

GCSE Maths: Estimating roots and powers, and using a calculator (Higher): worksheet

GCSE Maths - Factors, Multiples and Primes - Higher - Lesson 2.9

Name: _____

Date: _____

Score: _____

23 questions. Write your answers in the spaces. Answers and step-by-step help are free at websink.site/gcse/maths/ch02-factors-multiples-primes-powers/higher/estimating-roots-and-powers-and-using-a-calculator/

Exercise 21 Estimating roots and powers (non-calculator)

Non-calculator

1 Write down the two consecutive whole numbers between which each square root lies.

(a) $\sqrt{20}$

Answer: _____

(b) $\sqrt{50}$

Answer: _____

(c) $\sqrt{75}$

Answer: _____

(d) $\sqrt{110}$

Answer: _____

(e) $\sqrt{3}$

Answer: _____

(f) $\sqrt{200}$

Answer: _____

2 Write down the whole number that each square root is nearest to.

(a) $\sqrt{10}$

Answer: _____

(b) $\sqrt{20}$

Answer: _____

(c) $\sqrt{30}$

Answer: _____

(d) $\sqrt{40}$

Answer: _____

(e) $\sqrt{55}$

Answer: _____

(f) $\sqrt{90}$

Answer: _____

3 Write down the two consecutive whole numbers between which each cube root lies.

(a) the cube root of 10

Answer:

(b) the cube root of 30

Answer:

(c) the cube root of 70

Answer:

(d) the cube root of 200

Answer:

4 Find each square root to 1 decimal place. Use trial and improvement. Do not use the $\sqrt{\quad}$ key.

(a) $\sqrt{10}$

Answer:

(b) $\sqrt{20}$

Answer:

(c) $\sqrt{30}$

Answer:

(d) $\sqrt{50}$

Answer:

(e) $\sqrt{75}$

Answer:

(f) $\sqrt{12}$

Answer:

5 Estimate the value of each power by rounding the base to the nearest whole number.

(a) 2.9^2

Answer:

(b) 4.1^2

Answer:

(c) 6.8^2

Answer:

(d) 3.1^3

Answer:

(e) 4.9^2

Answer:

(f) 1.9^3

Answer:

6 A square field has an area of 70 m^2 . Find the length of one side of the field, to 1 decimal place.

Answer:

- 7** A rectangle is 3 cm by 5 cm. Its diagonal has length $\sqrt{3^2 + 5^2}$ cm. Find the whole number that the length of the diagonal is nearest to.

Answer:

- 8** Explain why $\sqrt{50}$ is nearer to 7 than to 8, without using a calculator.

Answer:

- 9** Is $\sqrt{40}$ bigger than 6.5, or smaller than 6.5? Show how you know.

Answer:

- 10** Alex says that $\sqrt{30} = 15$, because $30 \div 2 = 15$. Show that Alex is wrong.

Answer:

- 11** Estimate the value of $\sqrt{49.3 + 2.9^2}$ by rounding each number to a value that is easy to work with.

Answer:

- 12** Find each cube root to 1 decimal place.

- (a) the cube root of 20

Answer:

- (b) the cube root of 50

Answer:

- (c) the cube root of 100

Answer:

- (d) the cube root of 30

Answer:

- 13** Show that $\sqrt{7}$ lies between 2.6 and 2.7.

Answer:

- 14** Find the whole number n such that $\sqrt{n}$ is between 6.5 and 6.6.

Answer:

Exercise 2J Powers and roots with a calculator

Calculator allowed

- 1** Use a calculator to work out each power.

- (a) 1.7^4 (2 d.p.)

Answer:

- (b) 2.3^3 (1 d.p.)

Answer:

- (c) 0.85^2 (3 d.p.)

Answer:

- (d) 12.5^3 (3 s.f.)

Answer:

- (e) 3.2^5 (1 d.p.)

Answer:

(f) 1.05^{10} (3 d.p.)

Answer:

2 Use a calculator to work out each root.

(a) $\sqrt{77}$ (2 d.p.)

Answer:

(b) $\sqrt{150}$ (2 d.p.)

Answer:

(c) the cube root of 250 (1 d.p.)

Answer:

(d) $\sqrt{2}$ (3 d.p.)

Answer:

(e) the cube root of 90 (2 d.p.)

Answer:

(f) $\sqrt{1000}$ (1 d.p.)

Answer:

3 Use a calculator to work out each of these. Write down the estimate you used to check.

(a) $(2.5 + 1.3)^2$ (1 d.p.)

Answer:

(b) $\sqrt{6.4^2 - 3.2^2}$ (2 d.p.)

Answer:

(c) the cube root of $(2.5^3 + 1.5^3)$ (2 d.p.)

Answer:

(d) $1.2^3 \times 4.5$ (2 d.p.)

Answer:

4 A square has an area of 250 cm^2 . Work out the length of one side. Give your answer to 1 decimal place.

Answer:

5 A cube has a volume of 500 cm^3 . Work out the length of one edge. Give your answer to 1 decimal place.

Answer:

6 A single cell splits into two every 20 minutes. After 24 splits (8 hours), the number of cells is 2^{24} . Work out this number.

Answer:

7 Zoe uses her calculator to work out -4^2 and gets -16 . Max works out $(-4)^2$ and gets 16. Zoe says: "We did the same sum, so one of us is wrong." Explain what is happening.

Answer:

8 Show that 2^{100} is bigger than 10^{30} .

Answer:

9 Find the smallest whole number n for which 1.5^n is bigger than 1000.

Answer:

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