

Powers, Roots and Standard Form

GCSE Maths · Practice Questions

20 questions · 62 marks total

jtmaths.org · free maths resources

Section A · Foundation

Questions 1–3 are the most straightforward; they get harder as you go on. Question 10 is the most challenging.

1

[1 mark]

Work out 4^3

.....

2

[2 marks]

Work out

(a) $\sqrt{49}$

(b) the cube root of 27

.....

3

[2 marks]

Simplify $3^4 \times 3^2$, giving your answer as a single power of 3.

.....

4

[2 marks]

Write 5600 in standard form.

.....

5

[3 marks]

(a) Write 0.00042 in standard form.

(b) Write 3.1×10^5 as an ordinary number.

.....

6

[3 marks]

(a) Work out $2^5 \div 2^2$

(b) Write down the value of 7^0

7

[3 marks]

Work out $(3 \times 10^4) \times (2 \times 10^3)$

Give your answer in standard form.

8

[3 marks]

In each pair, work out which is larger. Show your working.

(a) 2^6 or 3^4

(b) 5^3 or 2^7

9

[4 marks]

(a) Between which two consecutive whole numbers does $\sqrt{150}$ lie? Explain your answer.

(b) By working out 12.2^2 and 12.3^2 , say which of these is closer to $\sqrt{150}$.

10

[4 marks]

The mass of the Sun is 1.99×10^{30} kg.

The mass of the Earth is 5.97×10^{24} kg.

How many times heavier is the Sun than the Earth?

Give your answer in standard form to 3 significant figures.

Higher-tier style. Again, questions 1–3 are the gentlest and question 10 is the hardest.

1 [2 marks]

Work out

(a) 5^{-2}

(b) $16^{3/4}$

2 [2 marks]

Simplify $\sqrt{50} + \sqrt{8}$, giving your answer in the form $a\sqrt{2}$

3 [3 marks]

Rationalise the denominator of $\frac{10}{\sqrt{5}}$ and simplify your answer.

4 [3 marks]

Expand and simplify $(3 + \sqrt{2})(4 - \sqrt{2})$

5 [4 marks]

Work out $(4.8 \times 10^5) \div (1.6 \times 10^{-2})$

Give your answer in standard form.

6 [4 marks]

Work out the value of $\left(\frac{8}{27}\right)^{-2/3}$

7

[4 marks]

Solve each equation.

(a) $2^x = 32$

(b) $3^{x+1} = 81$

(c) $5^x = \frac{1}{25}$

8

[4 marks]

A square has area 48 cm^2 .

(a) Find the exact length of one side, in the form $a\sqrt{b}$.

(b) Find the exact perimeter of the square.

9

[4 marks]

The Earth is approximately 1.5×10^8 km from the Sun.

Light travels at approximately 3×10^5 km per second.

Work out how many minutes light takes to travel from the Sun to the Earth. Give your answer to the nearest minute.

10

[5 marks]

Rationalise the denominator of

$$\frac{5 + \sqrt{3}}{2 - \sqrt{3}}$$

Give your answer in the form $a + b\sqrt{3}$
