Note: When printed double sided, answers will appear on the back of the corresponding question cards.

Q1

Round 4.73 to:

- The nearest whole number;
- 1 decimal place.

Q2

Round 1893 to:

- 1 significant figure;
- 2 significant figures.

Q3

Round 0.002999 to 3 significant figures.

Q4

BIDMAS, or the order of operations, tells us the order in which to perform a calculation. What do the letters stand for?

Q5

Which is larger, 4.73 or 4.721?

Q6

When adding decimal numbers using the column method, what must we remember?

Q7

Explain how to calculate 4.1×7.2 without using a calculator.

Q8

What is the lowest common denominator?

$\frac{2}{7}$ and $\frac{1}{4}$

A2

1 significant figure = 2000

2 significant figures = 1900

A1

nearest whole number = 5

1 decimal place = 4.7

A4

B = brackets
I = indices
D = division
M = multiplication
A = addition
S = subtraction

A3

0.00300

A6

Always line up the decimal points.

A5

Write 4.73 as 4.730.

We see that 4.730 is larger than 4.721.

A8

28

A7

Work out 41 × 72 (to get 2952). Divide the answer by 10, then 10 again. This is the same as dividing by 100 (to get 29.52).

Q9

When adding mixed number fractions, what are the main steps?

Q10

Explain how to work out $\frac{1}{5} \div \frac{2}{3}$.

Q11

To estimate the answer to 1.79 × 0.0892, what calculation would you perform?

Q12

List all the factors of 20.

Q13

A prime number is _____ .

Q14

List the first 5 prime numbers.

Q15

The general expression for writing a number in standard form is $a \times 10^n$. What are the criteria for a and n?

Q16

List all the index laws.

A10

$$\frac{1}{5} \times \frac{3}{2} = \frac{3}{10}$$

This is sometimes called “Keep, Change, Flip” or multiplying by the reciprocal of the divisor.

A9

1. Convert them into improper fractions.
2. Multiply to create a common denominator.
3. Add the numerators.
4. Convert the answer back into a mixed number fraction.

A12

1, 2, 4, 5, 10, 20

A11

2 × 0.09 (Round each number to 1 significant figure.)

A14

2, 3, 5, 7, 11

A13

A number which has exactly two factors – one and itself.

A16

$x^a \times x^b = x^{a+b}$ (add the powers)

$x^a \div x^b = x^{a-b}$ (subtract the powers)

$(x^a)^b = x^{ab}$ (multiply the powers)

$x^0 = 1$

$x^{-a} = \frac{1}{x^a}$ (the reciprocal)

A15

$1 \leq a < 10$

n is an integer.

Q17

Find $\frac{3}{5}$ of 25.

Q18

Change 0.27 into a fraction and percentage.

Q19

What is $\frac{3}{50}$ as a percentage and decimal?

Q20

Find 10% of 350.

Q21

Work out 75% of 80.

Q22

List the steps you would take to work out 12% of a number without using a calculator.

Q23

Write down the decimal multiplier that you would use to work out a 2.5% increase.

Q24

A car depreciates by 2% per annum. It cost £8000 when it was new. Ben wants to work out how much it would cost after 3 years. Fill in the gap in his calculation.

$8000 \times \_\_\_\_\_^{3}$

A18

$\frac{27}{100}$ and 27%

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A17

$25 \div 5 = 5$

$5 \times 3 = 15$

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A20

35

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A19

$\frac{3}{50} = \frac{6}{100}$

6% and 0.06

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A22

Find 10% by dividing by 10.

Find 1% by dividing by 100 (or dividing the 10% value by 10 again).

Make 12% by adding 10% and $2 \times 1\%$.

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A21

$25\% = 80 \div 4 = 20$

$75\% = 20 \times 3 = 60$

(Alternatively, you could use 25% and 50%).

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A24

0.98

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A23

1.025

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Q25

The cost of a car service increases by 10% to £540. Write down the calculation you would use to work out the cost of the car service before the increase.

Q26

Simplify 18:27

Q27

To share £72 in the ratio 2:7, you begin by dividing 72 by what number?

Q28

A recipe for 4 cupcakes requires 120g flour. How much flour would be needed in a recipe for 6 cupcakes?

Q29

What is the reciprocal of 7?

Q30

Evaluate:

a. 2^5
b. 7^2
c. $\sqrt{64}$
d. $\sqrt[3]{125}$

Q31

A number, x, rounded to 1 decimal place is 2.8. What are the upper and lower bounds of x?

Q32

Which of the following are like terms?

$3x^2$

$2x$

x^3

$4x^6$

$5x$

A26

2:3

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A25

540 ÷ 1.1

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A28

120 ÷ 4 = 30

30 × 6 = 180g

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A27

2 + 7 = 9

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A30

a. 32

b. 49

c. 8

d. 5

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A29

$\frac{1}{7}$

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A32

$2x$ and $5x$. Different powers of x are not alike.

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A31

Upper bound: 2.85

Lower bound: 2.75

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Q33

Simplify $3a \times 2b \times 4b$

Q34

Expand $2x(x + 5)$

Q35

Factorise $6x^2 + 9x$

Q36

What does factorising mean?

Q37

Explain how to factorise

$x^2 + 5x + 4$

Q38

What is the next term in this sequence? Explain how you found it.

16, 13, 10, 7

Q39

The first five terms in a sequence are 1, 6, 11, 16 and 21. Explain how you know that the number 103 will not be a term in this sequence.

Q40

What is the 12th term in the sequence with n^{th} term $4n + 3$?

A34

$2x^2 + 10x$

A33

$24ab^2$

A36

Factorising means to put an expression back into brackets.

A35

$3x(2x + 3)$

A38

4

Subtract 3 each time.

A37

This goes into two brackets. There is an x at the front of each and we find the numerical part by finding two numbers that multiply to make 4 and add to make 5. They are 1 and 4.

$(x + 1)(x + 4)$

A40

$4 \times 12 + 3 = 51$

A39

The terms only end in 1 or 6.

Q41

Find the n^{th} term of the sequence whose first 4 terms are 1, 5, 9, 13.

Q42

Alex is working out the value of $2x^2$ when $x = 3$. He writes the following:

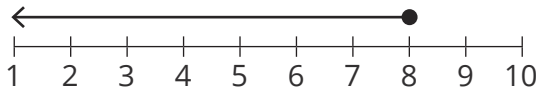
$2 \times 3 = 6$

$6^2 = 36$

What is his mistake?

Q43

Which inequality is represented on this number line?



Q44

Caleb solves the equation $2x + 5 = 37$ using the following method. What is his mistake?

$2x + 5 = 37$

$2x = 42$

$x = 21$

Q45

What is the first step in solving this equation?

$4x + 1 = x + 5$

Q46

Fill in the gaps to complete the table of values for the equation $y = 3x + 5$.

x	-1	0	3	5
y		5		

Q47

What do the m and c stand for in the equation for a straight line, $y = mx + c$?

Q48

Give the equation of a line that is parallel to $y = 4x + 5$.

A42

Alex has not used the order of operations. He should have squared 3 first to get 9, then multiplied this by 2 to get 18.

A41

$4n - 3$

A44

He adds 5 instead of subtracting it.

A43

$x \leq 8$

A46

x	-1	0	3	5
y	**2**	5	**14**	**20**

A45

Subtract x from both sides.

A48

$y = 4x + a$, where a is any number not including 5.

A47

m is the gradient of the line and c is the value of the y-intercept.

Q49

Explain how to solve a pair of simultaneous linear equations using the elimination method.

Q50

What is the subject in this equation?

$r = p + 2q$

Make p the subject.

Q51

Angles about a point sum to _____?

Q52

What do the interior angles in a trapezium sum to?

Q53

What do you know about opposite angles in a parallelogram?

Q54

List what you know about angles in parallel lines.

Q55

What are the three things you need to remember when working with bearings?

Q56

The bearing of A from B is 070°. What is the bearing of B from A?

A50

r

$p = r - 2q$

A49

1. Make sure the coefficients of either the x or y variables are the same. If not, multiply one or both equations until they are.
2. If the signs of the variable with the same coefficient are the same, subtract the equations. If not, add the equations.
3. Solve this equation.
4. Substitute the answer back into one of the original equations and solve this to find the other variable.

A52

360°

A51

360°

A54

Corresponding angles are equal (the ones that look like the letter F).

Alternate angles are equal (the ones that look like the letter Z).

Co-interior/supplementary angles sum to 180° (the ones that look like the letter C).

A53

They are equal.

A56

There is always a difference of 180° in “reverse bearings”.

70 + 180 = 250°

A55

1. Measure from the north line.
2. Measure in a clockwise direction.
3. Use 3 digits, e.g. 83° would be 083°.

Q57

What is the formula to calculate the sum of the interior angles (in degrees) in an n-sided polygon?

Q58

What is the sum of the exterior angles of a polygon?

Q59

What is a bisector?

Q60

What is the perimeter of a shape?

Q61

What is the formula for the area of a trapezium?

Q62

State the formulae for the area and circumference of a circle.

Q63

What is the formula for the volume of a prism?

Q64

What is the formula for the volume of a cuboid?

A58

360°

A57

$180(n - 2)$

A60

The total length of the sides.

A59

A bisector is a line that cuts another line or an angle in half. We construct bisectors using a ruler and a pair of compasses (and a pencil).

A62

Area = πr^2

Circumference = πd or $2\pi r$

A61

$\frac{1}{2}(a + b)h$ where a and b are the lengths of the parallel sides and h is the height between them.

A64

Volume = $l \times w \times h$
(multiply all three dimensions)

A63

Volume = area of cross-section × length

Q65

Change 3cm into mm.

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Q66

Convert 2500g into kg.

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Q67

How many lines of symmetry does a rectangle have?

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Q68

State the order of rotational symmetry of an isosceles triangle.

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Q69

What is the face of a 3D shape?

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Q70

Explain how to find the surface area of a cuboid.

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Q71

What is the formula for speed?

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Q72

How could you use Pythagoras' theorem to prove that a triangle with dimensions 6cm, 8cm and 10cm is right-angled?

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A66

2.5kg

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A65

30mm

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A68

1

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A67

2

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A70

A cuboid has 6 rectangular faces. Find the total area of all 6 faces.

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A69

One of its flat surfaces.

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A72

Find the sum of the squares of the smaller sides.

$6^2 + 8^2 = 100$

Square the remaining side.

$10^2 = 100$

Since these are equal, this triangle satisfies Pythagoras' theorem and must be right-angled.

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A71

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

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Q73

What are the three trigonometric ratios?

Q74

State the values of:

a. sin60°
b. cos45°
c. tan30°

Q75

What is the formula for the volume of a cone?

Q76

A shape has been translated by a vector $\begin{pmatrix}3\\2\end{pmatrix}$. What does this look like?

Q77

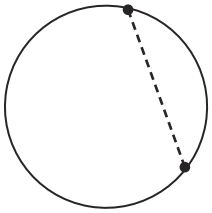
List the three things you need to include when describing a rotation.

Q78

A car travels at 45mph for 20 minutes. What calculation would you perform to find the distance travelled in miles?

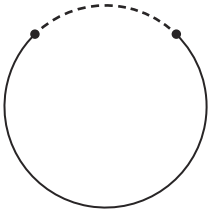
Q79

What is the name of the line that joins two points on the circumference of the circle but does not pass through the centre?



Q80

What is the name of the line that joins two points on the circumference of the circle but does not pass through the centre?



A74

a. $\frac{\sqrt{3}}{2}$

b. $\frac{\sqrt{2}}{2}$

c. $\frac{\sqrt{3}}{3}$ or $\frac{1}{\sqrt{3}}$

A73

$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$

$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}}$

$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$

A76

The shape slides 3 units right and 2 units up.

A75

$V = \frac{1}{3}\pi r^2 h$

A78

$\frac{20}{60} = \frac{1}{3}$

Distance = $45 \times \frac{1}{3} = 15$ miles

A77

1. centre of rotation
2. angle
3. direction

A80

arc

A79

chord

Q81

What is the name of the straight line that touches the circumference of the circle at a point?

Q82

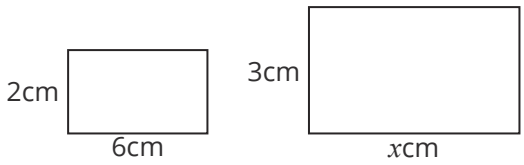
The mass of a block is 100g and its volume is 25cm^3. What is its density? Give the units to your answer.

Q83

What is the formula for pressure?

Q84

These two rectangles are similar. By working out the scale factor, find the value of x.

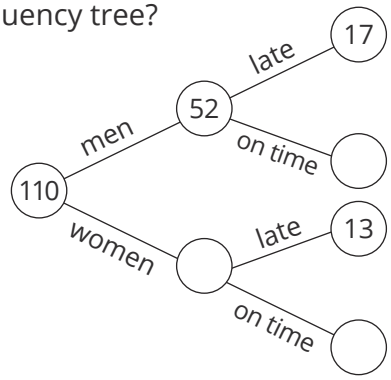


Q85

What does it mean for two shapes to be congruent?

Q86

What are the missing numbers in this frequency tree?



Q87

What kind of data is a two-way table used to present?

Q88

The key for a pictogram is shown.

 = 4 people

What frequency does the following represent?

A82

$$\text{Density} = \frac{100}{25} = 4\text{g/cm}^3$$

A81

tangent

A84

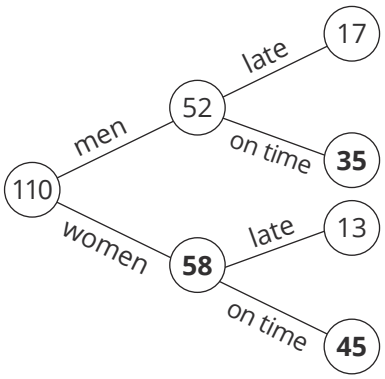
$$\text{Scale factor} = \frac{3}{2} = 1.5$$

$$6 \times 1.5 = 9\text{cm}$$

A83

$$\text{Pressure} = \frac{\text{force}}{\text{area}}$$

A86



A85

They are identical – the angles and sides in each shape are equal.

A88

14 people

A87

Bivariate data – data that uses two variables.

Q89

List the steps required to draw a pie chart.

Q90

What are the types of correlation that can be represented in a scatter graph?

Q91

True or false?

A line of best fit must pass through the origin (0, 0).

Q92

How do you plot the x-coordinates when drawing a frequency polygon?

Q93 How do you calculate an estimate for the mean from this frequency table?

Age, x, years	Frequency
$0 \leq x < 10$	3
$10 \leq x < 20$	4
$20 \leq x < 30$	7
$30 \leq x < 40$	1

Q94

A fair six-sided dice is thrown. What is the probability that it lands on a 2?

Q95

A bag contains red and green counters only. If there are 4 red and 8 green counters, what is the probability of choosing a red counter at random? Give your answer as a fraction in its simplest form.

Q96

The probability that it rains on a given day is 0.35. What is the probability that it doesn't rain?

A90

Positive correlation – as one variable increases, so does the other.

Negative correlation – as one variable decreases, the other increases.

No correlation – there is no clear relationship between the variables.

A89

1. Find the total frequency.
2. Divide 360 by this number.
3. Multiply each frequency by this new number.
4. Draw each angle carefully and label each sector.

A92

Use the midpoint of each interval.

A91

false

A94

$\frac{1}{6}$

A93

Find the midpoints of the intervals.

Multiply these values by the frequency to calculate fx.

Divide the sum of these values by the total frequency: $\frac{\sum fx}{\sum f}$

A96

$1 - 0.35 = 0.65$

A95

$\frac{4}{12} = \frac{1}{3}$

Q97

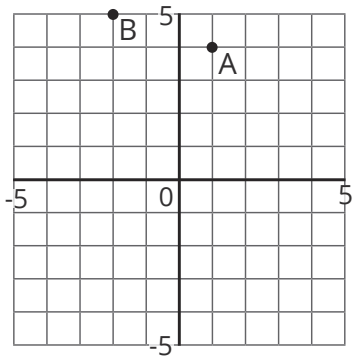
Two coins are flipped. They can land on heads(H) or tails (T). What are all the possible outcomes?

Q98

Describe how to find the:

- mode
- median
- mean
- range

Q99



What are the coordinates of the points A and B?

Q100

There are n paperclips in a pot. How many paperclips are there in 5 of the same pot?

Q101

A tree grows by x centimetres per day. If it measures 120cm at the start, how tall is it after 15 days? Give your answer in centimetres.

Q102

Charlie shares £80 equally between y friends. Give an expression for the amount, in pounds, that each friend gets.

A98

- **Mode** – the most common value or values.
- **Median** – the middle number when they are in order.
- **Mean** – add up all the values and divide by how many there are.
- **Range** – the difference between the largest and smallest value.

A97

HH, TH, HT or TT.

A100

$5n$

A99

A (1, 4) and B (-2, 5).

A102

$£\frac{80}{y}$

A101

$(120 + 15x)$cm