KS3 MATHEMATICS

10 4 10

Level 6 Answers

Day 1

Mental Arithmetic Questions

1. What number is five cubed?

$5^3 = 5 \times 5 \times 5$

$= 25 \times 5 =$ **125**

2. A circle has radius *r*.

What is the formula for the area of the circle?

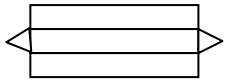
Area = pi x radius x radius

$= \pi r^2$ Learn this!

3. Jenny and Mark share some money in the ratio two to three. Jenny's share is one hundred and ten pounds. How much is Mark's share?

	Jenny	:	Mark
x 5	2	:	3
x 10	10	:	15
	100	:	150
100 +10	110	:	**165**

4. The net of a triangular prism is made from triangles and rectangles. How many of each shape are needed?



3 rectangles
2 triangles

5. Multiply minus six by minus two.

12

2x6 = 12
-2x6 = -12
2x-6 = -12
-2x-6 = 12

Advert

You can work out the cost of an advert in a newspaper by using this formula:

C = 15*n* + 75

C is the cost in pounds

n is the number of words in the advert

Remember 15n means 15 multiplied by number of words in the advert

(a) An advert has **18 words**.

Cost = 15 x number of words + 15
Cost = (15x 18) + 75
Cost = £270.00 + 75
Cost + £345.00

COMMON ERROR
An incorrect answer was to add 18 + 75 to give an answer of 93. Pupils not understood the meaning of 15n.

(b) The cost of an advert is **£615**

How many words are in the advert?

Show your working.

- This time we are told the final cost is £615.
- Work in reverse order – inverse
- The last operation in part (a) was + 75, the inverse is –75
- 615 – 75 = 540.
- The inverse of 15n (multiply by 15) is divide by 15
- 540 ÷ 15 = 36
- **There are 36 words in the advert**

COMMON ERROR
An incorrect answer was 540. Pupils subtracted 75 from 615 and ignored division by 15.

Toys

The cost of an old toy vehicle depends on its condition and on whether it is in its original box.

Condition	Value
excellent, and in its box	100%
good, and in its box	85%
poor, and in its box	50%
excellent, but not in its box	65%
good, but not in its box	32%
poor, but not in its box	15%

A Mail Van in excellent condition, and in its original box, costs **£125**.

(a) How much is a Mail Van in **good** condition, and in its box?

100% = £125
10% = £12.50
5% = £6.25

SO
15% = £18.75 (£12.50 + £6.25)
85% (GOOD CONDITION AND IN BOX) = £125 - £18.75 = £106.25

Calculator method.
85% of 125
= 0.85 x 125
= £106.25

(b) How much is a Mail Van in **good** condition, **but not in its box**?

Calculator Method
100% = £125
32% of £125
0.32 x £125 = £40

(c) A Petrol Tanker in excellent condition, and in its box, costs £152.
Another Petrol Tanker should be sold for £98.80
Using the chart above, what is its condition and does it have a box?

We are looking for a percentage as an answer.

$$\frac{\text{Selling price of petrol tanker}}{\text{Original price of petrol tanker}} = \frac{£98.80 \times 100\%}{£152}$$

This gives an answer of 65%
Using the table at the start of the question the petrol tanker is **EXCELLENT, BUT NOT IN IT'S BOX.**

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Level 6 Answers

Day 2

Mental Arithmetic Questions

1. What is one third of three-quarters of one hundred?

¼ of100 = 100 ÷ 4 = 25
¾ of 100 = 3 x 25 = 75
$^1/_3$ of 75 = 75 ÷ 3 = **25**

2. I'm thinking of a number. I call it n. I square my number then add four. Write an expression to show the result.

Start with n to represent your number.
Square it …n^2
Then add 4… **$n^2 + 4$**

3. Twenty-one out of thirty-six pupils said they watched Top of the Pops. What angle would show this on a pie chart?

360 ÷ 36 = 10° represents 1 person
21 x 10 = 210 so the angle is **210°**

4. There are seven red and three blue balls in a bag. I am going to take a ball out of the bag at random. What is the probability that the ball will be blue?

Total number of balls = 7 + 3 = 10

Probability (blue ball) = 7 out of 10 = $^7/_{10}$ **= 0.7**

5. Write a multiple of three that is bigger than one hundred.

Keep adding the digits of your number until you have a one-digit number. If it is 3, 6 or 9 then your number **<u>is</u>** a multiple of 3

Area

The information in the box describes three different squares, A, B and C.

Area of square = length x length

The **area** of square A is **36 cm²**

The **side length** of square B is **36 cm**

The **perimeter** of square C is **36 cm**

A square has 4 equal side lengths. So, 36 ÷ 4 = 9

You need to work out the side length in C.

Put squares A, B and C in order of size, starting with the smallest. You **must** show calculations to explain how you work out your answer.

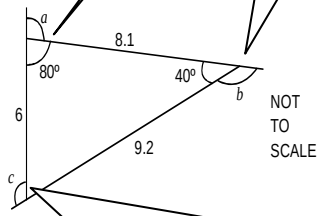
Show how you work out the area for square B and C.
Area A = 36cm² .....given
Area B = 36 x 36 = 1296cm²
Area C = 9 x 9 = 81cm²

....A..... ..C..... ...B....
smallest largest

Angles

Angles on a straight line add up to 180°

Kay is drawing shapes on her computer.
She wants to draw this triangle. She needs to know angles *a, b* and *c*.



Calculate angles *a*, *b* and *c*.

a = ...100

b = ...140°

c = ... .120°

Angles in triangle add up to 180°. (angle next to c is 180° - 80° - 40° = 60°. So c = 180° - 60° = 120°.)
OR
The exterior angle of triangle is equal to the sum of the 2 opposite interior angles. (c = 80° + 40° = 120°)

A rhombus has 2 pairs of parallel sides. Mark them on the diagram.

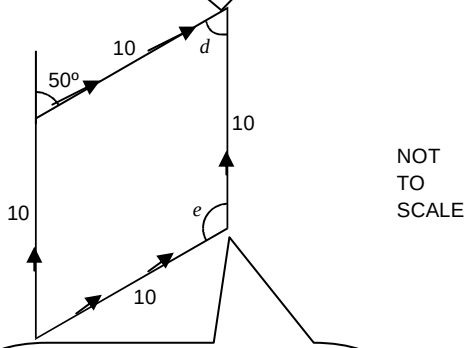
(b) Kay draws a rhombus:

Calculate angles *d* and *e*.

d = ...50 °

e = ...130 °

Find an angle that is alternate (Z angle) to d. Alternate (Z) angles are equal.



d and e are interior angles. Interior angles inside parallel lines add up to 180°.

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Level 6 Answers

Day 3

Mental Arithmetic Questions

1. I am thinking of a number. I call it *n*.
   I double my number then I subtract three. Write an expression to show the result.

'Think of a number' n
'I double my number' 2n
'Then I subtract three' **2n - 3**

2. What percentage of fifty pounds is thirty-five pounds?

Equivalent Fractions

$\frac{35}{50} = \frac{?}{100}$ x2 $\frac{35}{50} = \frac{70}{100}$ **= 70%**

3. On average, the driest place on earth gets only nought point five millimetres of rain every year. In total, how much rain would it expect to get in twenty years?

20 x 0.5 = 10 **10 mm**

4. To the nearest whole number, what is the square root of eighty-three point nine?

√100 = 10
√81 = 9
√83.9 is nearest to **9**

The nearest square number to 83.9 is 81

5. It takes me one and a half minutes to swim one length of the pool. How many lengths can I swim in fifteen minutes

no. of lengths = 1 x 10 = **10**

Length	:	Minutes
1	:	1.5
?	:	15

x 10

Sheep and Lambs

On a farm **80** sheep gave birth.

30% of the sheep gave birth to two lambs.
The rest of the sheep gave birth to just one lamb.

In total, how many lambs were born?
Show your working.

30%
2 Lambs

10% of 80 sheep = 8 sheep
30% of 80 sheep = 8 x 3 = 24
so
24 sheep have 2 Lambs which makes 48 Lambs altogether.

70%
1 Lamb

10% of 80 sheep = 8 sheep
70% of 80 sheep = 8 x 7 = 56
so
56 sheep have 1 Lamb

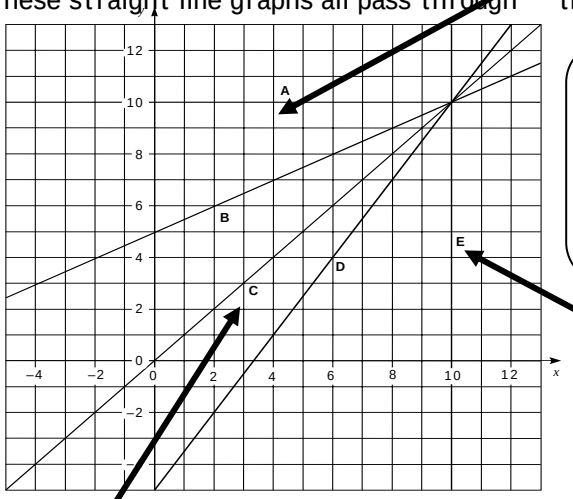
ANSWER

ALTOGETHER
48 + 56 = 104 LAMBS

Equations

Some points/coordinates on line A are (0,10); (4,10); (8,10) y coordinate stays the same.

These straight line graphs all pass through the point (10,10)



This question is about graphs
Y = m x + c

This is the y intercept, the point at which the straight line meets the y axis

GRADIENT

Some points/coordinates on line E are (10,1); (10,6)
(10,10) *x* coordinate stays the same

a.) Fill in the gaps to show which line has which equation

Some points/coordinates on line C are: (2,2); (10,10); (-3,-3). Notice that the first coordinate is the same as the last coordinate. This means the x coordinate is the same as the y coordinate x = y; y = x

Line .....E..... has equation x = 10

Line .....A..... has equation y = 10

Line .....C..... has equation y = x

Line .....D..... has equation $y = \frac{3}{2}x - 5$

Line .....B..... has equation $y = \frac{1}{2}x + 5$

b.) Does the line that has the equation y = 2x – 5 pass through the point (10,10)?

Explain how you know

Using the coordinate pair (10,10); x = 10 and y = 10.
In the equation y = 2x – 5 we can replace y with 10 and x with 10 to give 10 = (2 x 10) – 5 so the equation becomes 10 = 20 – 5
20 – 5 = 15 this is not equal to 10 so the equation does not pass through the point (10, 10)

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Level 6 Answers

Day 4

Mental Arithmetic Questions

1. Tariq won one hundred pounds in a maths competition. He gave two-fifths of his prize money to charity. How much of his prize money, in pounds, did he have left?

Money left is $\frac{3}{5}$ of the £100

$\frac{1}{5}$ of 100 = 100 ÷ 5 = £20 so $\frac{3}{5}$ of 100 = 3 x £20

= **£60**

2. What is three point nine divided by two?

39 ÷ 2 = 19.5

so 3.9 ÷ 2 = **1.95**

3. The instructions for a fruit drink say to mix one part blackcurrant juice with four parts water. I want to make one litre of this fruit drink.
How much blackcurrant juice should I use? Give your answer in millilitres.

Blackcurrant	:	Water	:	Fruit drink
1	:	4	:	5
?	:		:	1000

So amount of blackcurrant is 1 x 200 = **200 ml**

4. What is half of two-thirds?

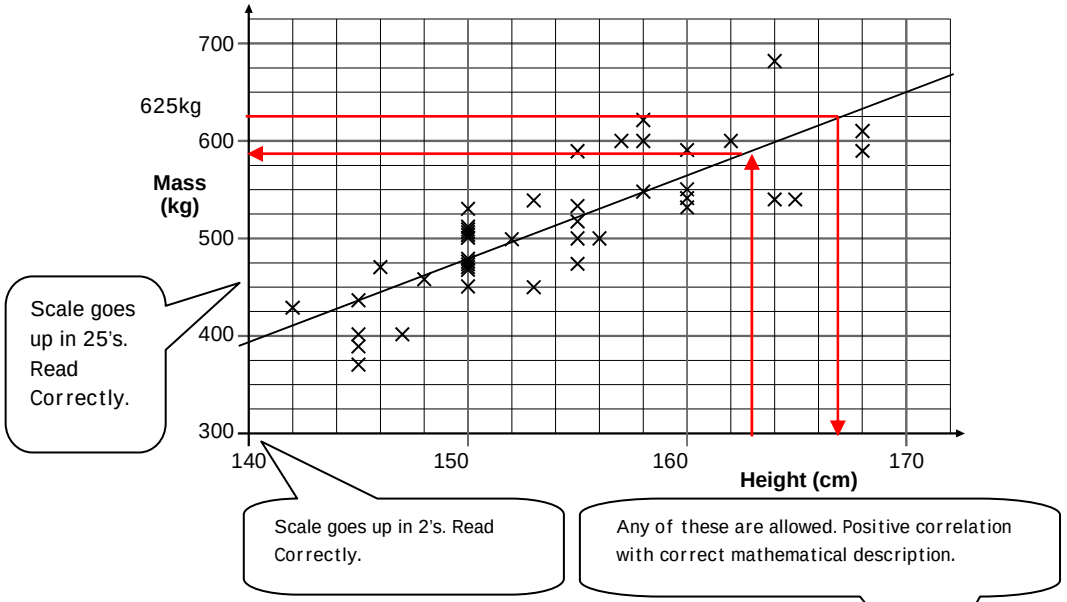
$\frac{2}{3} \div 2 = \frac{\mathbf{1}}{\mathbf{3}}$

5. The population of the United Kingdom is about fifty-nine million.
Write this number in figures.

59 000 000

Horses

The scatter diagram shows the heights and masses of some horses. The scatter diagram also shows a line of best fit.



(a) What does the scatter diagram show about the **relationship** between the height and mass of horses?

Taller horses tend to be heavier *OR* smaller horses are lighter *OR* as one goes up so does the other *OR* positive correlation

(b) The **height** of a horse is **163cm**.
Use the line of best fit to estimate the mass of the horse.

Any value between 580 and 585kg allowed.

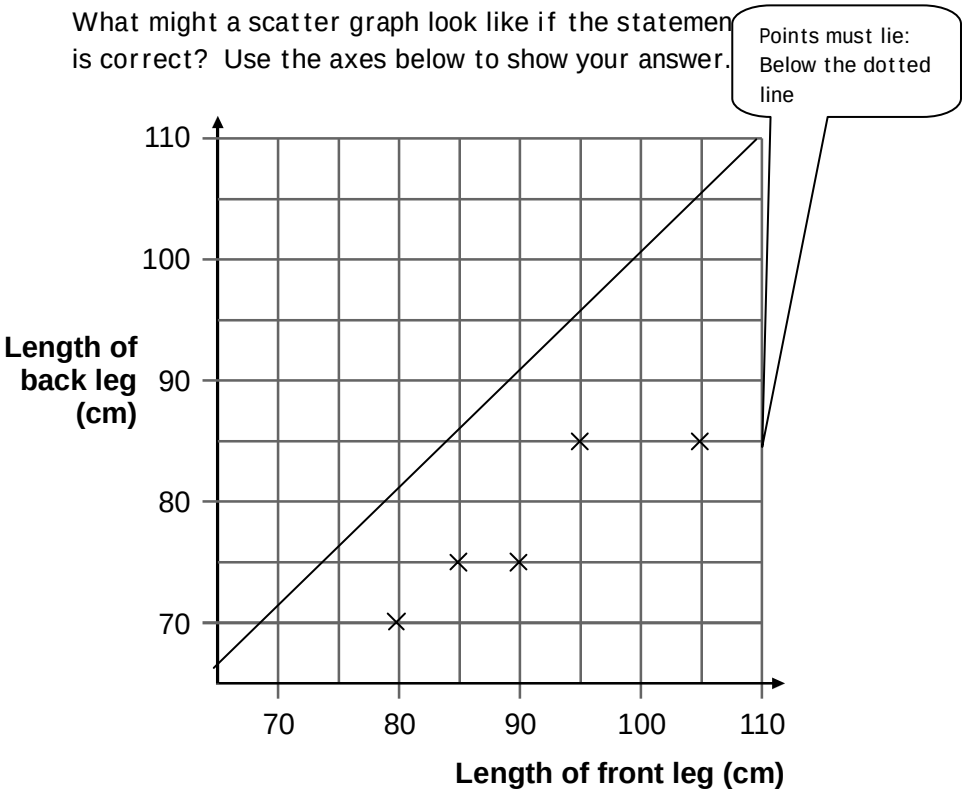
(c) A different horse has a **mass of 625kg**.
Use the line of best fit to estimate the height of the horse.

167cm

(d) A teacher asks his class to investigate this statement:

"The length of the **back leg** of a horse is **always less than** the length of the **front leg** of a horse."

What might a scatter graph look like if the statement is correct? Use the axes below to show your answer.

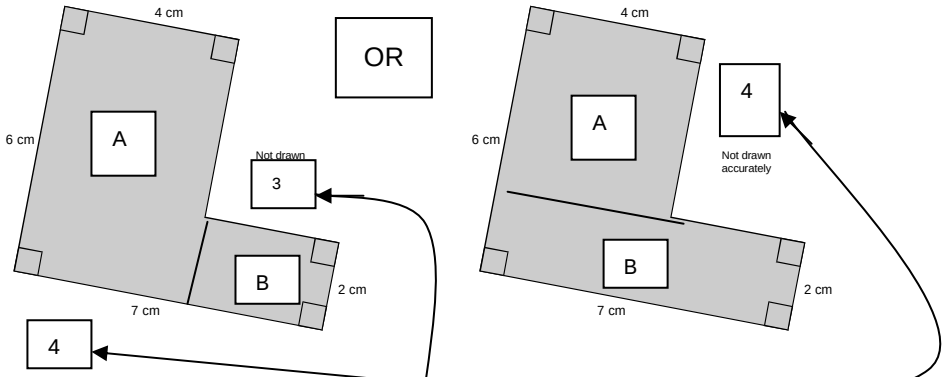


e.g. (front leg, back leg)
(80, 70)
(85, 75)
(90, 75)
(95, 85)
(105, 85)

L-shape

What is the area of this L-shape?
Show your working.

You need to divide the shape into 2 rectangles.



Mark the missing lengths on each

Area A = 6 X 4
= 24 cm^2
Area B = 2 X 3
= 6cm^2
Total area = 24 + 6
= 30cm^2

Area A = 4 X 4
= 16 cm^2
Area B = 2 X 7
= 14cm^2
Total area = 14 + 16
= 30cm^2

.....30..... cm^2

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Level 6 Answers

Day 5

Mental Arithmetic Questions

1. What is three-fifths of forty pounds?
   One fifth (£40 ÷ 5) = £8
   Three fifths (£8 x 3) = £24

2. The longest bone in the human body is in the leg. The average length of this bone in a man is fifty centimetres. In a woman it is ten per cent less. What is the average length of this bone in a woman?
   10% of 50cm (50 ÷ 10) = 5cm
   Woman's bone = 50cm – 5cm
   = 45cm

3. Using three as an approximation for pi, what is the area of a circle with radius five centimetres?
   Area = 3 x 5^2
   = 3 x 25
   = 75 cm^2

   Learn this
   Area = πr^2

4. I am thinking of a two-digit number that is a multiple of eight. The digits add up to six. What number am I thinking of?
   Multiples of 8: 8, 16, 24, 32, 40
   Which digits in each multiple add up to 6?
   Answer = 24

5. I am thinking of a number. I call it *n*. I add five to my number.
   Write an expression to show the result.
   Answer: n + 5

Fractions

(a) Add $\frac{6}{10}$ and $\frac{6}{5}$

Both fractions must have the same DENOMINATOR

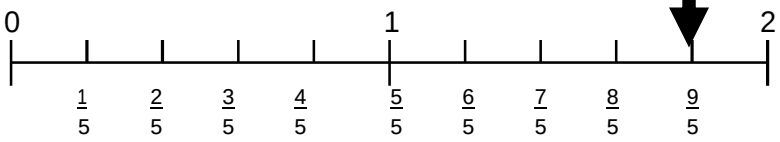
$\frac{6}{10} = \frac{3}{5}$

This becomes $\frac{3}{5} + \frac{6}{5}$

$\frac{9}{5} = 1\frac{4}{5}$

Now use an arrow (↓) to show the result on the number line.

Notice the line is scaled in fifths



(b) How many **sixths** are there in $3\frac{1}{3}$?

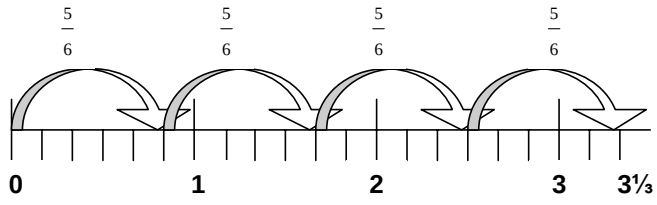
How many sixths are there in 1 whole?

$\frac{6}{6}$ or 6 sixths in 1 whole

so 18 sixths in 3 whole.

(c) Work out $3\frac{1}{3} \div \frac{5}{6}$

Show your working.

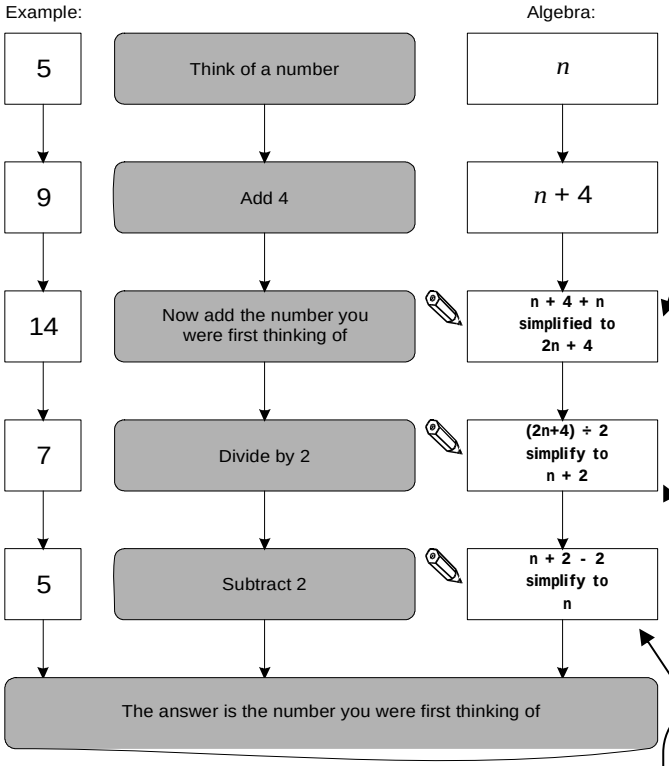


Answer = 4

Puzzle

You can often use algebra to show why a number puzzle works.
Fill in the missing **expressions.**

This is an example with numbers.



Take the last answer n+4 and add n NOT 5

Take the last answer 2n+4 and divide everything by 2

Previous answer is n+2; now subtract 2 to give n+2-2. Simplify to give the answer n NOT 5- Remember 5 is just an example

KS3 MATHEMATICS

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Level 6 Answers

Day 6

Mental Arithmetic Questions

1. Five percent of a number is 8. What is the number?
   5% = 8
   10% =16
   100% = 160

2. A fair spinner has eight equal sections with a number on each section. Five of them are even numbers. Three are odd numbers. What is the probability that I spin an even number?

Probability = $\frac{5}{8}$ — **5 even numbers on the spinner**; **8 equal sections of numbers on spinner**

3. I can make a three-digit number from the digits two, three and four in six different ways. How many of these three-digit numbers are even?
   234 **324** 423
   243 **342** **432** **Even in bold**

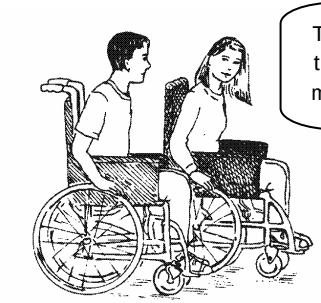
4. What is the volume of a cuboid measuring five centimetres by six centimetres by seven centimetres?
   Volume = length x breadth x height
   = 5cm x 6cm x 7cm
   = 210 cm³

5. What is the remainder when you divide three hundred by twenty-nine?

   10 x 29 = 290 Therefore remainder is 10 (300 – 290)

Wheelchair

Wyn and Jay are using their wheelchairs to measure distances.



The **circumference (C)** is the distance the wheel moves in one revolution

Formula:
C = π x d
(π = 3.142)
You need to learn this formula

(a) The large wheel on **Wyn's** wheelchair has a **diameter** of **60cm.** Wyn pushes the wheel round **exactly** once.

Calculate how far Wyn has moved. Show your working.

C = π x d

= 3.142 x 60

= 188.52

.....188.52 ..... cm

(b) The large wheel on **Jay's** wheelchair has a **diameter** of **52cm.** Jay moves her wheelchair forward **950cm.**

C = π x d = 3.142 x 52 = 163.28

You need to work out the circumference first.

Calculate how many times the large wheel goes round.
Show your working.

950 ÷ 163.28 = 5.8182264

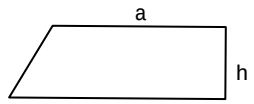
Find how many times the circumference fits into the distance forward.

Any would be acceptable

or. 5.8 or 5.82 or 6..... times

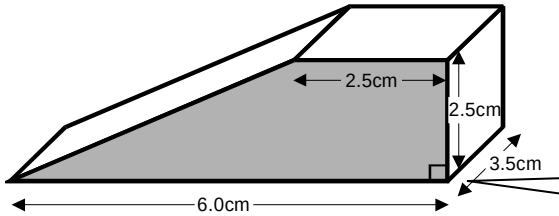
Wedges

Formula:
Area = $\frac{(a+b)}{2}$ x h



You need to learn this formula

This door wedge is the shape of a prism.



NOT TO SCALE

The shaded face is called the ***cross-section***.

(a) The shaded face of the door wedge is a trapezium.

Calculate the area of the shaded face.

Show your working.

$\frac{(2.5 + 6.0)}{2}$ x 2.5

= $\frac{8.5}{2}$ x 2.5

= 4.25 x 2.5 = 10.625

10.625..... cm²

(b) Calculate the volume of the door wedge.

Show your working.

10.625 x 3.5 = 37.1875

Formula:
Volume = area of **Cross-section** x depth
You need to learn this formula

37.1875 or 37 or 37.2 or 37.19cm³

Any would be acceptable

KS3 MATHEMATICS

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Level 6 Answers

Day 7

Mental Arithmetic Questions

1. Twenty-five per cent of a number is seven.
   What is the number?

   25% = 7
   50% = 14
   Therefore 100% = 28

2. There are fourteen girls and thirteen boys in a class.
   What is the probability that a pupil chosen at random will be a girl?

   Probability = $\frac{14}{27}$

   14 – Total number of girls
   27 – Total number of boys and girls

3. The first even number is two.
   What is the hundredth even number?

   Answer 200

4. The mean of two numbers is 8. One of the numbers is two. What is the other number?

   Mean = 8, Total of 2 numbers is 16 because 16 ÷ 2 = 8
   If one of the numbers is 2 then the other number must be 14 (16 – 2)

5. How many edges are there on a square based pyramid?

   Base has 4 edges (square) it also has 4 vertices which each in turn join to form the peak of the pyramid (another 4 edges. Total number of edges is 8.

Number Cards

James has these four number cards:

1	8	5	2

The **mean** is 4

(1 + 8 + 5 + 2) ÷ 4
16 ÷ 4 = 4

1	8	5	2	?

(1 + 8 + 5 + 2 + ?) ÷ 5 = 4
Bracket must = 20
16 + ? = 20
? = 4

James takes another card. The mean of the five cards is still 4. What number is on his new card? 4

(b)Tara has these four number cards:

10	3	2	5

You have to work out the mean of the four cards first.

Mean = (10 + 3 + 2 + 5) ÷ 4
= 20 ÷ 4
= 5

She takes another card. The mean goes **up** by **2.** What number is on her new card?

10	3	2	5	?

(10 + 3 + 2 + 5 + ?) ÷ 5 = 7
total must be 35
20 + ? =35
? = 15

Show .....

15

(c) Ali has six cards. The **mean** of the six cards is **10**. The **range** of the six cards is **4**.

What are the numbers on the other two cards?

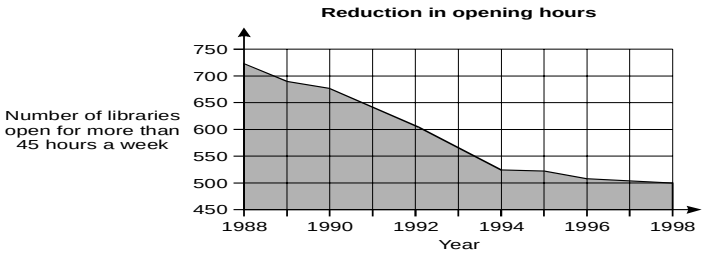
RANGE is the highest subtract the lowest.

You need **2** numbers with a difference of 4 and a total of 20

10	10	10	10	?	?

(10 + 10 + 10 + 10 + ?+ ?) ÷ 6 = 10
total must be 35
(40 + ? + ?) = 60
? + ? = 20
As the range is 4, these numbers cannot be the same

A newspaper wrote an article about public libraries in England and Wales. It published this diagram.



Data on libraries from LISU (Library and Information Statistics Unit)
Use the diagram to decide whether each statement below is true or false, or whether you cannot be certain.

(a) The number of libraries open for more than 45 hours per week **fell by more than half** from 1988 to 1998. Explain your answer.

☐ True ☑ False ☐ Cannot be certain

1988 about 725. ½ of this is about 362.
1998 is 500 which is **more** than 362.
Or it only dropped from 725 to 500, it should have dropped to about 360.

You only get the mark for the explanation. Make sure the scale is read correctly.

(b) **In 2004** there will be **about 450 libraries** open in England and Wales for more than 45 hours a week.

☐ True ☐ False ☑ Cannot be certain

Explain your answer.

You cannot predict because:
Data for 2004 is not given
The trend might change
There is not enough information given

You only need 1 reason for the mark. Remember you cannot assume anything unless it is given on a graph.

KS3 MATHEMATICS

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Level 6 Answers

Day 8

Mental Arithmetic Questions

1. Multiply 8.7 by 2

   Think about doubling

   8.7 x 2 = **17.4**

2. A bat flies at an average speed of 32 kilometres an hour. At this speed, how far will it fly in 15 minutes?

   ¼ of 32 = 32 ÷ 4

   32 ÷ 4 = **8 km**

   Remember 15 mins is ¼ of an hour

3. Multiply the brackets (2x + 1) (x – 1)

   (2x + 1) (x – 1)

   = $2x^2$–x–1

   OR use a multiplication grid

   (2x + 1)(x - 1)

   $2x^2$ - 2x + x - 1

   = $2x^2$ – x – 1

4. I'm thinking of a number. I call it t. I half it and subtract five. Write an expression to show the result.

   t ÷ 2 – 5 **or** $\frac{t}{2}$ **-5**

5. The first odd number is 1. What is the hundredth odd number?

   199

   2 x 100 – 1 = 199

Equations

Solve these equations.
Show your working.

8*k* - 1 = 15

OR use matched number line

- **16 – 1 = 15, so 8k must equal 16**
- **8 x 2 = 16, so k must equal 2**

k = ...2

2*m* + 5 = 10

- **5 + 5 = 10, so 2m must equal 5.**
- **2 x 2 ½ is 5, so m must equal 2 ½**

m = ...2 ½ .

3*t* + 4 = *t* + 13

- **Partition 3t + 4** to make 2t + t + 4
- This gives 2t+t+4 = t + 13
- Remove t from both sides thus keeping the equation balanced.
- 2t + 4 = 13
- 9 + 4 = 13, so 2t = 9
- t = 4 ½

t = ...4 ½

2(3*n* + 7) = 8

METHOD 1

- 2x4=8. This means that 3n+7 is equal to 4 and can be written like this 3n+7=4
- -3+n=4 which means that 3n=-3 i.e. 3xn=-3
- n= -1

METHOD 2

- Multiply everything in the bracket by 2. This gives 2x3n+2x7 = 8
- → 6n+14 = 8
- Subtract 14 from both sides to give 6n+14-14 = 8-14
- → 6n+-6, 6xn=-6 so n = -1

n = ...- 1

Sibling ages

Paul is 14 years old.
His sister is exactly **6 years younger**, so this year she is 8 years old.

This year, the ratio of Paul's age to his sister's age is **14 : 8**
14 : 8 written as simply as possible is **7 : 4**

(a) When Paul is **21**, what will be the ratio of Paul's age to his sister's age?
Write the ratio as **simply** as possible.

21-6 = 15 so Paul's sister is 15 years old

Ratio
Paul : **Sister**
21 (÷ 3): 15 (÷ 3)
simplifies to
7 : 5

(b) When his sister is **36**, what will be the ratio of Paul's age to his sister's age?
Write the ratio as **simply** as possible.

Paul : **Sister**
? : 36
Paul's age is 6 more than his sister, so his age must be 42.
42 (÷6) : 36 (÷6)
7 : 6

(c) Could the ratio of their ages ever be **7 : 7**?
Tick (✓) Yes or No.

Yes ☐ No ☑

Explain how you know.

7:7 implies that the ages will be the same at some point in their life. This is **NOT** true.
They will never be the same age as Paul is always six years older.

KS3 MATHEMATICS

10 4 10

Level 6 Answers

Day 9

Mental Arithmetic Questions

1. Add four to minus five.

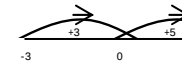
- 5 + 4 = **-1**

Think of a number line

2. What number should you add to minus three to get the answer five?

-3 + **8** = 5

Think of a number line again



3. How many nought point fives are there in ten?

10 ÷ 0.5 = **20**

Remember 0.5 = ½
20 x ½ = 10

4. On average, the driest place on earth gets only nought point five millimetres of rain every year.
In total, how much rain would it expect to get in twenty years?

0.5 x 20 = **10 mm**

5. What is the sum of the angles in a rhombus?

360°

A rhombus is a quadrilateral. All quadrilaterals have an angle sum of 360°

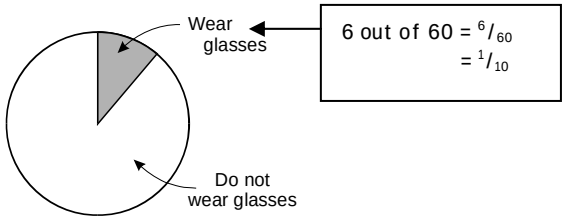
Glasses

Find the fraction for 'wear glasses'. Total angles = 360°

There are **60 pupils** in a school.

6 of these pupils wear glasses.

(a) The pie chart is not drawn accurately.



6 out of 60 = $^{6}/_{60}$ = $^{1}/_{10}$

What should the angles be?
Show your working.

Angle for **glasses** is $\frac{1}{10}$ of 360 = 36°

Angle for no glasses is 360 – 36 = 324

….**36°**... and ……**324°**...

(b) Exactly **half** of the 60 pupils in the school are boys.

From this information, what **percentage of boys** in this school **wear glasses**?

Tick (✓) the correct box below.

5%	☐	6%	☐	10%	☐		
20%	☐	50%	☐	not possible to tell	☐		

The 6 pupils who wear glasses could **all** be girls. We don't have enough information about who wears

Light Bulbs

Take care with decimals.
Remember:
- Probabilities must add up to 1.
- 0.09 + 0.03 is 0.12 NOT 0.012.

The state of the company's machines can be:

available for use and being used

or available for use but not needed

or broken down.

(a) The table shows the probabilities of the state of the machines in July 1994.

Write in the missing probability.

State of machines: July 1994	Probability
Available for use, being used	**0.88**
Available for use, not needed	0.09
Broken down	0.03

1 – (0.09 + 0.03)
= 1 – 0.12

Can be available and being used OR available and not needed.

(b) During another month the probability of a machine being available for use was 0.92.
What was the probability of a machine being broken down?

.... **0.08**.....

Brightlite calculated the probabilities of a bulb failing within 1000 hours and within 2000 hours. Complete the table below to show the probabilities of a bulb still working at 1000 hours and at 2000 hours.

Time	Failed	Still working
At 1000 hours	0.07	**0.93**
At 2000 hours	0.57	**0.43**

1 – 0.07 = 0.93

1 – 0.57 = 0.43

(c)

KS3 MATHEMATICS

10 4 10

Level 6 Answers

Day 10

Mental Arithmetic Questions

1. It takes someone one and a half minutes to swim the length of the pool. How many lengths can I swim in 15 minutes?

10 x 1.5 = 15
So 15 ÷ 1.5 = 10

15 ÷ 1 ½
= 15 ÷ 1.5
=10 lengths

2. Multiply minus eight by minus three.

-8 x -3 = **24**

8x3 = 24
- 8x3 = -24
8x-3 = -24
-8x-3 = 24

3. If 4x + 3 = 23, what is the value of x?

23 – 3 = 4x
20 = 4x
20 ÷ 4 = x
x = 6

OR use matched line

4. I have a fair eight sided dice numbered 12 to 19. What is the probability that I will throw a prime number?

P(prime number) = $^{3}/_{8}$

Remember a prime number has only 2 factors, itself and 1.
Possible primes are 13, 17 & 19.

5. What must I multiply n squared by to get n cubed?

$n^2 = n \times n$
$n^3 = n \times n \times n$
so $n^2 \times$ **n** $= n^3$

Hedging

A garden centre sells plants for hedges.
The table shows what they sold in one week.

Plants	Number of plants sold	Takings
Beech	125	£212.50
Leylandii	650	£2437.50
Privet	35	£45.50
Hawthorn	18	£23.40
Laurel	5	£32.25
Total	**833**	**£2751.15**

(a) What percentage of the total number of plants sold was **Leylandii**?

Show your working.

$$\frac{\text{Number of Leylandii}}{\text{Total number of plants}} \times 100$$

$$= \frac{650}{833} \times 100$$

= 78.03%
rounds to 78%

(b) What percentage of the **total takings** was for Leylandii? Show your working.

$$\frac{\text{Total takings for Leylandii}}{\text{Total number of plants}} \times 100 = \frac{2436.50}{2751.15} \times 100$$

= 88.6%

(c) Which is the **cheaper** plant, Beech or Privet?

One beech = £212.50 ÷ 125 plants = £1.70
One privet plant = £45.50 ÷ 35 plants = £1.30
(so privet is the cheapest)

Work out the cost of one beech plant and one privet plant

Algebra Pairs

(a) Join pairs of algebraic expressions that have the **same value** when ***a* = 3**, ***b* = 2** and ***c* = 6**

This is very important
a = 3. b = 2. c = 6

One pair is joined for you.

ab means a x b. Substitute
A = 3 and b = 2 becomes 3 x 2 = 6

ab

3c means 3 x c. Substitute c = 6 3 x 6 = 18

$3c$

$3c - 2b$

This means (3xc) – (2xb) Substitute C = 6 and b = 2 so (3x6) – (2x2) 18 – 4 = 14

2c + b means (2xc) + b. Substitute c=6 and b=2 so (2x6) + 2 = 14

$2c + b$

$2a$

2a means 2 x a. Substitute a = 3 2 x 3 = 6

a^2 means axa. Substitute a=3, 3x3 = 9

a^2

$a + c$

Substitute a=3 and c=6 so 3+6 = 9

(b) Draw lines to join any pairs that will always have the **same value** when ***a* = *b* = *c***

Replace b with a so ab becomes aa to make a x a = a^2

ab

IMPORTANT a = b = c. Replace All letters with **a** because they all have the same value.

Replace c with a so 3c becomes 3a

$3c$

$3c - 2b$

Replace c and b with a. So 2c + b becomes 2a + a which simplifies to 3a

$2c + b$

Replace c and b with a, so 3c-2b becomes 3a – 2a = a.

This is **THE ODD ONE OUT**

$2a$

Replace c with a so a+c becomes a+a which simplifies to 2a

a^2

$a + c$