



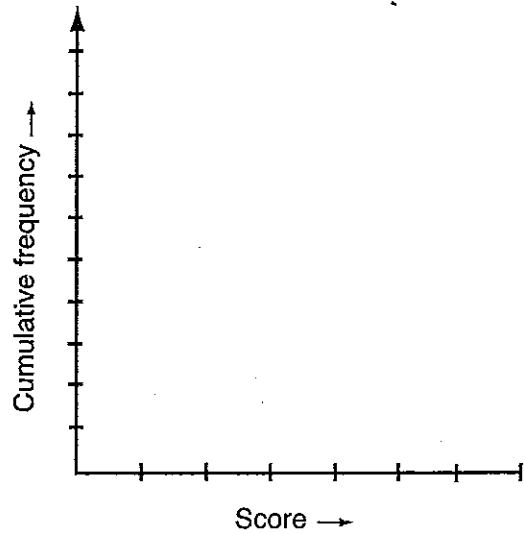
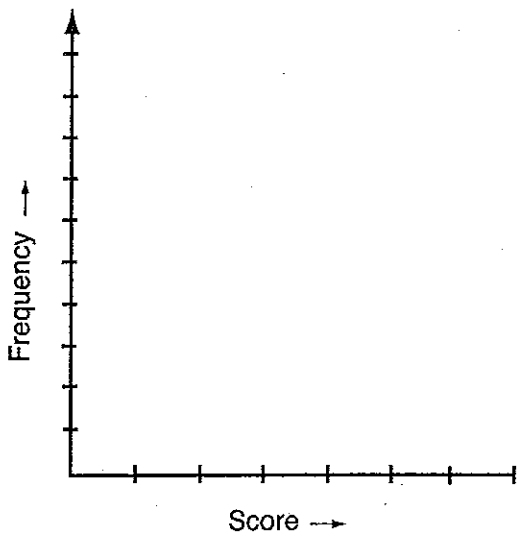
## UNIT 6: Review of statistics

**QUESTION 1** Fifty families were surveyed to find how many children each family has and the following set of data was obtained.

5 3 2 4 1 5 0 2 3 2 2 1 1 3 3  
 4 1 3 2 1 3 3 2 2 2 3 2 1 3 1  
 2 3 0 1 1 5 3 4 5 0 3 0 2 0 2  
 2 1 5 4 3

- Complete the frequency distribution table.
- Draw a frequency histogram.
- Draw a frequency polygon.
- Draw a cumulative frequency histogram.
- Draw a cumulative frequency polygon.

Score (x)	Tally	Frequency (f)	Cumulative frequency
0			
1			
2			
3			
4			
5			
		$\Sigma f =$	



**QUESTION 2** For the frequency distribution given above, calculate:

- the mean \_\_\_\_\_
- the mode \_\_\_\_\_
- the range \_\_\_\_\_
- the median \_\_\_\_\_
- the relative frequency \_\_\_\_\_



## UNIT 7: Measures of spread, standard deviation

**QUESTION 1** Use your calculator to find the mean and standard deviation, correct to one decimal place, for the following sets of scores. Also find the range of each set of scores.

a 2, 4, 8, 9, 10

b 1, 2, 3, 4, 5, 6, 7

c 7, 11, 12, 13, 14, 15, 16, 17, 18

d 35, 46, 48, 40, 36, 41, 42, 37

e 8, 3, 7, 3, 9, 5, 8, 8, 6, 9, 3, 6, 2, 3

f 5, 8, 10, 15, 15, 10, 8, 9, 18, 20, 18, 15, 10, 15

g

Score	5	7	9	11	13	15
Frequency	8	5	7	8	3	6

h

Score	10	20	30	40	50	60	70
Frequency	3	4	3	2	5	2	3

**QUESTION 2** Five students sat for a mathematics test and a science test. Their marks are given below.

Science                      56    60    69    59    65

Mathematics                70    75    86    82    80

a Find the mean and standard deviation for each set of scores.

b Michael scored 69 in science and 86 in mathematics. Which was the better average mark?

c If Matthew scored 65 in science and 80 in mathematics, in which subject did Matthew perform better compared with the class average?

d Use your calculator to find the standard deviation and the mean for each test.

Test A            8    10    13    13    14    15    16    18    16    17

Test B            3    11    15    15    9    10    7    16    16    19

For which test would the result 16 be better compared with the class average?

## UNIT 8: Measures of spread, interquartile range

**QUESTION 1** For the following set of scores, 2, 3, 3, 4, 5, 7, 9, 9, 10, 11, 12, 12, find:

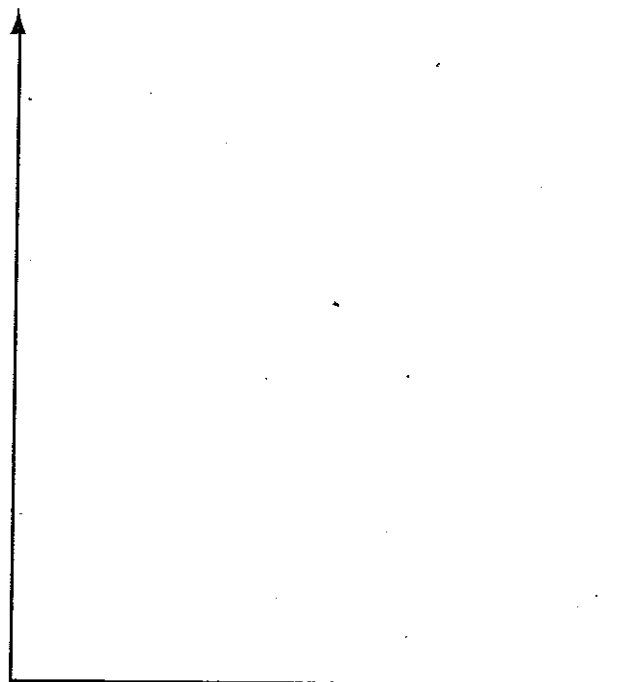
- a the 1st quartile (Q1) \_\_\_\_\_
- b the 2nd quartile (Q2) – (the median) \_\_\_\_\_
- c the 3rd quartile (Q3) \_\_\_\_\_
- d the interquartile range \_\_\_\_\_

**QUESTION 2** Complete the cumulative frequency table and draw a cumulative frequency histogram from the completed table.

Score	55	56	57	58	59	60	61	62	63
Frequency	1	2	4	6	7	12	8	5	3
Cumulative frequency									

From the graph find:

- a the median \_\_\_\_\_
- b the lower quartile \_\_\_\_\_
- c the 80th percentile \_\_\_\_\_
- d the interquartile range \_\_\_\_\_
- e the mode \_\_\_\_\_



**QUESTION 3** Find the interquartile range of the following sets of scores.

- a 5, 2, 3, 6, 8, 9, 6, 8
- \_\_\_\_\_

- b 8, 10, 12, 10, 12, 11, 13, 12, 10, 12, 10, 12, 10, 11, 13, 14, 13, 12, 10, 11
- \_\_\_\_\_

Probability and statistics

Instructions for SECTION 1

- You have 15 minutes to answer Section 1
- Each question is worth 2 marks
- Attempt ALL questions
- Calculators are NOT to be used
- Fill in only ONE CIRCLE for each question

- 1** From a pack of 52 cards, one card is drawn at random. Find the probability of drawing a diamond.
- (A)  $\frac{1}{13}$                       (B)  $\frac{2}{13}$                       (C)  $\frac{1}{4}$                       (D)  $\frac{3}{4}$
- 2** In a single throw of one die, find the probability of throwing an odd number.
- (A)  $\frac{1}{6}$                       (B)  $\frac{1}{3}$                       (C)  $\frac{1}{2}$                       (D)  $\frac{2}{3}$
- 3** In a single throw of two dice, find the probability of throwing a double.
- (A)  $\frac{1}{6}$                       (B)  $\frac{2}{3}$                       (C)  $\frac{1}{2}$                       (D)  $\frac{3}{4}$
- 4** For the set of scores, 5, 8, 3, 1, 9, 5, 6, 7, find the range.
- (A) 6                      (B) 7                      (C) 8                      (D) 9
- 5** For the set of scores, 10, 20, 50, 10, 60, what is the difference between the mean and the mode?
- (A) 10                      (B) 20                      (C) 30                      (D) 40
- 6** The test marks of 10 students are 5, 9, 5, 7, 3, 7, 8, 7, 9, 7. What is the modal mark?
- (A) 6                      (B) 7                      (C) 8                      (D) 9
- 7** For the following set of scores, 3, 1, 4, 6, 5, 5, 7, 3, 4, 5, 4, 5, 7, the mode is
- (A) 6                      (B) 4.538                      (C) 5                      (D) 4
- 8** Find the range of the set of scores 8, 9, 12, 7, 9, 11, 8, 9, 5, 13, 7, 9.
- (A) 7                      (B) 9                      (C) 4                      (D) 8
- 9** The median of the numbers 6, 4, 9, 7, 4, 2, 8, is
- (A) 8                      (B) 6                      (C) 5                      (D) 4
- 10** The mean of the numbers 8, 10 and  $x$  is the same as the mean of the numbers 6, 8, 10 and 12. Find the value of  $x$ .
- (A) 6                      (B) 9                      (C) 10                      (D) 12

Total marks achieved for SECTION 1

Probability and statistics

- Instructions for SECTION 2**
- You have 20 minutes to answer ALL of Section 2
  - Each question is worth 2 marks
  - Attempt ALL questions
  - Calculators may be used

Questions	Answers	Mar
<p>A bag contains 3 yellow, 2 blue and 4 white balls. If a ball is drawn at random, find the probability that it is:</p> <p><b>1</b> yellow.</p> <p><b>2</b> blue.</p> <p><b>3</b> not white.</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>2</p> <p>2</p> <p>2</p>
<p>A coin is tossed three times and the results noted. Use a tree diagram to find the probability of:</p> <p><b>4</b> three tails.</p> <p><b>5</b> two tails and one head in any order.</p> <p><b>6</b> at least one tail.</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>2</p> <p>2</p> <p>2</p>
<p>A pair of dice is rolled simultaneously. Find the probability of getting:</p> <p><b>7</b> a double five.</p> <p><b>8</b> any double.</p> <p><b>9</b> a score greater than 9.</p> <p><b>10</b> at least one six on the uppermost face of a die.</p> <p><b>11</b> the sum of the two numbers rolled being 11.</p> <p><b>12</b> two even numbers.</p>	<p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>
<p>Use your calculator to find the mean and standard deviation, correct to one decimal place, for the following sets of scores.</p> <p><b>13</b> 8, 9, 6, 9, 7, 6, 6</p> <p><b>14</b> 12, 14, 9, 6, 1, 12</p> <p><b>15</b> 25, 33, 26, 56, 44, 41, 33, 25</p>	<p>_____</p> <p>_____</p> <p>_____</p>	<p>2</p> <p>2</p> <p>2</p>

**Total marks achieved for SECTION 2**

/

# Answers

**PAGE 35** 1 a  $361.6 \text{ cm}^3$  b  $174.1 \text{ cm}^3$  2 a  $306 \text{ m}^3$  b  $2.33 \text{ m}^3$  3 a  $216.2 \text{ cm}^3$  b  $776.8 \text{ cm}^3$  4 a  $396.8 \text{ cm}^3$  b  $285.6 \text{ m}^3$

**PAGE 36** 1 a  $121.5 \text{ cm}^3$  b  $1838.6 \text{ cm}^3$  2 a  $88.22 \text{ m}^3$  b  $144.76 \text{ m}^3$  3 a  $1005.3 \text{ cm}^3$  b  $55.9 \text{ cm}^3$  c  $4712.4 \text{ cm}^3$  4 a  $20910.4 \text{ cm}^3$  b  $1392.8 \text{ cm}^3$

**PAGE 37** 1 a  $3053.6 \text{ cm}^3$  b  $4188.8 \text{ cm}^3$  c  $113097.3 \text{ cm}^3$  d  $22449.3 \text{ cm}^3$  e  $15002.5 \text{ cm}^3$  f  $91952.3 \text{ cm}^3$  2 a  $4188.8 \text{ cm}^3$  b  $150532.6 \text{ cm}^3$  3 a  $1526.8 \text{ cm}^3$  b  $15529.7 \text{ cm}^3$  4 a  $10576.70 \text{ cm}^3$  b  $753.98 \text{ cm}^3$

**PAGE 38** 1 a  $5.1472 \times 10^3 \text{ km}^2$  b  $1.098 \times 10^{12} \text{ km}^3$  2 a  $261.3 \text{ m}^2$  b  $397.18 \text{ m}^3$  3  $61.26 \text{ m}^2$  4 a  $377 \text{ cm}^3$  b  $377 \text{ mL}$  5 a  $\$140$  b  $375 \text{ kL}$

**PAGE 39** 1 B 2 C 3 C 4 B 5 C 6 D 7 B 8 C 9 B 10 C

**PAGE 40** 1  $208 \text{ cm}^2$  2  $192 \text{ cm}^3$  3  $172 \text{ cm}^2$  4  $120 \text{ cm}^3$  5  $672\pi \text{ cm}^2$  6  $1960\pi \text{ cm}^3$  7  $360 \text{ cm}^2$  8  $400 \text{ cm}^3$  9  $96\pi \text{ cm}^2$  10  $96\pi \text{ cm}^3$  11  $324\pi \text{ cm}^2$  12  $972\pi \text{ cm}^3$  13  $147\pi \text{ cm}^2$  14  $\frac{686\pi}{3} \text{ cm}^3$  15  $784\pi \text{ cm}^2$

**PAGE 41** 1 a  $\frac{1}{4}$  b  $\frac{1}{2}$  c  $\frac{1}{13}$  d  $\frac{3}{4}$  e  $\frac{1}{26}$  f  $\frac{1}{2}$  2 a  $\frac{1}{3}$  b  $\frac{2}{3}$  c  $\frac{1}{3}$  3 a  $\frac{1}{6}$  b  $\frac{1}{2}$  c  $\frac{2}{3}$  d 0 e  $\frac{1}{2}$  f  $\frac{1}{3}$  4 a  $\frac{2}{5}$  b  $\frac{4}{15}$  d  $\frac{3}{5}$  e 0 f  $\frac{3}{5}$  5 a 0 b 1 c  $\frac{1}{3}$  d 1 e  $\frac{1}{3}$  f 1 6 a  $\frac{4}{7}$  b  $\frac{3}{7}$  c  $\frac{1}{7}$  d 0 e  $\frac{4}{7}$  f  $\frac{2}{7}$  7 a  $\frac{4}{11}$  b  $\frac{7}{11}$  c  $\frac{2}{11}$  d e 0 f  $\frac{1}{11}$

**PAGE 42** 1 a  $\frac{1}{8}$  b  $\frac{3}{8}$  c  $\frac{7}{8}$  2 a 12 b  $\frac{2}{3}$  c  $\frac{1}{3}$  d  $\frac{7}{12}$  3 a  $\frac{3}{10}$  b  $\frac{1}{10}$  c  $\frac{3}{5}$  4 a  $\frac{1}{8}$  b  $\frac{3}{8}$  c  $\frac{3}{8}$  d  $\frac{1}{2}$  e  $\frac{1}{2}$  f  $\frac{1}{2}$

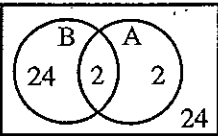
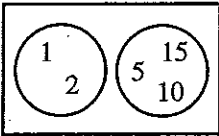
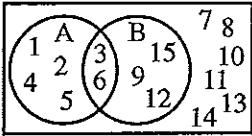
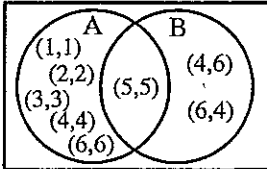
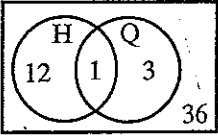
**PAGE 43** 1 a  $\frac{5}{18}$  b  $\frac{5}{18}$  c  $\frac{1}{6}$  d  $\frac{5}{18}$  e  $\frac{5}{9}$  2  $\frac{4}{25}$  3 a  $\frac{3}{20}$  b  $\frac{51}{380}$  c  $\frac{3}{190}$  d  $\frac{68}{95}$  e  $\frac{27}{95}$  f  $\frac{51}{190}$  4 a  $\frac{5}{11}$  b  $\frac{3}{11}$

**PAGE 44** 1 a 

1,1	2,1	3,1	4,1	5,1	6,1
1,2	2,2	3,2	4,2	5,2	6,2
1,3	2,3	3,3	4,3	5,3	6,3
1,4	3,4	3,4	4,4	5,4	6,4
1,5	2,5	3,5	4,5	5,5	6,5
1,6	2,6	3,6	4,6	5,6	6,6

 2 a  $\frac{1}{36}$  b  $\frac{1}{6}$  c  $\frac{1}{9}$  d  $\frac{1}{12}$  e  $\frac{1}{12}$  f  $\frac{1}{6}$  g  $\frac{1}{6}$  h  $\frac{1}{4}$  i  $\frac{1}{12}$  j  $\frac{11}{32}$  k 3 rolling one die 4  $\frac{1}{4}$  5  $\frac{1}{4}$  6 rolling one die

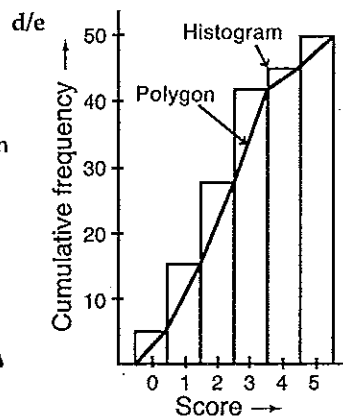
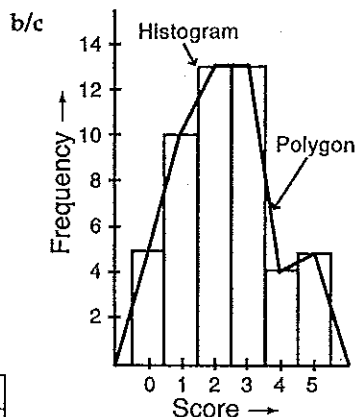
## PAGE 45

1  2 a  b  3  4   
 $P(BA) = \frac{7}{13}$        $P = \frac{1}{3}$        $P = \frac{3}{5}$        $P = \frac{2}{9}$        $P = \frac{4}{13}$

## PAGE 46

1 a

x	Tally	f	c.f.
0		5	5
1		10	15
2		13	28
3		13	41
4		4	45
5		5	50



2 a 2.32 b 2 and 3 c 5 d 2

e

Score	0	1	2	3	4	5
Relative f	0.1	0.2	0.26	0.26	0.08	0.1

# Answers

**PAGE 47** 1 a  $\bar{x} = 6.6$ ,  $SD = 3.07$ , range = 8 b  $\bar{x} = 4$ ,  $SD = 2$ , range = 6 c  $\bar{x} = 13.67$ ,  $SD = 3.20$ , range = 11 d  $\bar{x} = 40.63$ ,  $SD = 4.36$ , range = 13 e  $\bar{x} = 5.71$ ,  $SD = 2.43$ , range = 7 f  $\bar{x} = 12.57$ ,  $SD = 4.39$ , range = 15 g  $\bar{x} = 9.59$ ,  $SD = 3.41$ , range = 10 h  $\bar{x} = 39.1$ ,  $SD = 19.75$ , range = 60  
2 a Science:  $\bar{x} = 61.8$ ,  $SD = 4.62$ ; Mathematics:  $\bar{x} = 78.6$ ,  $SD = 5.57$  b Science c Science d Test A:  $\bar{x} = 14$ ,  $SD = 2.97$ ; Test B:  $\bar{x} = 12.1$ ,  $SD = 4.68$ . The result is better for Test B.

**PAGE 48** 1 a 3.5 b 8 c 10.5 d 7 2 a 60 b 58 c 61 d 3 e 60  
3 a 4 b 2

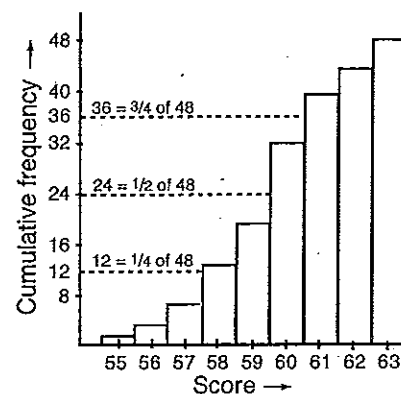
**PAGE 49** 1 C 2 C 3 A 4 C 5 B 6 B 7 C 8 D 9 B 10 B

**PAGE 50** 1  $\frac{1}{3}$  2  $\frac{2}{9}$  3  $\frac{5}{9}$  4  $\frac{1}{8}$  5  $\frac{3}{8}$  6  $\frac{7}{8}$  7  $\frac{1}{36}$  8  $\frac{1}{6}$

9  $\frac{1}{6}$  10  $\frac{11}{36}$  11  $\frac{1}{18}$  12  $\frac{1}{4}$  13  $\bar{x} = 7.29$ ,  $SD = 1.28$

14  $\bar{x} = 9$ ,  $SD = 4.40$  15  $\bar{x} = 35.375$ ,  $SD = 10.28$

$x$	$f$	$c.f.$
55	1	1
56	2	3
57	4	7
58	6	13
59	7	20
60	12	32
61	8	40
62	5	45
63	3	48



**PAGE 51** 1 a  $AB$  and  $EF$ ,  $AD$  and  $EH$ ,  $DC$  and  $HG$ ,  $BC$  and  $FG$  b  $AB$  and  $DE$ ,  $BC$  and  $EF$ ,  $AC$  and  $DF$  c  $AB$  and  $EF$ ,  $BC$  and  $FG$ ,  $CD$  and  $GH$ ,  $DA$  and  $HE$  2 a  $\frac{AB}{EF} = \frac{AD}{EH} = \frac{DC}{HG} = \frac{BC}{FG}$  b  $\frac{AB}{EF} = \frac{BC}{FG} = \frac{CD}{GH} = \frac{DA}{HE}$  c  $\frac{PQ}{LM} = \frac{QR}{MN} = \frac{RS}{NO} = \frac{SP}{OL}$  3 a  $\frac{x}{4} = \frac{4}{2}$ ,  $x = 8$ ;  $\frac{y}{5} = \frac{4}{2}$ ,  $y = 10$

b  $\frac{12}{12+x} = \frac{9}{12}$ ,  $x = 4$ ;  $\frac{y}{y+5} = \frac{9}{12}$ ,  $y = 15$  c  $\frac{x}{10} = \frac{10}{4}$ ,  $x = 25$ ;  $\frac{y}{8} = \frac{10}{4}$ ,  $y = 20$

**PAGE 52** 1 a  $AB$  and  $DE$ ,  $BC$  and  $EF$ ,  $AC$  and  $DF$  b  $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$  c  $x = 6$ ,  $y = 15$  2 a  $AB$  and  $CD$ ,  $BE$  and  $CE$ ,  $AE$  and  $DE$

b  $\frac{AB}{CD} = \frac{BE}{CE} = \frac{AE}{DE}$  c  $x = 4$ ,  $y = 10$  3 a  $AD$  and  $AB$ ,  $AE$  and  $AC$ ,  $DE$  and  $BC$  b  $\frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC}$  c  $x = 45$ ,  $y = 6$  4 a  $AB$  and  $DE$ ,  $BC$  and  $DC$

$AC$  and  $EC$  b  $\frac{AB}{DE} = \frac{BC}{DC} = \frac{AC}{EC}$  c  $x = 15$ ,  $y = 16$  5 a  $AB$  and  $DE$ ,  $BC$  and  $EF$ ,  $AC$  and  $DF$  b  $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$  c  $x = 9$ ,  $y = 15$  6 a  $AB$  and

$DE$ ,  $BC$  and  $EF$ ,  $AC$  and  $DF$  b  $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$  c  $x = 24$ ,  $y = 65$  7 a  $PQ$  and  $TR$ ,  $QR$  and  $RS$ ,  $PR$  and  $TS$  b  $\frac{PQ}{TR} = \frac{QR}{RS} = \frac{PR}{TS}$  c  $x = 21$ ,  $y = 6$

8 a  $LM$  and  $QN$ ,  $MN$  and  $NP$ ,  $LN$  and  $QP$  b  $\frac{LM}{QN} = \frac{MN}{NP} = \frac{LN}{QP}$  c  $x = 24$ ,  $y = 35$  9 a  $AB$  and  $ED$ ,  $BC$  and  $DC$ ,  $AC$  and  $EC$  b  $\frac{AB}{ED} = \frac{BC}{DC} = \frac{AC}{EC}$

c  $x = 52\frac{1}{2}$ ,  $y = 6$

**PAGE 53** 1 a Sides in the same ratios,  $m = 20^\circ$  b Two pairs of sides in the same ratio and the included angles equal,  $y = 10$  c equiangular;  $x = 7$ ,  $y = 10$  d equiangular;  $x = 2$ ,  $y = 14$  e equiangular;  $x = 3$ ,  $y = 8$  f equiangular;  $x = 6$ ,  $y = 25$  2 a  $x = 40$ ,  $y = 8$  b  $x = 15$ ,  $y = 12$  c  $x = 9$ ,  $y = 21$

**PAGE 54** 1 a  $\frac{25}{64}$  b  $\frac{9}{25}$  c  $\frac{9}{25}$  2 a  $22\frac{5}{7}$  cm<sup>2</sup> b  $3\frac{3}{8}$  cm<sup>2</sup> c  $348\frac{4}{9}$  cm<sup>2</sup> 3 a 4 times b 3:1 c Always similar d 4:9

**PAGE 55** 1 a  $\frac{8}{27}$  b  $\frac{1}{8}$  c  $\frac{8}{125}$  2 a 31 cm<sup>3</sup> b 12.97 cm<sup>3</sup> c 5.1 cm<sup>3</sup> 3 a 125:64 b i 8:7 ii 512:343 c 544 cm<sup>3</sup>

**PAGE 56** 1 a i  $AB$  and  $DE$ ,  $BC$  and  $EF$ ,  $AC$  and  $DF$  ii  $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$  iii  $x = 8$ ,  $y = 15$  b i  $AD$  and  $AB$ ,  $DE$  and  $BC$ ,  $AE$  and  $AC$

ii  $\frac{AD}{AB} = \frac{DE}{BC} = \frac{AE}{AC}$  iii  $x = 3$ ,  $y = 15$  c i  $AB$  and  $CD$ ,  $BE$  and  $CE$ ,  $AE$  and  $DE$  ii  $\frac{AB}{CD} = \frac{BE}{CE} = \frac{AE}{DE}$  iii  $x = 6$ ,  $y = 20$  2 a  $x = 9$ ,  $y = 35$

b  $x = 25$ ,  $y = 12$  c  $x = 12$ ,  $y = 12$  3 a 4:25 b 8:125 4 a 3:7 b 9:343

**PAGE 57** 1 D 2 C 3 B 4 C 5 B 6 C 7 B 8 B 9 A 10 D

**PAGE 58** 1 2:5 2 4:25 3 8:125 4  $AB$  and  $DE$ ,  $BC$  and  $EF$ ,  $AC$  and  $DF$  5  $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$  6  $x = 6$ ,  $y = 6$  7  $AB$  and  $CD$ ,  $AE$  and  $DE$ ,

$BE$  and  $CE$  8  $\frac{AB}{CD} = \frac{BE}{CE} = \frac{AE}{DE}$  9  $x = 8$ ,  $y = 12$  10 Four times 11 Always similar 12 4:25 13 3:4 14 2:5 15 8:125

**PAGE 59** 1 a 0.966 b 0.675 c -0.5 d 2.156 e -0.269 f 0.336 2 a  $30^\circ$  b  $43^\circ 11'$  c  $69^\circ 46'$  d  $27^\circ T$  e  $53^\circ 40'$  f  $15^\circ$

3 a  $\sin \theta = \frac{4}{5}$ ,  $\cos \theta = \frac{3}{5}$ ,  $\tan \theta = \frac{4}{3}$  b  $\sin \theta = \frac{5}{13}$ ,  $\cos \theta = \frac{12}{13}$ ,  $\tan \theta = \frac{5}{12}$  c  $\sin \theta = \frac{15}{17}$ ,  $\cos \theta = \frac{8}{17}$ ,  $\tan \theta = \frac{15}{8}$  4 a 29.5 cm b 12.3 cm c 21.7 cm