

*e* = ...........................................................

*f* = ...........................................................

**(3)**

**(Total for question = 8 marks)**

**Q11.**



*a* and *b* are positive integers.
 Find the value of a and the value of *b*.
 Show your working clearly.

*a* = ...........................................................

*b* = ...........................................................

**(Total for question = 3 marks)**

**Q12.**

Express $\sqrt{48}+\sqrt{108}$ in the form $k\sqrt{6}$

...........................................................

**(Total for question = 3 marks)**

**Q13.**

Simplify    

Give your answer in the form $a+b\sqrt{18}$ where *a* and *b* are integers.

Show your working clearly.

 ...........................................................

**(Total for question = 3 marks)**

**Q14.**

A trapezium *ABCD* has an area of 5√6 cm2.



*AB* = 4 cm.
*BC* = √3 cm.
*DC* = *k* cm.

Calculate the value of *k*, giving your answer in the form *a*√*b* − *c*
where *a*, *b* and *c* are positive integers.
Show each step in your working.

*k* = ...........................................................

**(Total for Question is 3 marks)**

**End of questions**