BROAD HORIZON
TUITION CENTRE

11+ Tuition – Year 4

Week 30

Answers

Contents

Maths Revision Lesson

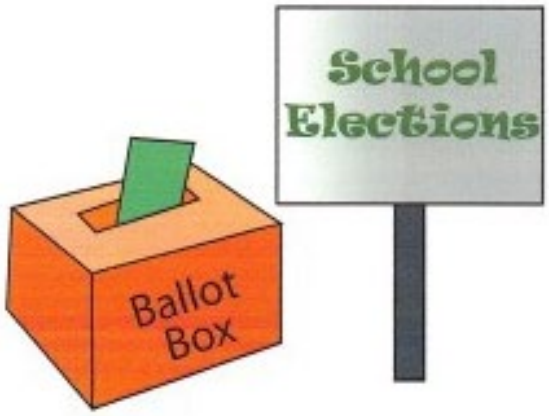
Pie Charts and Data

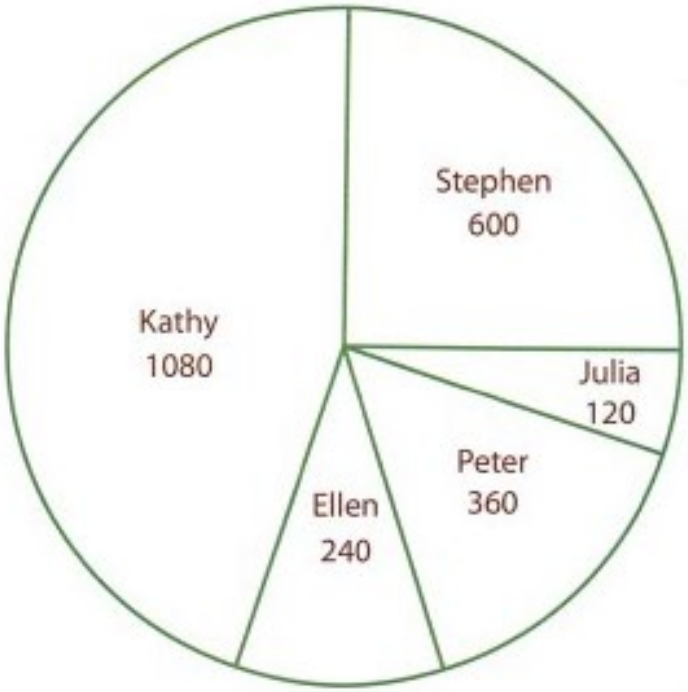
A popular movie magazine took a poll among its readers on their favorite type of movie. The results were published in the form of a pie graph. Answer the questions based on the pie graph.

1. What fraction of people like movies on fantasy? $\frac{1}{5}$
2. Which movie genres got the same number of votes? Action, Adventure
3. What percentage of readers like science fictions? 30 %
4. What fraction of readers voted for comedy as their favorite? $\frac{1}{4}$
5. How many would watch any other movie rather than 2375

Pie Graph - School Elections

Edwards High School conducted an election for the post of school president. The pie graph displays the result of the election. Read the pie graph and answer the questions.





1. Who became the school president? Kathy
2. What fraction of votes did Peter get? $\frac{3}{20}$
3. What fraction of students voted for Stephen? $\frac{1}{4}$
4. How many more votes did Ellen get than Julia? 120
5. What is the percentage of votes received by Kathy? 45 %

Misleading Data

1. Anne

Despite only having 12 votes, Anne received a higher percentage than Jamie, Hasim, Ted and Lex. Jamie got 25%, Hasim got 10% and Ted got 5%. Lex didn't get any votes, so he got 0%.
So that leaves Anne with 100% – 40% (25 + 10 + 5) = 60%
(There were only twenty voters).

2. C

The pictures in this pictogram are different sizes and this is misleading. For example the crocodile row appears longer than the snake row, but there are only 12 crocodiles (3 x 4 = 12) compared to 22 snakes (5.5 x 4 = 22).

3. D

The steps on the vertical axis double each time. What the graph appears to show at a glance is different to what the data actually shows. For example, the number of calls on Wednesday is actually double the number on Tuesday, but the difference between the values plotted on the graph looks smaller than this.

4. D

The number of children with blue eyes is $\frac{3}{4}$ of the number with green eyes. There are 24 children with blue eyes and 32 with green eyes. $\frac{1}{4}$ of 32 is 8 (32 ÷ 4 = 8) so $\frac{3}{4}$ of 32 = 3 x 8 = 24.
(The blue bar is not $\frac{3}{4}$ of the height of the green bar because the scale does not start at zero.)

Mean

1. 6

4 + 3 + 7 + 8 + 8 = 30. There are 5 numbers in total. So the mean is 30 ÷ 5 = 6.

2. 9

8 + 12 + 8 + 7 + 10 = 45. There are 5 numbers in total. So the mean is 45 ÷ 5 = 9.

3. 8

5 + 9 + 7 + 6 + 4 + 17 = 48. There are 6 numbers in total. So the mean is 48 ÷ 6 = 8.

4. 10

9 + 8 + 10 + 12 + 9 + 12 = 60. There are 6 numbers in total. So the mean is 60 ÷ 6 = 10.

5. 8

10 + 8 + 11 + 11 + 2 + 4 + 12 + 6 = 64.
There are 8 numbers in total.
So the mean is 64 ÷ 8 = 8.

6. 14 s

When the five sprint times are added together you get: 14 + 12 + 15 + 17 + 12 = 70. There are 5 times in total. So the mean time is 70 ÷ 5 = 14.

7. 11

2 + 3 + 9 + 10 + 12 + 3 + 5 + 7 + 19 + 20 + 31 = 121. There are 11 scores in total.
So the mean score is 121 ÷ 11 = 11.

8. 12 mm

9 + 12 + 14 + 13 = 48. There are 4 numbers in total. So the mean is 48 ÷ 4 = 12.

9. 21

30 + 6 + 9 + 10 + 11 + 60 = 126.
There are 6 scores in total.
So the mean score is 126 ÷ 6 = 21.

10. E

The mean of E is (16 + 4 + 9 + 7 + 14) ÷ 5 = 50 ÷ 5 = 10. So E is the correct answer.

Mean, Mode, Median and Range

Mean, Mode, Median, and Range

1) 3, 8, 2, 3
2, 3, 3, 8

Mean 4 Median 3 Mode 3 Range 6

2) 7, 9, 7, 9
7, 7, 9, 9

Mean 8 Median 8 Mode 7, 9 Range 2

3) 6, 7, 3, 3, 6, 5
3, 3, 5, 6, 6, 7

Mean 5 Median 5.5 Mode 3, 6 Range 4

4) 8, 5, 3, 8
3, 5, 8, 8

Mean 6 Median 6.5 Mode 8 Range 5

5) 5, 6, 8, 5, 6, 6
5, 5, 6, 6, 6, 8

Mean 6 Median 6 Mode 6 Range 3

6) 8, 9, 8, 8, 9, 9, 9, 4
4, 8, 8, 8, 9, 9, 9, 9

Mean 8 Median 8.5 Mode 9 Range 5

7) 3, 7, 2, 8
2, 3, 7, 8

Mean 5 Median 5 Mode None Range 6

8) 6, 9, 2, 8, 2, 4, 7, 2
2, 2, 2, 4, 6, 7, 8, 9

Mean 5 Median 5 Mode 2 Range 7

9) 7, 5, 9, 5, 2, 2
2, 2, 5, 5, 7, 9

Mean 5 Median 5 Mode 2, 5 Range 7

10) 7, 4, 8, 2, 5, 7, 8, 7
2, 4, 5, 7, 7, 7, 8, 8

Mean 6 Median 7 Mode 7 Range 6

Page 24

To calculate the mean, add up all the values and divide this total by the number of values.

1. 7
2. 17
3. 16
4. 4
5. 5

6. 2

To calculate the mean, add up all the numbers of goals: (0 + 2 + 4 + 2 + 5 + 1 + 0 + 2 = 16) and then divide by the number of matches they played (8). 16 ÷ 8 = 2

7. 20

Add up the numbers of eggs hatched each day: (25 + 10 + 25 + 20 + 25 + 15 + 20 = 140) and then divide by the number of days (7). 140 ÷ 7 = 20

8. 10

Mean = total score on the six tests ÷ number of tests (6). So, to work out the total score on the six tests, multiply the mean by 6: 7 x 6 = 42. To find the missing score, subtract the other scores from 42. 42 – 4 – 6 – 7 – 10 – 5 = 10

9. 10 °C

Add up the 'High' temperatures for each day: 14 + 14 + 10 + 4 + 8 + 11 + 9 = 70, and then divide by the number of days (7). 70 ÷ 7 = 10

10. 5 °C

Add up the 'Low' temperatures for each day: 10 + 6 + 4 + 3 + 2 + 4 + 6 = 35, and then divide by the number of days (7). 35 ÷ 7 = 5

Adding and Subtracting Fractions

Adding Fractions

1) $\frac{6}{10} + \frac{2}{4} = \frac{12}{20} + \frac{10}{20} = \frac{22}{20} = \frac{11}{10} = 1\frac{1}{10}$

2) $\frac{5}{10} + \frac{1}{4} = \frac{10}{20} + \frac{5}{20} = \frac{15}{20} = \frac{3}{4}$

3) $\frac{1}{3} + \frac{2}{5} = \frac{5}{15} + \frac{6}{15} = \frac{11}{15}$

4) $\frac{1}{2} + \frac{2}{3} = \frac{3}{6} + \frac{4}{6} = \frac{7}{6} = 1\frac{1}{6}$

5) $\frac{1}{4} + \frac{3}{5} = \frac{5}{20} + \frac{12}{20} = \frac{17}{20}$

6) $\frac{2}{3} + \frac{3}{4} = \frac{8}{12} + \frac{9}{12} = \frac{17}{12} = 1\frac{5}{12}$

7) $\frac{2}{5} + \frac{1}{4} = \frac{8}{20} + \frac{5}{20} = \frac{13}{20}$

8) $\frac{3}{4} + \frac{3}{5} = \frac{15}{20} + \frac{12}{20} = \frac{27}{20} = 1\frac{7}{20}$

9) $\frac{1}{3} + \frac{8}{10} = \frac{10}{30} + \frac{24}{30} = \frac{34}{30} = \frac{17}{15} = 1\frac{2}{15}$

10) $\frac{1}{2} + \frac{1}{5} = \frac{5}{10} + \frac{2}{10} = \frac{7}{10}$

Subtracting Fractions

1) $\frac{2}{3} - \frac{2}{10} = \frac{20}{30} - \frac{6}{30} = \frac{14}{30} = \frac{7}{15}$

2) $\frac{9}{10} - \frac{2}{3} = \frac{27}{30} - \frac{20}{30} = \frac{7}{30}$

3) $\frac{4}{5} - \frac{2}{3} = \frac{12}{15} - \frac{10}{15} = \frac{2}{15}$

4) $\frac{1}{2} - \frac{1}{3} = \frac{3}{6} - \frac{2}{6} = \frac{1}{6}$

5) $\frac{3}{4} - \frac{6}{10} = \frac{15}{20} - \frac{12}{20} = \frac{3}{20}$

6) $\frac{9}{10} - \frac{3}{5} = \frac{9}{10} - \frac{6}{10} = \frac{3}{10}$

7) $\frac{2}{4} - \frac{2}{10} = \frac{10}{20} - \frac{4}{20} = \frac{6}{20} = \frac{3}{10}$

8) $\frac{8}{10} - \frac{2}{4} = \frac{16}{20} - \frac{10}{20} = \frac{6}{20} = \frac{3}{10}$

9) $\frac{6}{10} - \frac{1}{5} = \frac{6}{10} - \frac{2}{10} = \frac{4}{10} = \frac{2}{5}$

10) $\frac{2}{3} - \frac{1}{4} = \frac{8}{12} - \frac{3}{12} = \frac{5}{12}$

Fractions of Numbers

Working with fractions and whole numbers.

1) Find $\frac{2}{6}$ of 108 =
36

2) Find $\frac{1}{4}$ of 32 =
8

3) Find $\frac{1}{12}$ of 48 =
4

4) Find $\frac{2}{5}$ of 50 =
20

5) Find $\frac{5}{8}$ of 440 =
275

6) Find $\frac{2}{5}$ of 90 =
36

7) Find $\frac{4}{10}$ of 280 =
112

8) Find $\frac{5}{10}$ of 150 =
75

9) Find $\frac{3}{4}$ of 24 =
18

10) Find $\frac{1}{3}$ of 9 =
3

11) Find $\frac{1}{8}$ of 96 =
12

12) Find $\frac{1}{5}$ of 25 =
5

13) Find $\frac{4}{6}$ of 144 =
96

14) Find $\frac{1}{6}$ of 72 =
12

15) Find $\frac{11}{12}$ of 1320
1210

16) Find $\frac{3}{4}$ of 48 =
36

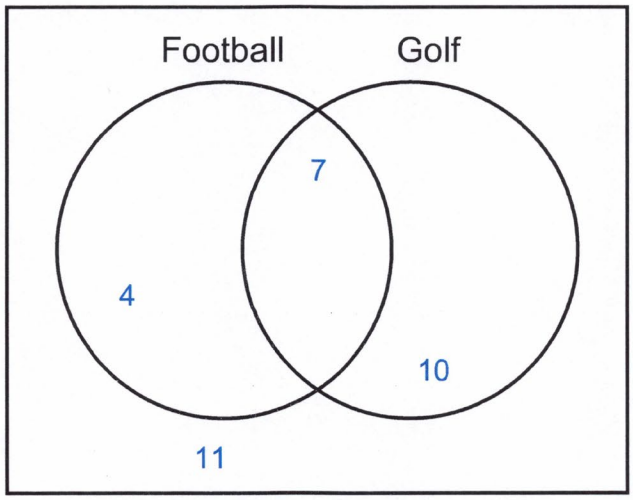
17) Find $\frac{11}{12}$ of 1320
1210

18) Find $\frac{1}{10}$ of 20 =
2

19) Find $\frac{2}{3}$ of 42 =
28

20) Find $\frac{1}{3}$ of 33 =
11

Venn Diagrams



1) How many students like Football or Golf ? 21

2) How many students do not like either Football or Golf ? 11

3) How many students do not like both Football and Golf ? 25

4) How many students like Football ? 11

5) How many students like Golf ? 17

6) How many students only like Golf ? 10

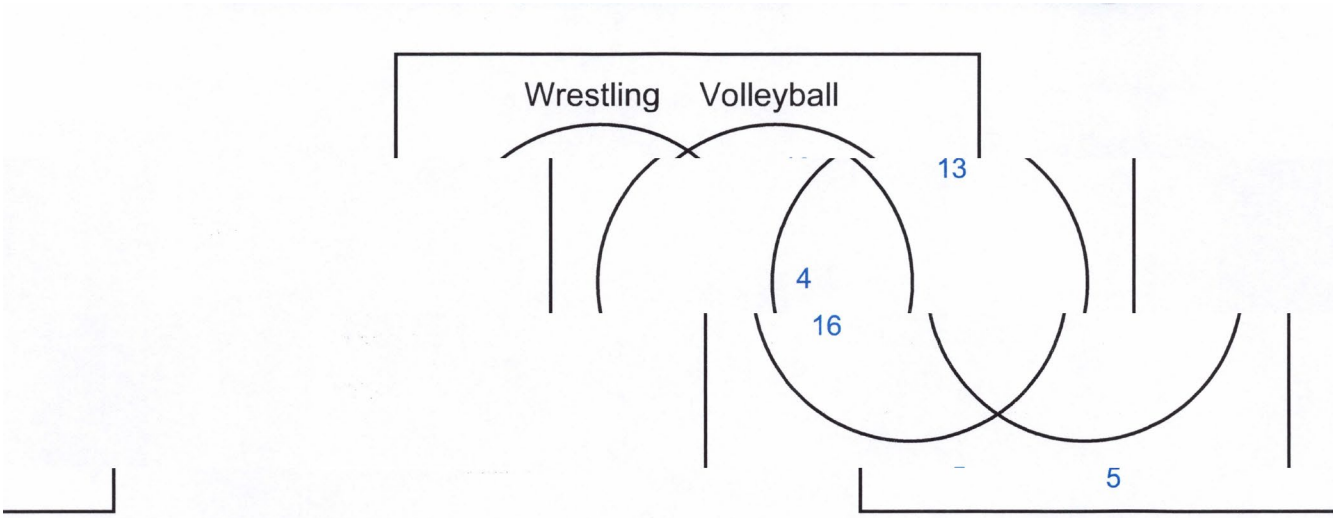
7) How many students do not like Golf ? 15

8) How many students only like Football ? 4

9) How many students do not like Football ? 21

10) How many students like both Football and Golf ? 7

Answer the questions based on the Venn diagram



ıg or Volleyball ? 5 1) How many students do not like either Wrestlir

stling ? 18 2) How many students do not like Wres

olleyball ? 17 3) How many students like Volleyball?

restling ? 20 4) How many students like W

nts do not like both Wrestling and Volleyball ? 34 5) How many studer

nts only like Volleyball ? 13 6) How many studer

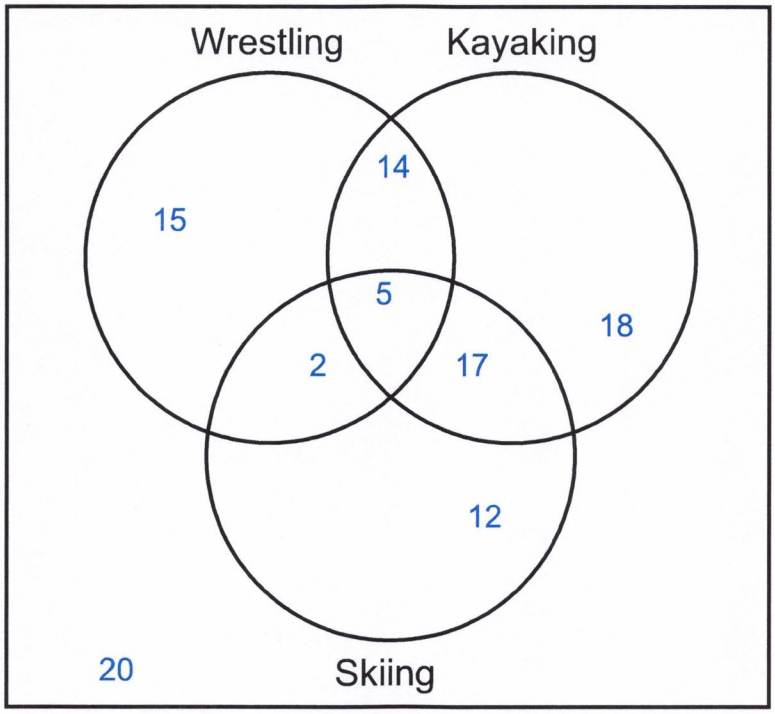
ny students do not like Volleyball ? 21 7) How ma

How many students like Wrestling or Volleyball ? 33 8)

How many students only like Wrestling ? 16 9)

10) How many students like both Wrestling and Volleyball ? 4

Answer the questions based on the Venn diagram



1) How many students like both Wrestling, Kayaking, and Skiing ? 5

2) How many students like both Wrestling and Kayaking ? 19

3) How many students do not like both Kayaking and Skiing ? 81

4) How many students like both Wrestling and Skiing but not Kayaking ? 2

5) How many students like Wrestling or Skiing but not Kayaking ? 29

6) How many students like Wrestling or Skiing ? 65

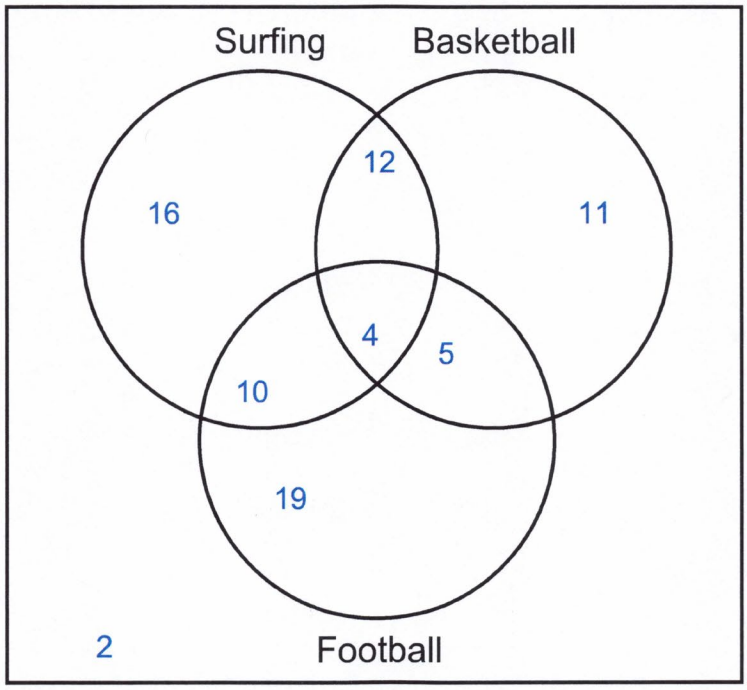
7) How many students like both Kayaking and Skiing ? 22

8) How many students do not like both Wrestling and Kayaking ? 84

9) How many students like Wrestling or Kayaking ? 71

10) How many students only like Skiing ? 12

Answer the questions based on the Venn diagram



1) How many students like both Surfing and Football ? 14

2) How many students like both Basketball and Football but not Surfing ? 5

3) How many students only like Surfing ? 16

4) How many students like both Surfing and Basketball but not Football ? 12

5) How many students like Basketball or Football ? 61

6) How many students like both Surfing, Basketball, and Football ? 4

7) How many students do not like both Surfing and Football ? 65

8) How many students only like Basketball ? 11

9) How many students only like Football ? 19

10) How many students do not like both Surfing and Basketball ? 63

BIDMAS – Order of Operations

Solve.

1) $(83 - 38) \div 3^2$

Ans = **5**

2) $(36 \div 9)^3 - 87$

Ans = **– 23**

3) $(7^2 + 41) \div 3 - 94$

Ans = **– 64**

4) $(14 \times 5) + 2^5$

Ans = **102**

5) $3^2 + (26 - 9) \times 2$

Ans = **43**

6) $7 + 66 \div (2^4 - 5)$

Ans = **13**

7) $(64 + 24) \div 2^3$

Ans = **11**

8) $(55 - 45)^2 \div 4$

Ans = **25**

9) $14 + 75 - (31 \times 3^2)$

Ans = **– 190**

10) $3^3 + 77 \div (27 - 16)$

Ans = **34**

Q.No	Start Time	End Time	Elapsed Time
1)	4:02 A.M.	7:23 A.M.	3 hours and 21 minutes
2)	9:32 P.M.	11:48 P.M.	2 hours and 16 minutes
3)	1:10 A.M.	9:44 A.M.	8 hours and 34 minutes
4)	5:12 P.M.	7:27 P.M.	2 hours and 15 minutes
5)	3:18 A.M.	10:09 A.M.	6 hours and 51 minutes
6)	11:10 P.M.	11:52 P.M.	42 minutes
7)	2:33 A.M.	8:47 A.M.	6 hours and 14 minutes
8)	4:54 P.M.	6:03 P.M.	1 hour and 9 minutes
9)	7:16 A.M.	9:28 A.M.	2 hours and 12 minutes
10)	5:59 P.M.	11:04 P.M.	5 hours and 5 minutes
11)	1:08 A.M.	3:17 A.M.	2 hours and 9 minutes
12)	10:22 P.M.	Midnight	1 hour and 38 minutes
13)	2:45 A.M.	8:33 A.M.	5 hours and 48 minutes
14)	6:11 P.M.	10:10 P.M.	3 hours and 59 minutes
15)	2:14 A.M.	6:36 A.M.	4 hours and 22 minutes

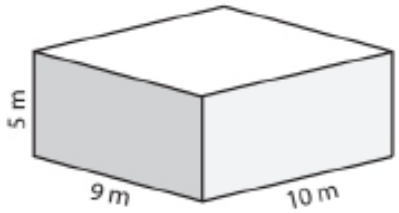
Percentages of Numbers

Question	Answer
1	72
2	0.5
3	5
4	25
5	21
6	45
7	21
8	2.5
9	32
10	45
11	72
12	14
13	27.5
14	93.5
15	22.5

Question	Answer
16	15
17	18
18	123.5
19	19.5
20	9.5
21	44
22	544
23	345
24	931
25	243
26	77
27	15.5
28	533
29	390
30	480

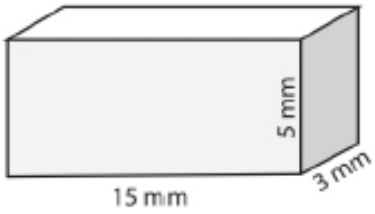
Surface Area

1)



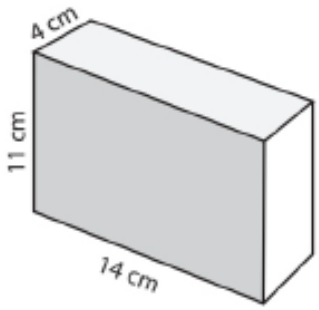
Surface Area = **370 m²**

2)



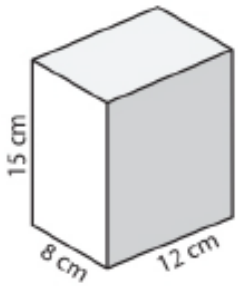
Surface Area = **270 mm²**

3)



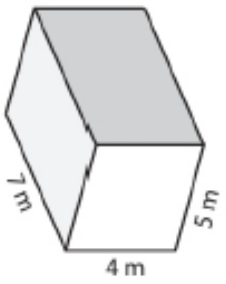
Surface Area = **508 cm²**

4)



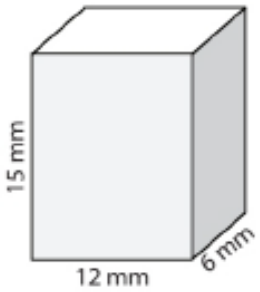
Surface Area = **792 cm²**

5)



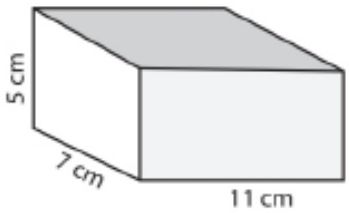
Surface Area = **166 m²**

6)



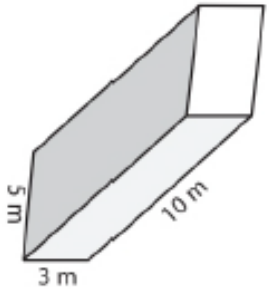
Surface Area = **684 mm²**

7)



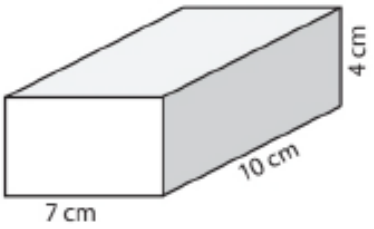
Surface Area = **334 cm²**

8)



Surface Area = **190 m²**

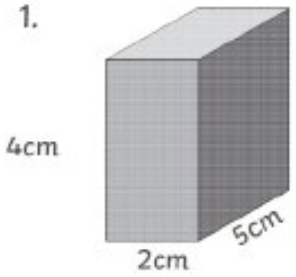
9)



Surface Area = **276 cm²**

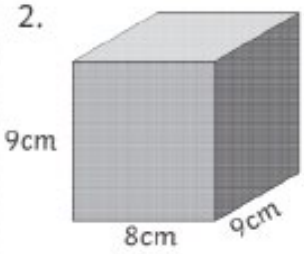
Volume

1.



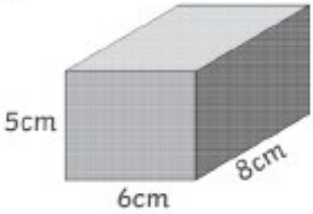
Volume = **40cm³**

2.



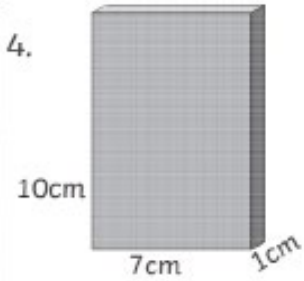
Volume = **648cm³**

3.



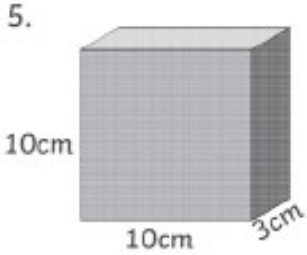
Volume = **240cm³**

4.



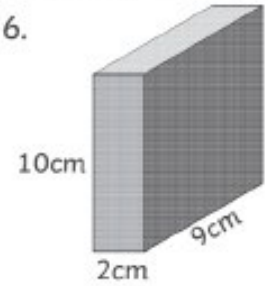
Volume = **70cm³**

5.



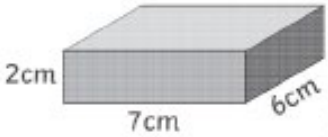
Volume = **300cm³**

6.



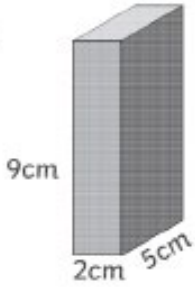
Volume = **180cm³**

7.



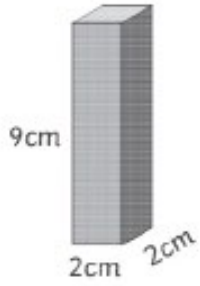
Volume = **84cm³**

8.



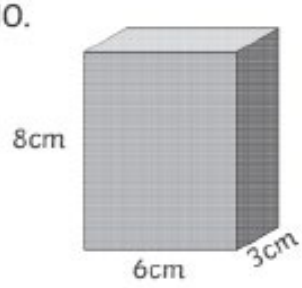
Volume = **90cm³**

9.



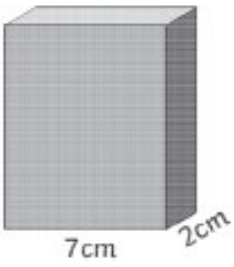
Volume = **36cm³**

10.



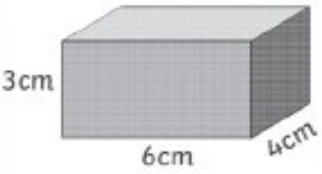
Volume = **144cm³**

11.



Volume = **126cm³**

12.



Volume = **72cm³**

Comprehension Practice (inference)

Exercise 1 - A Great Idea, page 2

Question	Answer	Explanation
1	The narrator losing his or her job	Inferred from the line: 'I tried not to think of the day before; my company had announced redundancies and I had had to leave my job.'
2	The sun was shining through the trees.	Inferred from the line: 'The sun shone through the trees...'
3	At work	Inferred from the line: 'It was midweek and I had thought that most people would be busy elsewhere.'
4	Wonderful/ideal/ happy/peaceful	Inferred from the line: 'This was an idyllic scene, so different to the grey drudgery of office life.'
5	Happy	Inferred from the line: '...park keepers buzzed around on small tractors, busily transporting fallen branches or piles of leaves about the park, and obviously enjoying their work.'
6	Work outdoors/ spend time outdoors	Inferred from the line: '...life was best spent in the outdoors, feeling the heat of the sun and enjoying the healthiness of physical work. Right there, I resolved to follow their example...'

Exercise 2 - The Dance Class, page 3

Question	Answer	Explanation
1	Happy	Inferred from the line: '...called good naturedly...'
2	Unusual/surprising	Inferred from the line: 'I had wondered if he had been joking. He didn't seem the type to go dancing on a Monday evening.'
3	Their difference in height	Inferred from the line: 'He said he had a wonderful dance partner, who was half a foot taller than his already short 5'3" stature.'
4	He is too stiff.	Inferred from the line: 'I said I was too stiff to dance well.'
5	It is charity.	Inferred from the line: 'Beginners and new participants were both welcome and the event was to be held for charity. This last fact convinced me to go.'
6	He said he was heading off to the dance floor.	Inferred from the line: '...a few months later, I too was heading off to the dance floor each Monday.'

Exercise 3 - Hampton Pool, page 4

Question	Answer	Explanation
1	A roof	Inferred from the line: '...it is out in the open air.'
2	Every day	Inferred from the line: '...the pool is open 365 days a year!'
3	The east side	Inferred from the line: 'Situated in the west corner of Bushy Park...'
4	Walking to the pool (from the changing rooms)	Inferred from the line: '...though you do shiver a bit walking from the changing rooms over to the pool!'
5	1916	Inferred from the line: '...it was not opened until 1922, six years later than planned.'
6	Raised money	Inferred from the line: 'It was unfortunately closed in 1980 due to lack of money, but the local community clubbed together and it was reopened in 1985.'

Verbal Reasoning

Cloze Wordbank

Test 27

Cloze Wordbank Test 27

Q1 ***D***
goddess
Q2 ***E***
believed
Q3 ***G***
homes
Q4 ***H***
design
Q5 ***C***
celebration
Q6 ***I***
symbols
Q7 ***J***
infinity
Q8 ***A***
lotus
Q9 ***F***
drawn
Q10 ***B***
indicate

Cloze Wordbank Test 28

Q1 ***F***
receives
Q2 ***I***
recognition
Q3 ***D***
need
Q4 ***B***
risk
Q5 ***H***
tirelessly
Q6 ***C***
environment
Q7 ***E***
challenges
Q8 ***G***
examples
Q9 ***J***
volunteer
Q10 ***A***
single

Mixed Verbal Reasoning

Test 1

PAGES 30-35 — ASSESSMENT TEST 1

1. **D** — *In the passage it says that Gary Dahl was "an advertising executive", which means that he worked in advertising.*
2. **B** — *In the passage it says that "after 1975, sales dried up".*
3. **C** — *In the passage it says that Pet Rocks don't need "feeding, walking or bathing", and won't incur "any expensive vet bills".*
4. **D** — *The instruction booklet didn't tell you how to make a bed of straw.*
5. **A** — *In the passage it says "Pet Rocks sold well during the Christmas period", and "after 1975, sales dried up", so they sold well in December 1975.*
6. **C** — *In the passage it says "they were destined to be a fad". This means that people lost interest in them.*
7. **D** — *He came up with an idea that people wouldn't expect to do well but he made a lot of money from it.*

8. **C** — *'original' is closest in meaning to "unique". Both words mean 'not based on anything else'.*
9. **B** — *'short-lived trend' is closest in meaning to "fad". Both words mean 'a craze that doesn't last'.*
10. **A** — *"sales dried up" means that people stopped buying Pet Rocks.*
11. **D** — *Pet Rocks sold well at Christmas because they were a popular novelty gift.*
12. **C** — *This phrase means 'to be well-known around the globe'.*
13. **sunset** — *'sunrise' means 'dawn', whereas 'sunset' means 'dusk'.*
14. **light** — *'heavy' means 'weighing a lot', whereas 'light' means 'weighing little'.*
15. **girl** — *'boy' means 'a young male', whereas 'girl' means 'a young female'.*
16. **conclusion** — *'introduction' means 'beginning', whereas 'conclusion' means 'end'.*
17. **winter** — *'summer' is the hottest season, whereas 'winter' is the coldest season.*
18. **always** — *'never' means 'not ever', whereas 'always' means 'all the time'.*
19. **demolish** — *'build' means 'to construct', whereas 'demolish' means 'to tear down'.*
20. **risky** — *'safe' means 'not dangerous', whereas 'risky' means 'dangerous'.*
21. s**h**ar**p** — *Both words mean 'spiky'.*
22. h**a**s**t**y — *Both words mean 'speedy'.*
23. s**l**e**n**de**r** — *Both words mean 'thin'.*
24. s**lee**py — *Both words mean 'drowsy'.*
25. de**l**a**y**ed — *Both words mean 'not on time'.*
26. ce**ntr**e — *Both words mean 'the half-way point'.*
27. b**rai**n**y** — *Both words mean 'intelligent'.*
28. in**jur**e — *Both words mean 'to harm'.*
29. sc**hoo**l — *'Ashok and Ben left **school**'*
30. s**tay**ed — *'They had **stayed** late for hockey practice'*
31. c**h**an**g**e**d** — *'Ben had taken ages to get **changed**'*
32. u**ncl**e — *'Ashok's aunt and **uncle** were coming round for dinner'*
33. h**om**e — *'he had to get **home** quickly.'*
34. **fiel**d — *'The boys jogged across the playing **field**'*
35. c**omp**ete — *'the tournament they were due to **compete** in on Saturday.'*
36. sud**denl**y — *"'Come on," said Ben **suddenly**'*
37. **ti**me — *'We'll be home in no **time**.'*
38. co**rn**e**r** — *'As the boys rounded the **corner**'*
39. s**tra**nge — *'they noticed a **strange** glow'*
40. l**arge** — *'the **large** industrial bins'*
41. **o**pe**n** — *'The lid of the bin was propped **open**.'*
42. **l**oo**k**ed — *'they saw what **looked** like a huge egg'*
43. wr**app**ed — *'half **wrapped** in an old sack'*
44. co**min**g — *'The eerie glow was **coming** from the egg'*
45. **mini** — *The other three all mean 'above average size'.*
46. **badger** — *The other three are all pets.*
47. **finger** — *The other three are all facial features.*
48. **scarf** — *The other three are all items of jewellery.*
49. **apple** — *The other three are all vegetables.*
50. **work** — *The other three involve using your voice.*
51. **solo** — *Both of these mean 'by yourself'.*
52. **damp** — *Both of these mean 'moist'.*
53. **minuscule** — *Both of these mean 'tiny'.*
54. **joyous** — *Both of these mean 'joyful'.*
55. **sprint** — *Both of these mean 'to move fast on foot'.*
56. **sketch** — *Both of these mean 'to depict something, usually in pencil'.*

Verbal Reasoning

GL Techniques – Types 1- 22

39. dice
65. LOST
66. BOOT
67. HOSE
8. step
9. time
10. lame
11. hush
12. tar
13. mate

78. tug yacht
79. cycle climb
80. Popeye Pluto

54. 5 1 2 4 3
55. 1 3 4 2 5

74. The bottom drawer
75. rabbit field hurry

31. FRANCE
32. RAKE
33. PENCIL

97. for
98. lay

14. g
15. n
16. y
17. d

48. WAND
49. TEAM

Non-Verbal Reasoning

Test 5

ASSESSMENT TEST 5

Section 1 — Complete the Square Grid

1. B
Moving from left to right, the hatching of the shape rotates 45 degrees clockwise.

2. D
Moving from left to right, the shape rotates 90 degrees anticlockwise in each grid square.

3. C
The third grid square in each row is made up of the figure in the first grid square on top of the figure in the middle grid square.

4. B
Each shape only appears once in each row and column.

5. A
Working from top to bottom, the circles are in the same position in each grid square. Working from left to right, the arrows are in the same position and orientation in each grid square.

6. B
In each row, the right-hand grid square is formed by combining the shape from the left-hand grid square with the shading from the circle in the central grid square.

7. C
Working from top to bottom, the square in each grid square gains an extra line.

8. A
Working from right to left, one section of the shape is removed in each grid square, going in a clockwise direction. The shape changes colour from white to grey and then back to white.

Section 2 — Find the Figure Like the First Two

1. C
All figures must have a triangle overlapping a circle.

2. B
All figures must have six sides.

3. C
All figures must have a white rectangle in front of a black rectangle.

4. B
All figures must be identical apart from rotation.

5. D
In each figure, the larger shape must have one more side than the smaller shape.

6. D
All figures must have two parallel lines crossing a single longer line.

7. B
All figures must have a dashed line between two shapes of the same colour. (Or they must all have a dashed line and a triangle.)

8. B
All figures must have a grey shape in front of a white shape.

Section 3 — Complete the Pair

1. E
The circles change position, but keep the same shading.

2. B
The figure rotates 90 degrees anticlockwise.

3. E
The shape changes into another shape with the same number of sides.

4. D
The figure rotates 180 degrees.

5. A
The circle and the arrowheads rotate 45 degrees anticlockwise.

6. F
The large shape splits in half and becomes the same colour as the circle.

7. E
The black shape becomes larger and moves to the centre. The white shape gets smaller and moves to the top-left of the black shape.

8. B
The grey shape reflects onto the black shape.

Section 4 — Rotate the Figure

1. D
The figure is rotated 270 degrees clockwise (or 90 degrees anticlockwise). Option A is a reflection. In option B, the shadings of the circle and the square have swapped. Option C has an extra line across the middle.

2. C
The figure is rotated 225 degrees clockwise (or 135 degrees anticlockwise). Options A and D are the wrong shape. Option B is a reflected rotation.

3. A
The figure is rotated 270 degrees clockwise (or 90 degrees anticlockwise). Options B and D are the wrong shape. Option C is a reflected rotation.

4. C
The figure is rotated 225 degrees clockwise (or 135 degrees anticlockwise). In option A, the shading of the circles is wrong. Option B is a reflected rotation. Option D has too many circles.

5. B
The figure is rotated 45 degrees clockwise. Options A and C are the wrong shape. Option D is a reflected rotation.

6. D

The figure is rotated 135 degrees clockwise. In option A the pentagon is positioned incorrectly. Option B has a si square instead of a pentagon. Option C is a reflected rot

7. B

The figure is rotated 270 degrees clockwise (or 90 degr anticlockwise). In option A, the shadings of the circles have swapped and there is no small square. Option C is a reflected rotation and both circles are shaded black. In option D, the parallel lines are positioned incorrectly.

8. C

The figure is rotated 225 degrees clockwise (or 135 deg anticlockwise). Option A is a reflected rotation. Option B has the wrong number of points on the star. In option D, the star is behind the arch instead of in front of it.

9. C

The figure is rotated 135 degrees clockwise. Option A is a reflected rotation. In option B, the arrow is positioned incorrectly. Option D is a reflection.

10. D

The figure is rotated 225 degrees clockwise (or 135 degrees anticlockwise). Options A and C are the wrong shape. Option B is a reflected rotation.

Section 5 — Complete the Series

1. D

The series alternates between the first two figures.

2. A

The entire contents of the series square rotates 45 degrees clockwise.

3. D

The number of 'arms' changes in the sequence: three, four, five, four, three. The shading of the circles alternates between grey and white.

4. C

In each series square, the missing side of the inner hexagon moves anticlockwise. The shading of the smallest hexagon alternates between black and white.

5. E

The entire contents of the series square rotates 90 degrees clockwise.

6. E

The sequence of the number of sides of each shape goes: three, four, five, four, three. The hatching alternates between horizontal and vertical.

7. E

Each series square is reflected across and the black shading moves up into the next triangle.

8. B

In each series square, one more arrow rotates so it is pointing diagonally up to the left.

9. D

In each series square, there is one more star. The number of squares alternates between two and one.

10. D

In each series square, the circle gets bigger and the square gets smaller. Each shape alternates between grey and white.