Key Stage 3 🡪 4

**Mathematics**

Summer Holiday

Intervention Resources

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Week 1: Pie Charts

Week 2: Averages

Week 3: Long multiplication

Week4: Long division

Week 5: Using timetables

Week 6: Percentages and fractions of amounts

**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Week 1 – Pie Charts**

**Method: work out what you need to multiply the TOTAL by to get 360°**

171°

84°

66°

39°

Example:

Pupils were asked what their favourite flavour of ice cream was.

The results were put in a table.

Draw a pie chart to show this data.

|  |  |  |
| --- | --- | --- |
| Flavour | No. of pupils | Angle |
| Strawberry | 57 |  |
| Toffee | 13 |  |
| Vanilla | 22 |  |
| Chocolate | 28 |  |
| Total |  |  |

**Solution**

Total = 57 + 13 + 22 + 28 = 120

Multiplier = 360 ÷ 120 = 3

|  |  |  |  |
| --- | --- | --- | --- |
| Flavour | No. of pupils | Working out | Angle |
| Strawberry | 57 | **57 x 3** | **171** |
| Toffee | 13 | **13 x 3** | **39** |
| Vanilla | 22 | **22 x 3** | **66** |
| Chocolate | 28 | **28 x 3** | **84** |
| Total | **120** |  | **360** |

If your working out is correct the angle column total will be 360°



Put you protractor as shown

Measure your angles going clockwise using the scale on the outside of the protractor. Turn your protractor as you go along.

**Questions**

**1.** The table shows information about 40 fruit trees.

|  |  |
| --- | --- |
| **Type of fruit tree** | **Number of trees** |
| apple | 12 |
| plum | 5 |
| pear | 14 |
| peach | 9 |

 Draw an accurate pie chart to show the information in the table.



(4)

**2.** Sam recorded the colours of cars parked at his school yesterday.
The table shows his results.

|  |  |  |
| --- | --- | --- |
| **Colour** | **Frequency** |  |
| Blue | 20 |  |
| Red | 22 |  |
| Green | 6 |  |
| White | 12 |  |

 Complete an accurate pie chart to show this information.

 Use the circle given below.



(4)

**Week 2 – Averages**

**MODE** Most common value of data

**MEDIAN** Middle value once the date is in numerical order.

**MEAN** Total of the date ÷ number of pieces of data

**RANGE** Biggest value – Smallest value

**Frequency Table**

This is when the data is been tallied together to give a frequency.

|  |  |  |
| --- | --- | --- |
| **Age of football players** | **Frequency** |  |
| 11 | 7 |  |
| 12 | 15 |  |
| 13 | 20 |  |
| 14 | 8 |  |
| **Total** | **50** |  |

This table shows that there were:

 Seven children who were aged 11, so their ages add up to

11 + 11 + 11 + 11 + 11 + 11 + 11 = 77

A quicker way to get the total would be to do 11 x 7 = 77

|  |  |  |
| --- | --- | --- |
| **Age of football players** | **Frequency** | **Subtotal** |
| 11 | 7 | **11 x 7 = 77** |
| 12 | 15 | **12 x 15 = 180** |
| 13 | 20 | **13 x 20 = 260** |
| 14 | 8 | **14 x 8 = 112** |
| **Total** | **50** | **269** |

Mean age = total of ages ÷ number of players

 = 269 ÷ 50

 = 12.58 years

**Questions**

**1.** Chloe made a list of her homework marks.

4 5 5 5 4 3 2 1 4 5

 (a) Write down the mode of her homework marks. ……………… (1)

(b) Work out her mean homework mark.

 ……………… (2)

**2.** Here are the weights, in kg, of 8 people.

63 65 65 70 72 86 90 97

(a) Write down the median of the 8 weights. ………………kg (1)

 (b) Work out the range of the weights. ……………… kg (2)

**3.** Tom recorded the shoe size of five of his friends.
Here are his results.

8 9 3 4 7

(a) Work out the median shoe size.

 ……………… (2)

Another friend has a shoe size of 8

(b) Work out the median shoe size of all **six** friends of Tom.

 ……………… (2)

**4.** 22 students took a short test.
The table gives information about their marks in the test.

|  |  |  |
| --- | --- | --- |
| **Mark** | **Frequency** |  |
| 7 | 1 |  |
| 8 | 6 |  |
| 9 | 5 |  |
| 10 | 10 |  |

(a) Write down the modal mark. ……………… (1)

(b) Work out the range of the marks. ……………… (2)

(c) Work out the mean mark.

 ……………… (3)

**5.** 20 students scored goals for the school hockey team last month.
The table gives information about the number of goals they scored.

|  |  |  |
| --- | --- | --- |
| Goals scored | Number of students |  |
| 1 | 9 |  |
| 2 | 3 |  |
| 3 | 5 |  |
| 4 | 3 |  |

(a) Write down the modal number of goals scored. ……………… (1)

(b) Work out the range of the number of goals scored. ……………… (1)

(c) Work out the mean number of goals scored.

 ……………… (3)

**Week 3 – Written Methods Long Multiplication**

**Calculate 25 x £1.49**

Imagine the calculation is 25 x 149

We can put the decimal point back in at the end

Use the grid method and partition your numbers

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **x** | **100** | **40** | **9** |  | **2** | **0** | **0** | **0** |
| **20** | **2000** | **800** | **180** |  |  | **8** | **0** | **0** |
| **5** | **500** | **200** | **45** |  |  | **1** | **8** | **0** |
|  |  |  |  |  |  | **5** | **0** | **0** |
|  |  |  |  |  |  | **2** | **0** | **0** |
|  |  |  |  | **+** |  |  | **4** | **5** |
|  |  |  |  |  | **3** | **7** | **2** | **5** |

Total up your answers, make sure you line up the digits carefully

3

25 x 149 = 3725

So, 25 x £1.49 = **£37.25**

**Questions**

**1.** Work out 286 × 43

 …………………… (3)

**2.** Nick takes 26 boxes out of his van.
The weight of each box is 32.9 kg.

 Work out the **total** weight of the 26 boxes.

 …………………… kg (3)

**3.** The cost of a calculator is £6.79
Work out the cost of 28 of these calculators.

 £…………………… (3)

**Week 4 – written Methods Long Division**

**Work out some useful fact**

**Subtract the closest useful fact**

**Make a note of how may went into the number**

**Keep going until you can no longer subtract a useful fact**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Calculate 397 ÷ 17** |  |  |  |  |  |  |  | Useful Facts |
|  | 1 | 7 | 3 | 9 | 7 |  |  | 17 × 2 = 34 |
|  |  | - | 3 | 4 | 0 |  | **20** | 17 × 4 = 68 |
|  |  |  |  | 5 | 7 |  |  | 17 × 8 = 136 |
|  |  |  | - | 3 | 4 |  | **2** | 17 × 10 = 170 |
|  |  |  |  | 2 | 3 |  |  | 17 × 20 = 340 |
|  |  |  | - | 1 | 7 |  | **1** |  |
|  |  |  |  |  | 6 |  |  | **397 ÷ 17 = 23 rem 6** |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  | Useful Facts |
| **Calculate 833 ÷ 24** | 2 | 4 | 8 | 3 | 3 |  |  | 24 × 2 = 48 |
|  |  | - | 4 | 8 | 0 |  | **20** | 24 × 4 = 96 |
|  |  |  | 3 | 5 | 3 |  |  | 24 × 8 = 192 |
|  |  | - | 2 | 4 | 0 |  | **10** | 24 × 10 = 240 |
|  |  |  | 1 | 1 | 3 |  |  | 24 × 20 = 480 |
|  |  | - |  | 9 | 6 |  | **4** |  |
|  |  |  |  | 1 | 7 |  |  | **833 ÷ 24 =34 rem 17** |

**Questions**

**1.** Josh buys 40 litres of milk.
The total cost is £33.20

 Work out the cost of 1 litre of the milk.

 ……………… (3)

**2.** 800 students are going on a school trip by bus.

 Each bus can carry 34 students.

 Work out the smallest number of buses needed to carry all the students.

 ……………… (3)

**3.** Nick fills his van with large wooden crates.

 The weight of each crate is 69 kg.

 The greatest weight the van can hold is 990 kg.

 Work out the greatest number of crates that the van can hold.

 ……………… (3)

**4.** Mario delivers pizzas.

 He is paid 65p for each pizza he delivers.

 One day he was paid £27.30 for delivering pizzas.

How many pizzas did Mario deliver?

 ……………… (3)

**Week 5 – Using Timetables**

**Each column represents a new journey**

**Draw diagrams showing arrows for time intervals to make it easier**

Here is part of a railway timetable.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Manchester | 05 15 | 06 06 | 06 45 | 07 05 | 07 15 | 07 45 |
| Stockport | 05 26 | 06 16 | 06 55 | 07 15 | 07 25 | 07 55 |
| Macclesfield | 05 39 | 06 29 | 07 08 |  | 07 38 | 08 08 |
| Stoke-on-Trent | 05 54 | 06 45 | 07 24 |  | 07 54 | 08 24 |
| Stafford | 06 12 |  | 07 41 |  | 08 11 |  |
| London Euston | 08 07 | 08 26 | **09 06** | 09 11 | 09 50 | 10 08 |

 A train leaves Manchester at 06 45

 (a) (i) At what time should this train get to London Euston? **09 06**

 (ii) How long should it take to travel between Manchester and Stoke-on-Trent?

Manchester Stoke-on-Trent

 06 45 07 08

 **15 min** **07 00** **8 min**

 **15 + 8 = 23 min**

(b) Work out how long it should take the 07 05 train from Manchester to get to London Euston.

Give your answer in hours and minutes.

Manchester London Euston

 07 05 09 11

 **55 min** **08 00** **1 h 11 min**

 **55 + 1h 11 = 2h 6 min**

**Questions**

**1.** Here is part of a train timetable from Crewe to London.

|  |  |
| --- | --- |
| **Station** | **Time of Leaving** |
| Crewe | 08 00 |
| Wolverhampton | 08 40 |
| Birmingham | 09 00 |
| Coventry | 09 30 |
| Rugby | 09 40 |
| Milton Keynes | 10 10 |

(a) At what time should the train leave Coventry? ……………………………… (1)

 The train should arrive in London at 10 45

(b) How long should the train take to travel from Crewe to London?

 ……………………………… (2)

 Verity arrived at Milton Keynes station at 09 53

(c) How many minutes should she have to wait before the 10 10 train leaves?

 …………………… minutes (1)

**2.** A train travels from London to Manchester.

 It leaves London at 16 55
It arrives in Manchester at 19 45

 Work out the number of minutes taken to travel from London to Manchester.

 …………………… minutes (3)

**3.** Here is part of a bus timetable.

|  |  |  |  |
| --- | --- | --- | --- |
| Bus Station | 07 00 | 07 30 | 08 00 |
| Castle Street | 07 10 | 07 40 | 08 15 |
| High Street | 07 25 | 07 55 | 08 25 |
| Station Road | 07 37 | 08 07 | 08 37 |
| Church Street | 07 50 | 08 20 | 08 50 |
| Wharf Inn | 07 55 | 08 25 | 08 55 |

A bus leaves the Bus Station at 07 00

(a) At what time should the 07 00 bus arrive at Station Road? ………………………………

 (1)

 Jill arrives at High Street at 07 45
She wants to catch a bus to Wharf Inn.

(b) How long should she have to wait for the next bus? …………………… minutes

 (1)

A bus leaves Station Road at 08 37

(c) How long should this bus take to travel from Station Road to Wharf Inn?

 ………………… minutes (1)

**4.** Here is part of a railway timetable.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Letchworth** | 11 30 | 11 55 | – | – | 12 30 | 12 55 |
| **Hitchin** | 11 34 | 11 59 | 12 04 | 12 29 | 12 34 | 12 59 |
| **Stevenage** | 11 39 | 12 04 | 12 09 | 12 34 | 12 39 | 13 04 |
| **Hatfield** | 11 53 | – | 12 23 | – | 12 53 | – |
| **Potters Bar** | 11 59 | – | 12 29 | – | 12 59 | – |
| **London** | 12 17 | 12 30 | 12 48 | 13 05 | 13 17 | 13 31 |

 A train leaves Letchworth at 11 55

(a) At what time should this train arrive in London? ……………………………… (1)

 Another train leaves Letchworth at 12 55

(b) Work out how many minutes it should take this train to get to London.

 …………………… minutes (1)

 Jerry is going to London.
He will catch the train in Hatfield.

 Jerry needs to arrive in London **before** 13 00

(c) Write down the time of the latest train he can catch from Hatfield.

 ……………………………… (1)

**Week 6 – Fractions and Percentages of amounts**

**10% =** $\frac{1}{10}$ **to find 10% we divide by 10.**

**20% = 2 x 10% to find 20% we find 10% and then double the answer.**

**5% = ½ of 10% to find 5% we find 10% and then half the answer.**

**Work out 35% of £320**

10% = 320 ÷ 10 = 32

10% = 320 ÷ 10 = 32

10% = 320 ÷ 10 = 32

5% = 32 ÷ 2 = 16

**15% = 112**

**Work out** $\frac{4}{5}$ **of £80**

Work out $\frac{1}{5}$ of £80 = 80 ÷ 5 = £**16**

Work out $\frac{4}{5}$ of £80 = 4 x $\frac{1}{5}$ of £80

 = 4 x **16**

 = **£64**

**Work out** $\frac{3}{7}$ **of £210**

Work out $\frac{1}{7}$of £210 = 210 ÷ 7 = £**30**

Work out $\frac{3}{7}$of £210 = 3 x $\frac{1}{7}$of £210

 = 3 x **30**

 = **£90**

**Questions**

**1.** Work out 35% of £400

£…………………… (2)

**2.** Work out 45% of 800

 …………………… (2)

**3.** Work out 70% of £340

£…………………… (2)

**4.** Work out 20% of £64

£…………………… (2)

**5.** Karl buys a car.
The normal price of the car is £7200

 Karl gets a 10% discount.

Work out how much Karl pays for the car.

£…………………… (3)

**6.** A concert ticket costs £45 plus a booking charge of 15%.

 Work out the total cost of a concert ticket.

£…………………… (3)

**7.** Work out  of £33.56

 £…………………… (2)

**8.** Alison travelled a total of 145 miles.

 She travelled  of this distance in the morning.

How many miles did she travel during the rest of the day?

 ………………miles (2)

**9.** Danny shares a bag of 20 sweets with his friends.

 He gives Mary  of the sweets.

 He gives Ann  of the sweets.

 He keeps the rest for himself.

 How many sweets does Danny keep for himself?

…………………… (3)