

**Now****Revise**Routine – Non  
Calculator**Surds & Indices**

Expressions and Formulae 1.1

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

**1**

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

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

Remove brackets and simplify

**2**

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

Simplify

**3**

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

Express

**4**

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

in its simplest form.

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

5

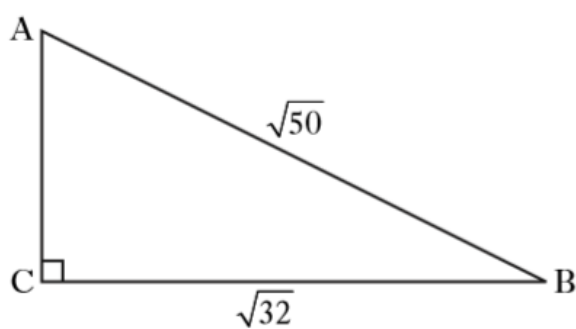
6

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  $x$ ,  $\sqrt{x} + \sqrt{18} = 4\sqrt{2}$ .

**Now  
Revise**

Routine –  
Calculator

# Surds & Indices

Expressions and Formulae 1.1

(a) Simplify

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

9

(b) Express

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

as a surd in its simplest form.

Express

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

10

as a surd in its simplest form.

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

11

Give your answer in its simplest form.

Simplify

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

12

**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  $3.27 \times 10^{-22}$  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  $3 \times 10^5$  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.

**Now  
Revise**

Unseen and  
Non Routine

# Surds & Indices

Expressions and Formulae 1.1

Three of the following have the same value.

17

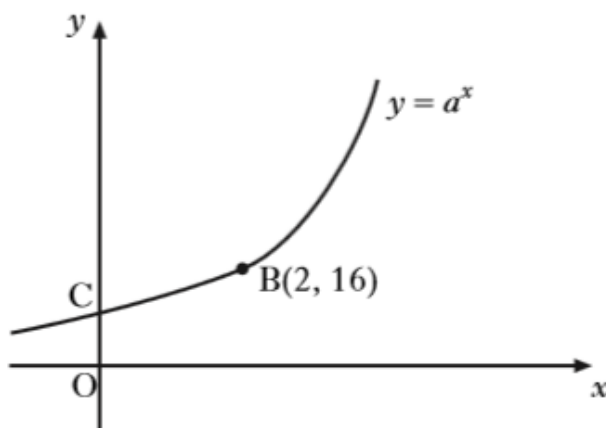
$$2\sqrt{6}, \quad \sqrt{2} \times \sqrt{12}, \quad 3\sqrt{8}, \quad \sqrt{24}.$$

Which one has a different value?

**You must give a reason for your answer.**

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

18



The graph cuts the  $y$ -axis at  $C$ .

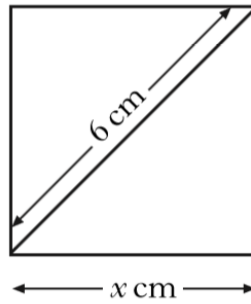
(a) Write down the coordinates of  $C$ .

$B$  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  $(2^3)^n = \frac{1}{64}$ .