Now Revise

Routine – Non Calculator

Surds & Indices

Expressions and Formulae 1.1

1

(*a*) Simplify $\sqrt{2}\times\sqrt{18}$.

(*b*) Simplify $\sqrt{2}+\sqrt{18}$.

(*c*) Hence show that $\dfrac{\sqrt{2}\times\sqrt{18}}{\sqrt{2}+\sqrt{18}} = \dfrac{3\sqrt{2}}{4}$.

2

Remove brackets and simplify

$$a^{\frac{1}{2}}(a^{\frac{1}{2}}-2).$$

3

Simplify

$$m^3\times\sqrt{m}.$$

4

Express

$$p^3(p^2-p^{-3})$$

in its simplest form.

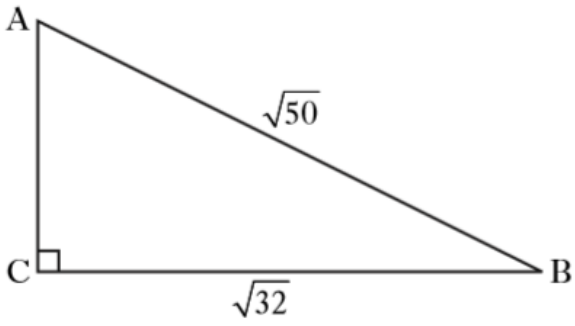
Simplify $\sqrt{2}\left(\sqrt{3}+\sqrt{2}\right)-\sqrt{6}$.

5

6 Evaluate

$$9^{\frac{3}{2}}.$$

7 A right angled triangle has dimensions as shown.



Calculate the length of AC, leaving your answer as a surd **in its simplest form**.

8 (*a*) Simplify $2a \times a^{-4}$.

(*b*) Solve for x, $\sqrt{x} + \sqrt{18} = 4\sqrt{2}$.

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9

(*a*) Simplify

$$\frac{m^5}{m^3}.$$

(*b*) Express

$$2\sqrt{5}+\sqrt{20}-\sqrt{45}$$

as a surd in its simplest form.

10

Express

$$\sqrt{63}+\sqrt{28}-\sqrt{7}$$

as a surd in its simplest form.

11

Express $\frac{12}{\sqrt{2}}$ with a rational denominator.

Give your answer in its simplest form.

12

Simplify $\frac{ab^6}{a^3b^2}$.

13 Simplify the expression below, giving your answer with a positive power.

$$m^5 \times m^{-8}$$

14 Simplify, expressing your answer with positive indices.

$$(x^2\, y^4) \div (x^{-3}\, y^6)$$

15 One atom of gold weighs $3{\cdot}27 \times 10^{-22}$ grams.

How many atoms will there be in one kilogram of gold?

Give your answer **in scientific notation correct to 2 significant figures**.

16 There are 3×10^5 platelets per millilitre of blood.

On average, a person has 5·5 litres of blood.

On average, how many platelets does a person have in their blood?

Give your answer in scientific notation.

17

Three of the following have the same value.

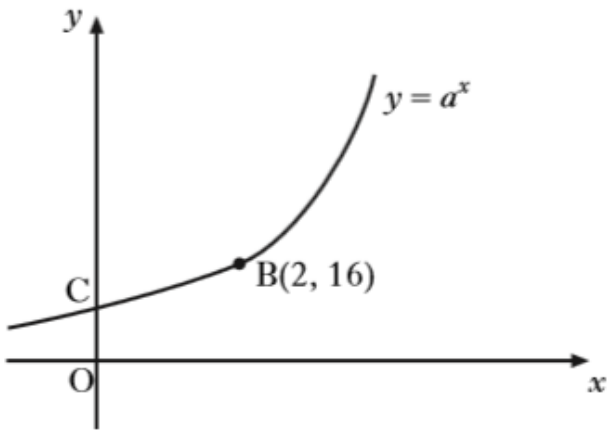
$2\sqrt{6}$, $\sqrt{2}\times\sqrt{12}$, $3\sqrt{8}$, $\sqrt{24}$.

Which one has a different value?

You must give a reason for your answer.

18

Part of the graph of $y = a^x$, where $a > 0$, is shown below.



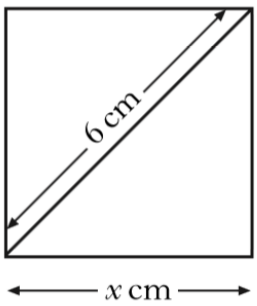
The graph cuts the y-axis at C.

(a) Write down the coordinates of C.

B is the point (2, 16).

(b) Calculate the value of a.

19 A square of side x centimetres has a diagonal 6 centimetres long.



Calculate the value of x, giving your answer as a surd in its simplest form.

20 (*a*) Evaluate $(2^3)^2$.

(*b*) Hence find n, when $(2^3)^n = \frac{1}{64}$.