

1 Write  $27 \times (3^2)^7$  as a single power of 3

[3 marks]

$$\textcircled{1} \quad 3^3 \times 3^{14} \quad \textcircled{1}$$

$$= 3^{3+14}$$

$$= 3^{17} \quad \textcircled{1}$$

Answer  $3^{17}$

2

Work out the value of  $100^{-\frac{1}{2}}$ 

[2 marks]

$$= \frac{1}{\sqrt{100}}$$

$$= \frac{1}{10} = 0.1$$

2

Answer 0.1

3

Work out

cube root of 512 : reciprocal of 0.4

Give your answer in the form  $n : 1$

[3 marks]

$$\sqrt[3]{512} = 8 \quad , \quad \frac{1}{0.4} = \frac{10}{4} = 2.5$$

$$8 : 2.5$$

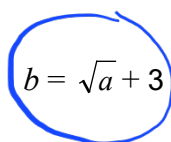
$$8 \div 2.5 = 3.2$$

Answer  $3.2$  :  $1$

- 4  $b$  is 3 more than the square root of  $a$ .

Circle the correct equation.

[1 mark]


$$b = \sqrt{a} + 3$$

$$b = \sqrt{a} - 3$$

$$b = \sqrt{a+3}$$

$$b = \sqrt{a-3}$$

- 5  $a^b = 3$  where  $a$  is an integer and  $b$  is a proper fraction.

Work out **one** possible pair of values of  $a$  and  $b$ .

[1 mark]

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$$a = \underline{9} \quad \textcircled{1} \quad b = \underline{\frac{1}{2}}$$

6 (a) Work out  $\frac{3^{12}}{3^7}$

Give your answer as a whole number.

[2 marks]

$$3^{12-7} = 3^5$$

$$= 243$$

(2)

Answer 243

6 (b) Simplify  $8 \times 2^6 \times 2^4$

Give your answer as a power of 2

[2 marks]

$$8 = 2^3$$

$$2^3 \times 2^6 \times 2^4$$

$$= 2^{3+6+4} = 2^{13}$$

Answer  $2^{13}$

(2)

7 Work out the value of  $\left(\frac{3}{2}\right)^2$

Give your answer as a mixed number.

[1 mark]

$$\left(\frac{3}{2}\right)^2 = \frac{9}{4} = \frac{4}{4} + \frac{4}{4} + \frac{1}{4}$$

$$= 2\frac{1}{4}$$

Answer  $2\frac{1}{4}$  ①

8

$$2^a \times 3 \times 5^2 = 600$$

Work out the value of  $a$ .

You **must** show your working.

[3 marks]

$$2^a \times 3 \times 25 = 600$$

$$2^a \times 75 = 600$$

$$2^a = \frac{600}{75} = 8$$

$$2^a = 8$$

$$a = 3$$

$$a = 3$$



9

Circle the value of

$$(\sqrt{6})^4 \quad (6^{1/2})^4 = 6^2 = 36$$

[1 mark]

12

36

1

10

$\sqrt{24}$

10 Work out  $\frac{4^6 - 11}{\sqrt{625} - 225}$

Circle your answer.

[1 mark]

−61.6

−20.425

204.25

3870.56



11 Work out  $(3.1 \times 10^9)^2$

Circle your answer.

[1 mark]

$6.2 \times 10^{18}$

$6.2 \times 10^{81}$

$9.61 \times 10^{18}$

$9.61 \times 10^{81}$



- 12 (a)  $k$  is a whole number between 40 and 50

The cube root of  $k$  is 3, to the nearest whole number.

Work out the **largest** possible value of  $k$ .

[2 marks]

$$3.5^3 = 42.875 \text{ (1)}$$

$$k = 42$$

Answer 42 (1)

- 12 (b) Fay tries to solve  $x^2 = 100$

She says,

“The only possible value of  $x$  is 10”

Give a reason why she is **not** correct.

[1 mark]

$x$  could also be -10 (1)

13  $2^x = 32$

Circle the value of  $x$ .

[1 mark]

4

5

6

6

7

14

Work out  $12^2 \div \left(\frac{1}{3} \times \sqrt{36}\right)$ 

[3 marks]

$$12^2 = 144$$

$$\sqrt{36} = 6 \quad \checkmark \text{ (1)}$$

$$= 144 \div \left(\frac{1}{3} \times 6\right)$$

$$= 144 \div 2$$

$$= 72$$

Answer  $72 \quad \checkmark \text{ (1)}$

15 (a) Between which two **consecutive** integers does the square root of 210 lie?

[1 mark]

$$14^2 = 196$$

$$15^2 = 225$$

square root of 210 is between 14 to 15 .

Answer 14 and 15