# Maths Book 3 LEARNING OBJECTIVES

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| **Learning Outcome** | **Tier** | **R** | **Y** | **G** |

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| --- | --- | --- | --- | --- |
| **Topic 1: Fractions (Core)** |  |  |  |  |
| LO1: To be able to multiply fractions | F | R | Y | G |
| LO2: To be able to divide fractions | F | R | Y | G |

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| **Topic 2: Percentages (Core)** |  |  |  |  |
| LO1: To be able to calculate proportional change | F | R | Y | G |
| LO2: To be able to calculate repeated proportional change | F+ | R | Y | G |

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| **Topic 3: Bearings** |  |  |  |  |
| LO1: To be able to calculate, measure and use bearings to describe direction | F | R | Y | G |

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| **Topic 4: Probability (Core)** |  |  |  |  |
| LO1: To be able to calculate the probability of successive independent events | F+ | R | Y | G |
| LO2: To be able to use and apply an understanding of experimental probability | F/F+ | R | Y | G |

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| **Topic 5: Averages and spread** |  |  |  |  |
| LO1: To be able to interpret the averages and spread of data sets | F | R | Y | G |
| LO2: To be able to calculate averages from frequency tables | F | R | Y | G |

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| **Topic 6: Pie charts** |  |  |  |  |
| LO1: To be able to construct and interpret pie charts | F | R | Y | G |

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| **Topic 7: Area and volume (Core)** |  |  |  |  |
| LO1: To be able to calculate lengths and areas of parts of circles | F | R | Y | G |
| LO2: To be able to calculate the volume of a cylinder | F | R | Y | G |
| LO3: To be able to calculate the surface area of a cuboid | F | R | Y | G |

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| **Topic 8: Fractions (Core)** |  |  |  |  |
| LO1: To be able to use BIDMAS to calculate solutions | F | R | Y | G |
| LO2: To be able to order and compare fractions, decimals and percentages | F | R | Y | G |

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| **Topic 9: Ratio and proportion (Core)** |  |  |  |  |
| LO1: To be able to use knowledge of ratio and proportion to solve problems in context. | F | R | Y | G |
| LO2: To be able to divide a quantity into two or more parts and solve problems involving ratio | F | R | Y | G |

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| **Topic 10: Properties of numbers (Core)** |  |  |  |  |
| LO1: To be able to find the HCF and LCM of two numbers | F | R | Y | G |
| LO2: To be able to use prime factors | F | R | Y | G |
| LO3: To be able to round to the appropriate number of significant figures | F | R | Y | G |

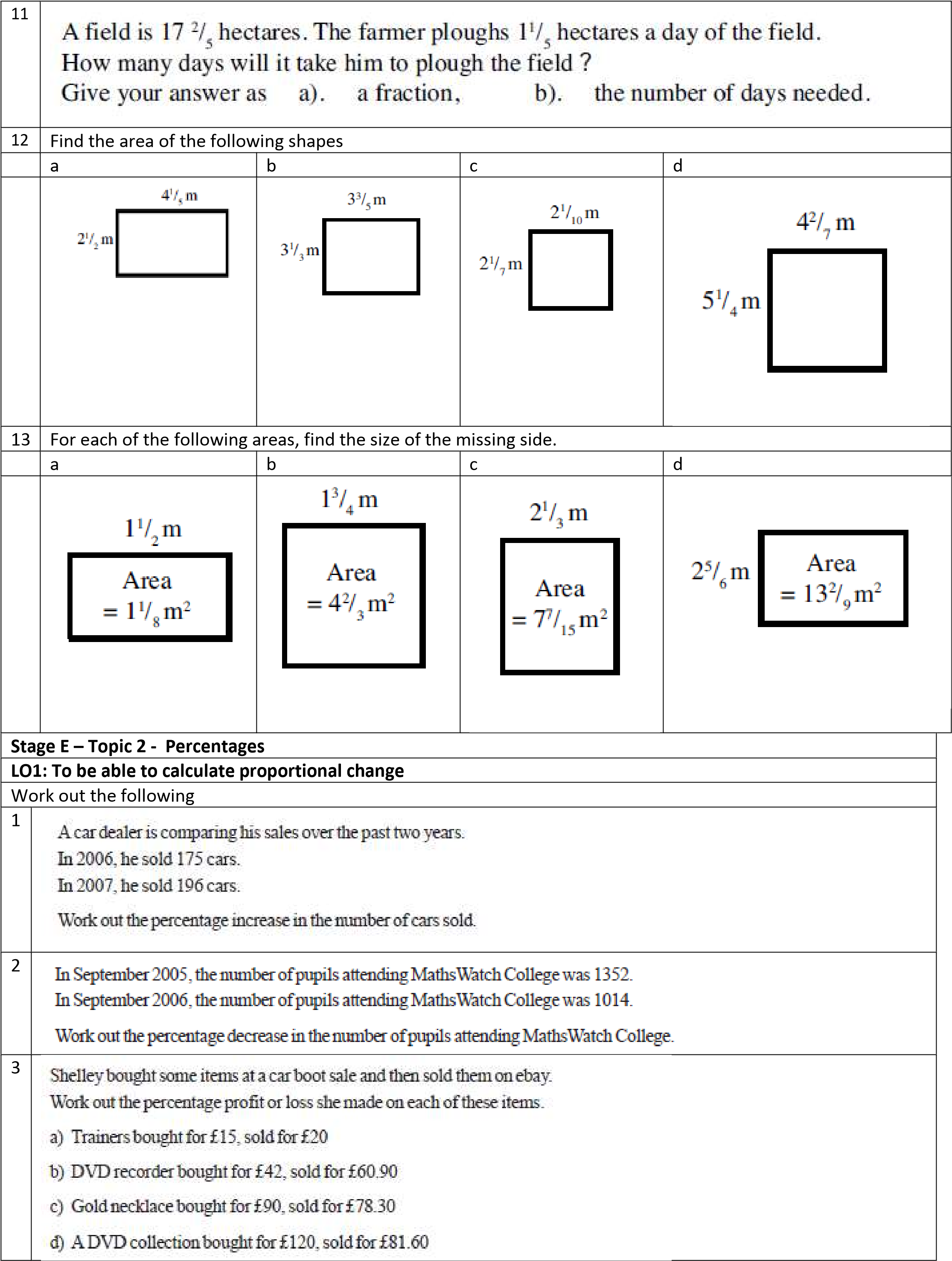
F - Foundation

F+ - Additional foundation

H - Higher

|  |  |
| --- | --- |
| **Stage E – Topic 1 - Fractions** | |
| **LO1: To be able to multiply fractions** | |
| Work out the following | |
| 1 |  |
| 2 |  |
| 3 |  |
| **LO2: To be able to divide fractions** | |
| 1 |  |

|  |  |
| --- | --- |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
| 10 |  |



|  |  |
| --- | --- |
| 4 |  |
| 5 |  |
| 6 |  |
| **LO2: To be able to calculate repeated proportional change** | |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| a |  |
| b |  |

|  |  |
| --- | --- |
| **Stage E – Topic 3 - Bearings** | |
| **LO1: To be able to calculate, measure and use bearings to describe direction** | |
| 1 |  |
| 2 |  |

|  |  |
| --- | --- |
|  |  |
| 3 |  |
| 4 |  |

|  |  |
| --- | --- |
| 5 |  |

|  |  |
| --- | --- |
| **Stage E – Topic 4 - Probability** | |
| **LO1: To be able to calculate the probability of successive independent events** | |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| **LO2: To be able to use and apply an understanding of experimental probability** | |

|  |  |
| --- | --- |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| a |  |
| b |  |

|  |  |
| --- | --- |
| **Stage E – Topic 5 - Averages and spreads** | |
| **LO1: To be able to interpret the averages and spread of data sets** | |
| 1 |  |
| a |  |
| b |  |
| 2 |  |
| a |  |
| b |  |
| 3 |  |
| a |  |
| b |  |
| 4 |  |
| 5 |  |
| **LO2: To be able to calculate averages from frequency tables** | |

|  |  |
| --- | --- |
| 1 |  |
| a |  |
| 2 |  |
| a |  |
| b |  |
| 3 |  |

a

b

c

d

**Stage E**

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**Topic 6**

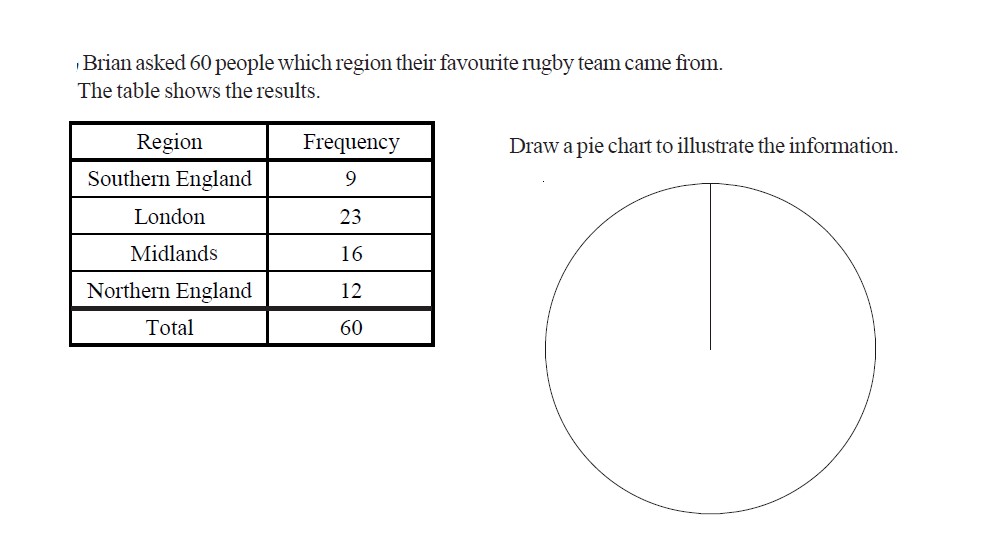
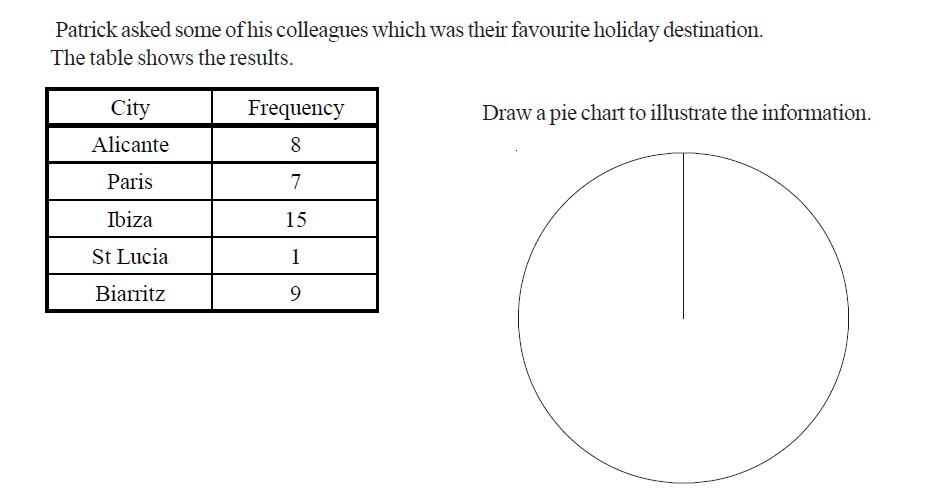
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**Pie charts**

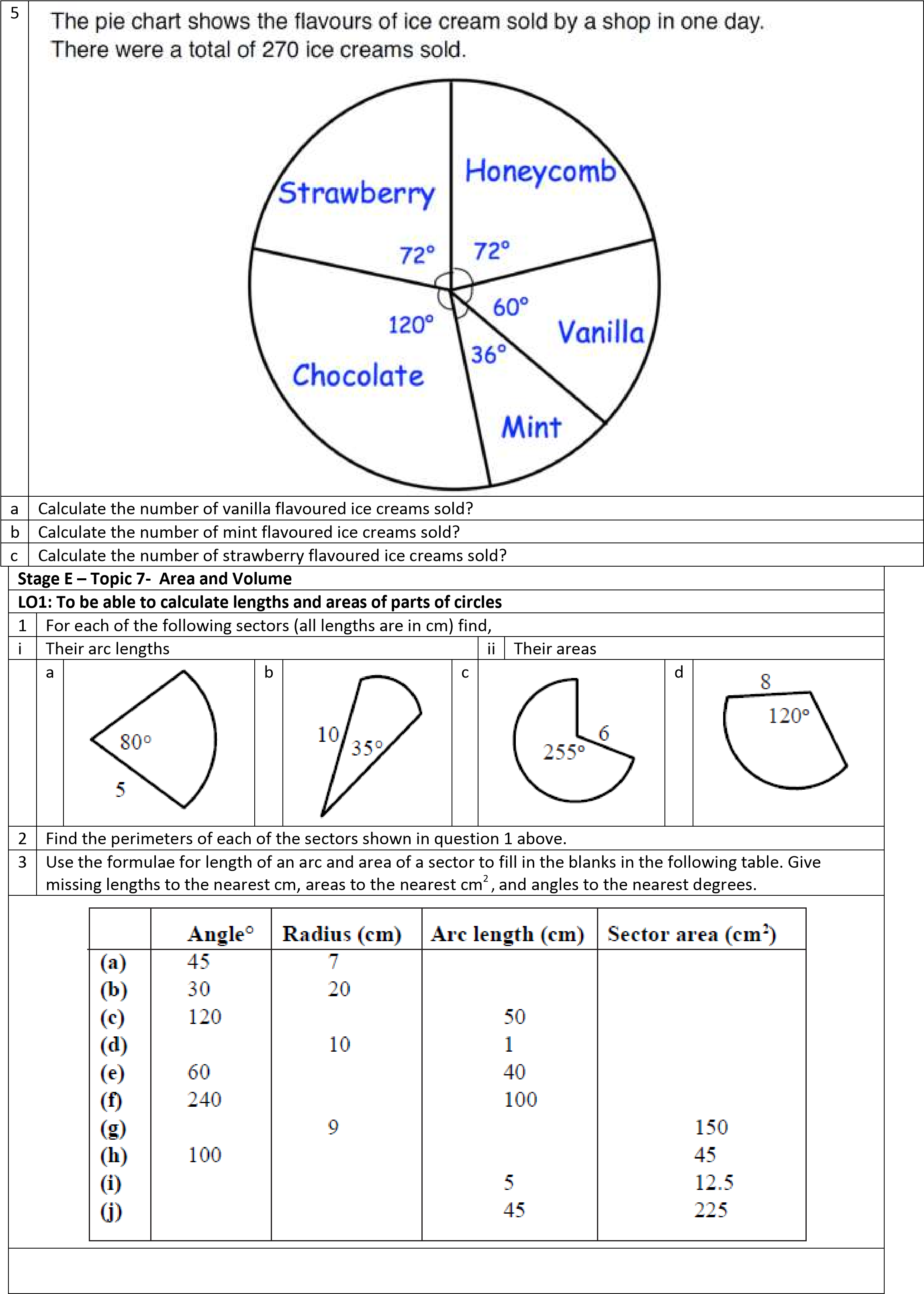
**LO1: To be able to construct and interpret pie charts**

1

2



|  |  |
| --- | --- |
| 3 |  |
| 4 |  |
| a | What fraction of the counters are white? Give your answer in its simplest form |
| b | What fraction of the counters are red? Give your answer in its simplest form |
| c | There are 24 counters in the bag Work out how many are black? |



|  |  |  |
| --- | --- | --- |
| **LO2: To be able to calculate the volume of a cylinder** | |  |
| 1 | Find the volume of each of these cylinders  a)    b)    c)    d) |
| 2 | a)  b)  c)    d) |
| **LO3: To be able to calculate the surface area of a cuboid** | | |
| 1 |  | |
|  |  | |
| Mixed Problems | | |
| 1 |  | |
|  |  | |

|  |  |
| --- | --- |
| **Stage E – Topic 9 - Ratio and Proportion** | |
| **LO1: To be able to use knowledge of ratio and proportion to solve problems in context.** | |
| 1 | Simplify the following ratios |
|  |  |
| 2 | Write in the missing values for the following ratios |
|  |  |
| 3 |  |
| 4 |  |

|  |  |
| --- | --- |
| a |  |
| b |  |
| 5 |  |
| a |  |
|  |  |
| b |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
| 10 |  |
| 11 |  |
| **LO2: To be able to divide a quantity into two or more parts and solve problems involving ratio** | |
| 1 |  |
| 2 |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3 | |  | | | | | | | | | | |
| 4 | |  | | | | | | | | | | |
| 5 | |  | | | | | | | | | | |
| 6 | |  | | | | | | | | | | |
| **Stage E – Topic 10 - Properties of Numbers** | | | | | | | | | | | | |
| **LO1: To be able to find the HCF and LCM of two numbers** | | | | | | | | | | | | |
| 1 |  | | | | | | | | | | | |
| 2 |  | | | | | | | | | | | |
| 3 |  | | | | | | | | | | | |
| 4 |  | | | | | | | | | | | |
| 5 |  | | | | | | | | | | | |
| 6 |  | | | | | | | | | | | |
| 7 |  | | | | | | | | | | | |
| 8 |  | | | | | | | | | | | |
| **LO2: To be able to use prime factors** | | | | | | | | | | | | |
| 1 |  | | | | | | | | | | | |
| 2 |  | | | | | | | | | | | |
| 3 |  | | | | | | | | | |  | | |
| 4 |  | | | | | | | | | |  | | |
| 5 |  | | | | | | | | | |  | | |
| 6 |  | | | | | | | | | |  | | |
| **LO3: To be able to round to the appropriate number of significant figures** | | | | | | | | | | |  | | |
| 1 | Round the following to 1 significant figure | | | | | | | | | |  | | |
|  | a | | 428 | b | 783 | | | c | 5608 | | d | 3521 | |
| 2 | Round the following to 2 significant figures | | | | | | | | | |  | | |
|  | a | | 846 | b | 2647 | | | c | 3552 | | d | 46817 | |
| 3 | Round the following to 3 significant figures | | | | | | | | | |  | | |
|  | a | | 91249 | b | 64182 | | | c | 223058 | | d | 389512 | |
| 4 | Round the following to 1 significant figure | | | | | | | | | |  | | |
|  | a | | 0.00618 | b | 0.00482 | | | c | 0.00006492 | | d | 0.004981 | |
| 5 | Round the following to 2 significant figures | | | | | | | | | |  | | |
|  | a | | 0.035812 | b | 0.00082477 | | | c | 0.0038611 | | d | 0.000037211 | |
| 6 | Round the following to 3 significant figures | | | | | | | | | |  | | |
|  | a | | 0.00143229 | b | 0.000721981 | | | c | 0.0000044251 | | d | 0.000668821 | |
| Mixed Problems | | | | | | | | | | |  | | |
| 1 | Work an estimate for the following calculations | | | | | | | | | |  | | |
| a | |  | | | b |  | | | c |  | | |
|  | d | |  | | | e |  | | | f |  | | |

# STAGE E ANSWERS

|  |  |
| --- | --- |
| **Stage E – Topic 1 – Fractions Answers** | |
| LO1: **To be able to multiply fractions** | |
| 1 |  |
| 2 |  |
| 3 |  |
| LO2: **To be able to divide fractions** | |
| 1 |  |

|  |  |
| --- | --- |
| 2 |  |
| 3 |  |
| 4 |  |
| Ans | £64.18 |
| 5 |  |
| Ans | a) 1440 𝑚𝑙 b) 960 𝑚𝑙 |
| 6 |  |
| Ans | a) £10385 b) £2077 |
| 7 | 2 |
| 8 | a) 17 b) 5 |
| 9 | 5 |
| 10 | 3 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 |  | a) 14 | b) 15 |  |  |  |  |  |
| 12 | a | 10 | b | 12 | c | 4 | d | 22 |
| 13 | a | 3 | b | 2 | c | 3 | d | 4 |

4

|  |  |
| --- | --- |
| **Stage E – Topic 2 – Percentages Answers** | |
| LO1: **To be able to calculate proportional change** | |
| 1 |  |
| 2 |  |
| 3a |  |
| 3b |  |
| 3c |  |
| 3d |  |
| 4 |  |
| 5 |  |
| 6 |  |
| LO2: **To be able to calculate repeated proportional change** | |
| 1 |  |
| 2 |  |

3

4

a

b

4

**Stage E**

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**Topi**

**c 3**

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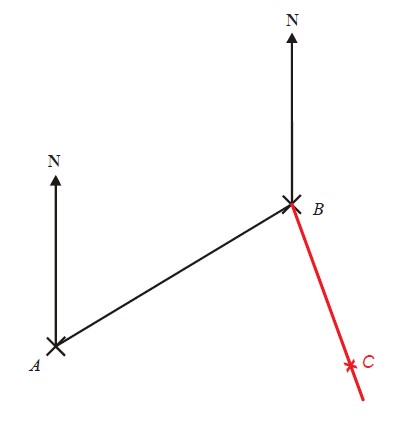
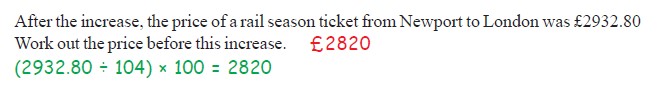
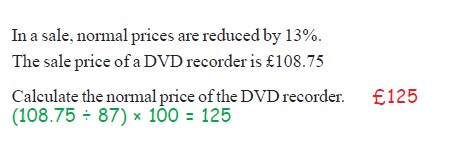
**Bearings**

**Answers**

LO1:

**To be able to calculate proportional change**

1



|  |  |
| --- | --- |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |

|  |  |
| --- | --- |
| **Stage E – Topic 4 - Probability** **Answers** | |
| LO1: **To be able to calculate the probability of successive independent events** | |
| 1a | Correct diagram |
| 1b |  |
| i | 0.63 |
| ii | 0.27 |
| iii | 0.03 |
| iv | 0.97 |
| 2 | Correct diagram |
| 2b |  |
| i | 0.09 |
| ii | 0.49 |
| iii | 0.42 |
| 3 |  |
| a | 0.04 |
| b | 0.64 |
| c | 0.32 |
| d | 0.96 |
| 4 |  |
| a | 25144 |
| b | 5  18 |
| c | 63  144 |
| d | 4  9 |
| LO2: **To be able to use and apply an understanding of experimental probability** | |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| a |  |
| b |  |

|  |  |
| --- | --- |
| **Stage E – Topic 5 – Averages and spread Answers** | |
| LO1: **To be able to interpret the averages and spread of data sets** | |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |

|  |  |
| --- | --- |
| **Answers** | |
| LO2: **To be able to calculate averages from frequency tables** | |
| 1 |  |
| 2 |  |
| a |  |
| b |  |
| 3 |  |
| 3a |  |
| 3b |  |
| 3c |  |
| 3d |  |

|  |  |
| --- | --- |
| **Stage E – Topic 6 – Piecharts Answers** | |
| LO1: **To be able to construct and interpret pie charts** | |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| a | 1  4 |
| b |  |
| c | Angle for black counters =  3600 – (1200 + 900)  3600 – 2100  = 1500    3600 = 24 counters  300 = 8 counters  1500 = 40 counters    Answer 40 counters |
| 5 |  |
| a | u270 45 |
| b | u270 27 |
| c | u270 54 |

|  |  |  |
| --- | --- | --- |
| **Stage E – Topic 7 – Area and Volume Answers** | | |
| LO1: **To be able to calculate lengths and areas of parts of circles** | | |
| 1i | 1. 6.98 2. 6.11 3. 26.7 4. 16.8 | |
| 1ii | 1. 17.5 2. 30.5 3. 80.1 4. 67.0 | |
| 2 | 1. 17.0 2. 26.1 3. 37.3 4. 32.8 | |
| 3 |  | |
| LO2: **To be able to calculate the volume of a cylinder** | | |
| 1 | a) | 9043.2 |
|  | b) | 1538.6 |
|  | c) | 276.9 |
|  | d) | 9420 |
| 2 | a) | 2034.7 |
|  | b) | 763.0 |
|  | c) | 474.8 |
|  | d) | 78.4 |
| LO3: **To be able to calculate the surface area of a cuboid** | | |
| 1 | 1. 125m2 2. 62 cm2 3. 136cm2 4. 864 cm2 5. 258 cm2 6. 128 m2 | |
| Mixed Problems | | |
| 1a |  | |
| i | 72.25 | |
| ii | 78.5 | |
| 1  b |  | |
| i | 108.75, 1020.5 | |
| ii | Cuboid 63.25 | |
| 2a |  | |
| i | Cylinder 1570, cuboid 2000 | |
| ii | 1.57 , 2 | |
| 2  b |  | |
| i | 16 tins | |
| ii | 20.38 21 tins | |

|  |  |
| --- | --- |
| **Stage E – Topic 9 – Percentages Answers** | |
| LO1: **To be able to calculate proportional change** | |
| 1 |  |

|  |  |
| --- | --- |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |

|  |  |
| --- | --- |
| 7 |  |
| 8 | 1 hour 12 mins |
| 9 | 1 hour 40 mins |
| 1  0 | 16 mins |
| 1  1 | 1 hour 30 mins |
| LO2: To be able to XXX | |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 6 |  | | |
| **Stage E – Topic 10 – Properties of Numbers Answers** | | |  |
| LO1: **To be able to find the HCF and LCM of two numbers** | | |
| 1 |  | |
| 2 |  | |
| 3 |  | |
| 4 |  | |
| 5 |  | |
| 6 |  | |
| 7 |  | |
| 8 |  | |
| LO2: **To be able to use prime factors** | | |
| 1 |  | |
| 2 |  | |
| 3 |  | |
| 4a |  | |
| 4b |  | |
| 5a |  | |
| 5b | |  |
| 6i | |  |
| 6ii | |  |
| 6ii  i | |  |

|  |  |
| --- | --- |
| **Answers** | |
| **LO3: To be able to round to the appropriate number of significant figures** | |
| 1 |  |
| 2 |  |
| 3 |  |

|  |  |
| --- | --- |
| 4 |  |
| 5 |  |
| 6 |  |
| Mixed Problems | |
| 1a |  |
| 1b |  |
| 1c |  |
| 1d |  |
| 1e |  |
| 1f |  |