



- 1 Write down the value of 6^2

(1 mark)

6^2 means 6×6

$$6 \times 6 = 36$$

36

- 2 Write down the value of $\sqrt{81}$

(1 mark)

The $\sqrt{\quad}$ symbol means the non-negative square root: the non-negative number that multiplies by itself to give 81

$$9 \times 9 = 81, \text{ so } \sqrt{81} = 9$$

9

- 3 Here is a list of numbers.

21 34 37 45 51 58 59

- Write down the even numbers in the list.
- Write down the prime numbers in the list.

(2 marks)

a)

even numbers end in 0, 2, 4, 6 or 8

34, 58

b)

check the odd numbers for factors

$$21 = 3 \times 7$$

$$45 = 5 \times 9$$

$$51 = 3 \times 17$$

37 and 59 have only 1 and themselves

37, 59

4

Here is a list of numbers.

15 21 27 36 49 55 64 100 125

From the list, write down

- all the triangular numbers
- all the square numbers
- all the cube numbers.

Some numbers belong in more than one answer.

(3 marks)

a) triangular: add 2, 3, 4, ...

1, 3, 6, 10, 15, 21, 28, 36, 45, 55

15, 21, 36, 55

b) square numbers

1, 4, 9, 16, 25, 36, 49, 64, 81, 100

36, 49, 64, 100

c) cube numbers

$1^3 = 1$, $2^3 = 8$, $3^3 = 27$, $4^3 = 64$, $5^3 = 125$

27, 64, 125

5

Work out $3 + 4 \times 5$

(1 mark)

The order of operations is a shared convention so everyone reads the same expression the same way. Do brackets, then powers, then multiplication/division from left to right, then addition/subtraction from left to right

Multiplication comes before addition

$$4 \times 5 = 20$$

$$3 + 20 = 23$$

23

6

a. $13^2 = 169$. Write down the value of $\sqrt{169}$ b. Write down the value of $\sqrt[3]{125}$ c. $\sqrt{50}$ lies between two consecutive whole numbers. Write down the two whole numbers.

(3 marks)

a) square root undoes squaring

$$13^2 = 169$$

$$\sqrt{169} = 13$$

b) which number cubed gives 125

$$5 \times 5 \times 5 = 125$$

$$5$$

c) squares either side of 50

$$7^2 = 49$$

$$8^2 = 64$$

$$49 < 50 < 64$$

$$7 \text{ and } 8$$

7

Use your calculator to work out

a. 2.3^3 b. $\sqrt{17.64}$ c. 3^7

(3 marks)

a)

$$2.3^3 = 2.3 \times 2.3 \times 2.3$$

$$12.167$$

b) check: $4.2 \times 4.2 = 17.64$

$$4.2$$

c) power button, then 7

$$2187$$

8 Work out $3^2 + 4 \times (7 - 2)$

(2 marks)

Brackets first

$$7 - 2 = 5$$

Indices next

$$3^2 = 9$$

Multiplication

$$4 \times 5 = 20$$

Addition

$$9 + 20 = 29$$

29

9 Here are the first five triangular numbers.

1 3 6 10 15

a. Describe how the sequence continues from one term to the next.

b. Work out the next two terms of the sequence.

(3 marks)

The differences between terms are 2, 3, 4, 5, so the amount added goes up by 1 each time

Next term

$$15 + 6 = 21$$

The term after that

$$21 + 7 = 28$$

10 Square tables are pushed together in a row for a class party.

1 table seats 6 pupils, 2 tables seat 10 pupils and 3 tables seat 14 pupils.

a. How many pupils can sit at 5 tables?

b. A Year 7 class has 30 pupils. How many tables are needed so that every pupil has a seat?

(3 marks)

each table adds 4 seats

6, 10, 14, ...

a)

4 tables: $14 + 4 = 18$

5 tables: $18 + 4 = 22$

22 pupils

b) keep adding 4

6 tables: $22 + 4 = 26$

7 tables: $26 + 4 = 30$

7 tables

11 Sophie adds up odd numbers, starting from 1.

$$1 = 1$$

$$1 + 3 = 4$$

$$1 + 3 + 5 = 9$$

$$1 + 3 + 5 + 7 = 16$$

a. Write down the next line of the pattern.

b. What type of numbers are the answers?

c. Use the pattern to work out $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19$ without adding the numbers one by one.

(3 marks)

a) next odd number is 9

$$1 + 3 + 5 + 7 + 9 = 25$$

$$1 + 3 + 5 + 7 + 9 = 25$$

b) 1, 4, 9, 16, 25

square numbers

c) count the odd numbers from 1 to 19

1, 3, 5, 7, 9, 11, 13, 15, 17, 19

that is 10 odd numbers

$$10^2 = 100$$

100

12

Work out

a. $\sqrt{36 + 64}$

b. $\sqrt{36} + \sqrt{64}$

c. $40 - (3 + 2)^2 \div 5$

(3 marks)

a) brackets first

$$\begin{aligned}\sqrt{36 + 64} &= \sqrt{100} \\ &= 10\end{aligned}$$

10

b) each root first

$$\begin{aligned}\sqrt{36} + \sqrt{64} &= 6 + 8 \\ &= 14\end{aligned}$$

14

c) brackets, indices, divide, then subtract

$$\begin{aligned}40 - (3 + 2)^2 \div 5 &= 40 - 5^2 \div 5 \\ &= 40 - 25 \div 5 \\ &= 40 - 5 \\ &= 35\end{aligned}$$

35