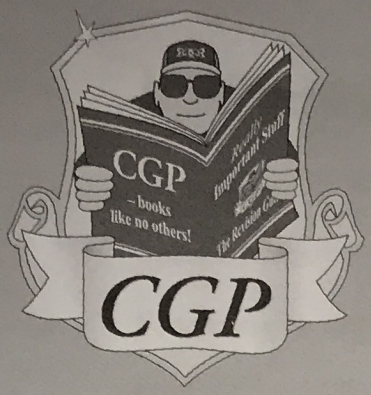


CGP

The 11+ Practice Test Papers

For the CEM (Durham University) test

11+

- Verbal Reasoning
- Comprehension
- Maths
- Non-Verbal Reasoning

The

Answer Book

Pack 2

Practise • Prepare • Pass

Everything your child needs for 11+ success

Using these Practice Tests

These practice tests are similar in format and style of questions to a typical 11+ test from the University of Durham CEM. The real test will look a little different and may contain question types that don't appear in these practice papers.

Preparing to take the tests

Find out whether your child will be taking the real test in multiple-choice or write-in format. To practise multiple-choice questions, they should mark their answers on the multiple-choice answer sheets provided by drawing a horizontal pencil line through the correct box. To practise write-in questions, they should mark their answers in pencil on the question paper. If they make a mistake, they should rub it out before marking their new answer.

Encourage your child to work under test conditions for some realistic practice. They shouldn't be distracted by anything going on around them or ask you questions once the test begins. Remind them to read the questions, work quickly but carefully and make sensible guesses for questions they can't answer.

Taking the tests

The tests are split into individually timed sections — the time allowed for each section is written on the paper. There's an example question at the start of each section, which isn't timed. Once your child has read the example, allow them the correct amount of time to answer the questions. If they don't quite finish in that time, draw a line under the last question they answered in the time limit and then move on to the next section. At the end, encourage them to go back and answer the questions they missed — it's a good way to get some extra practice.

What your child's score means

Marking the tests

Set A (Paper 1 and Paper 2) forms one complete test, and Set B (Paper 1 and Paper 2) forms another. You should give one mark for each correct answer, and then work out your child's total score out of 175. It's really important to go through any wrong answers with your child — use the explanations in this answer book to show them how to find the right answer.

Your child should be aiming to score 140 or more overall (that's around 80%). The pass mark of the actual test will vary from school to school.

What to do next

The score may help you pinpoint specific topics that your child needs to work at or skills they need to practise. For example, if your child scored 60%, got nearly all the questions right but didn't quite finish the test, they need to work faster next time. If they scored 60%, got to the end of the paper but got 40% of the questions wrong, they need to brush up on their accuracy. You can follow this up with some practice in the areas they find tricky, and then set another practice test.

Set A — Paper 1

Section 1: Verbal Reasoning — Comprehension 1: Don't get in a spin

1. C

The text says that track bikes are "similar to road bikes". Road bikes have "curved handlebars", so track bikes don't have straight handlebars.

2. C

In the passage it says that "Cyclists race for 21 days (with a couple of rest days on top of this)". 21 days is the equivalent of three weeks, so the Tour de France lasts for more than three weeks.

3. B

In the passage it says that "getting exercise is a vital part of looking after your health" and that "Riding a bike is one of the easiest ways to build regular exercise into your life". So, according to the author, the main benefit of cycling is that it is good for your health.

4. C

The text says that track bikes "have only one gear", so C is false.

5. D

The use of the word "drag" suggests that the act is forced and emphasises that it can be difficult to make yourself go running.

6. C

In the passage it says that "cycling puts very little strain on ankle, hip and knee joints", which reduces the risk of long-term injuries.

7. A

In the passage it says that BMX bikes "have a single gear", and that road bikes have "low gears" as well as "high gears".

8. A

In the passage it says that many people find it "difficult to make time for exercise". So their busy lifestyles prevent them from exercising.

9. B

In the passage it says that cycling regularly can "improve your fitness and reduce stress". Options 2 and 3 are additional benefits of cycling, not reasons why it's good for your health.

10. C

In the passage it says that cycling causes fewer long-term injuries "compared to high-impact sports such as running".

11. B

In the passage it says that road bikes have "thin, smooth tyres to reduce friction" — if there is less friction between the tyres and the road, then the bike will be able to move faster.

12. D

"professional" refers to something that people do to earn a living.

13. C

"exclusively" means 'solely'.

14. C

"challenging" means 'demanding'.

15. D

A "way of life" means the typical way in which you live, so for some people cycling affects how they live their lives.

16. D

"up for grabs" means available to be won by the best competitors.

Section 2: Verbal Reasoning — Comprehension 2: The History of the Hollywood Sign

1. D

The text says that the sign was "erected by a local businessman" to help him "fill the expensive housing estate he was building", so it was intended as an advertisement.

2. D

The text says that the "letter 'H' had been missing" since "the early 1940s", and the sign wasn't repaired until 1949, when the Hollywood Chamber of Commerce removed the word 'land' from the sign.

3. D

The text says that each letter is between 31 and 40 feet wide, and there are nine letters, so the widest the sign could be in total is $9 \times 40 = 360$ feet.

4. C

The text says that 2013 was the sign's 90th birthday, so it was erected in 1923. The word 'land' was removed from the sign in 1949, 26 years later.

5. D

The text says that construction began in August 1978 and that there was no sign for "three months", which means the new sign appeared some time in November 1978.

6. B

The text says that the sign cost more than $250 000 to build and that patrons "invested in stronger materials". This suggests that these materials were expensive to source.

7. C

The text says that "In the late 1940s, ownership of the sign was handed over to the city". Before then it was owned by Harry Chandler.

8. C

The text says that "Although they [the Chamber] removed the light bulbs... maintenance costs continued to escalate". This suggests that the bulbs were removed to save money.

9. D

A 'Golden Age' is a time when something is at its peak, so the 1920s are known as the 'Golden Age of Hollywood' because the movie business was very successful then.

10. B

The text says that Harry Chandler "had not meant the sign to last" so "it was not made of the most resilient materials."

Section 3: Verbal Reasoning — Multiple Meanings

1. bank

'bank' can mean 'a place to keep money' or 'the land beside a body of water'.

2. back

'back' can mean 'to support' or 'the reverse'.

3. jar

'jar' can mean 'a food container' or 'annoy'.

4. change

'change' can mean 'a modification' or 'money of relatively low value'.

5. clear

'clear' can mean 'straightforward' or 'prove innocent'.

6. fair

'fair' can mean 'not biased' or 'of light complexion'.

7. purchase

'purchase' can mean 'a grip that prevents something from slipping' or 'acquire with money'.

8. engaged

'engaged' can mean 'promised to be married' or 'in use'.

9. plant

'plant' can mean 'a living organism which grows in the ground' or 'a place where a product is manufactured'.

10. light

'light' can mean 'not serious' or 'not dark'.

11. converse

'converse' can mean 'contrasting' or 'engage in a spoken exchange'.

12. permit

'permit' can mean 'a document which grants authorisation' or 'consent'.

Section 4: Verbal Reasoning — Antonyms

1. trivial

'important' means 'significant', whereas 'trivial' means 'insignificant'.

2. cautious

'careless' means 'not taking care', whereas 'cautious' means 'taking a lot of care'.

3. worldly

'unsophisticated' means 'inexperienced', whereas 'worldly' means 'experienced'.

4. frivolous

'sensible' means 'practical', whereas 'frivolous' means 'impractical'.

5. frail

'tough' means 'strong', whereas 'frail' means 'weak'.

6. foe

'friend' means 'ally', whereas 'foe' means 'enemy'.

7. proven

'theoretical' means 'based on what is believed to be possible', whereas 'proven' means 'shown to be true'.

8. profound

'shallow' means 'lacking depth', whereas 'profound' means 'deep'.

9. mobile

'fixed' means 'immovable', whereas 'mobile' means 'movable'.

10. varied

'uniform' means 'the same', whereas 'varied' means 'different'.

11. quirky

'conventional' means 'normal', whereas 'quirky' means 'eccentric'.

12. flippant

'respectful' refers to taking something seriously, whereas 'flippant' refers to not taking something seriously.

13. passive

'dynamic' means 'active', whereas 'passive' means 'inactive'.

14. arduous

'easy' means 'not difficult', whereas 'arduous' means 'difficult'.

15. loiter

'hurry' means 'rush', whereas 'loiter' means 'dawdle'.

16. forfeit

'award' means 'a prize', whereas 'forfeit' means 'a punishment'.

Section 5: Verbal Reasoning — Synonyms

1. despise

Both words mean 'feel strong dislike'.

2. austere

Both words mean 'plain'.

3. promising

Both words mean 'giving hope'.

4. bewildered

Both words mean 'confused'.

5. abundance

Both words mean 'more than enough'.

6. berserk

Both words mean 'crazy'.

7. flamboyant

Both words mean 'flashy'.

8. arbitrary

Both words mean 'with no pattern or reason'.

9. dismal

Both words mean 'dark and dreary'.

10. cheerful

Both words mean 'happy'.

11. frigid

Both words mean 'chilly'.

12. droll

Both words mean 'funny'.

13. introverted

Both words mean 'reserved'.

14. radiant

Both words mean 'emitting heat or light'.

15. condensed

Both words mean 'compressed'.

16. inventive

Both words mean 'imaginative'.

17. apathetic

Both words mean 'indifferent'.

18. congested

Both words mean 'clogged'.

Section 6: Numerical Reasoning

1. 100 000

When you add 1 to 99 999, the units column equals 10 so you carry the 1 into the next column. This continues through the number to give you 100 000.

2. 10

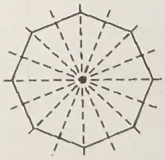
The difference between 31 and the starting number must be a multiple of 7: 31 – 10 = 21, which is 3 × 7. Alternatively, you could count back in 7s from 31 — 31, 24, 17, 10.

3. 7.04

The hundredths are the second column to the right of the decimal point. Look at the next decimal column to the right (the thousandths) to see whether to round up or down. Here there are 8 thousandths, so the number rounds up to 7.04.

4. 8

The number of lines of symmetry in a regular shape is equal to the number of sides. The eight lines of symmetry are shown below:



5. P, Q and S

A prism is a 3D shape that has the same face at each end. So there are three prisms: shapes P, Q and S. (A cube is a special prism, since all the edges are equal, but it is still a prism).

6. 6

The mode is the number which appears most often. 2, 5 and 7 occur once; 3 and 4 occur twice; 6 occurs three times (which is the most often) — so 6 is the mode.

7. 130 cm

The height of an average car is usually between 100 cm and 150 cm. 130 cm is the most likely figure as none of the other options are realistic.

8. 6

The key tells you that 1 symbol = 4 cars. There are 5 whole symbols for silver cars and 3 ½ symbols for black cars. The difference between them is 5 – 3 ½ = 1 ½. Since ½ a symbol shows ½ × 4 = 2 cars, there are 4 + 2 = 6 more silver cars. Alternatively, find the difference in the number of cars. There are 5 symbols for silver cars. 5 symbols show 5 × 4 = 20 silver cars. There are 3 ½ symbols for black cars. 3 symbols show 3 × 4 = 12 cars. ½ a symbol shows ½ × 4 = 2 cars. So there are 12 + 2 = 14 black cars. So the difference is 20 – 14 = 6.

9. 21

Work out how many people are left on the bus when 8 get off:
24 – 8 = 16 people.
5 people then got on the bus, so work out how many people are on the bus now: 16 + 5 = 21 people.

10. 480

Ignore the zero in the units column of each number and think of them as 21, 33, 34, 40 and 48. Then work out which of these numbers is in the 3 and 4 times table. The numbers that are in the 4 times table are 10 × 4 = 40 and 12 × 4 = 48. Of these two numbers only 48 is also divisible by 3 because the digits add up to a multiple of 3 (4 + 8 = 12).

11. 53°

Angles in a triangle add up to 180°. Add together the two known angles — 100° + 27° = 127°. Now subtract this from 180°. Missing angle x is 180° – 127° = 53°.

12. $\frac{1}{4}$

The cake is cut into 24 pieces. 18 of these are given away so there are 24 – 18 = 6 pieces left. As a fraction of the whole cake, this is $\frac{6}{24}$. The highest common factor of the numerator and denominator is 6, so divide the top and bottom by 6. This leads to 6 ÷ 6 = 1 and 24 ÷ 6 = 4, giving a fraction of $\frac{1}{4}$.

13. 3014

22 is half of 44, i.e. there are half as many erasers in one box as there are pencils. The answer to 137 × 22 must be half of the answer to 137 × 44. This is 6028 ÷ 2. You can work this out through partitioning: 6000 ÷ 2 = 3000, 28 ÷ 2 = 14, so the answer is 3014 erasers.

14. Wednesday

You could find all the Mondays by adding 7 each time: 4th June, 11th June, 18th June, 25th June. The 27th June is 2 days after the 25th June, so it is a Wednesday.

15. 72

To find the number that went into the machine you need to reverse the operations:
32 – 8 = 24
24 × 3 = 72.

16. –15 °C

If you count 9 down from –6 °C you get –15 °C.

17. £3.56

One method is to round both prices.
Add 1p to £4.99 to get £5 and 5p to £1.45 to get £1.50.
£5 + £1.50 = £6.50. Now take away the 6p extra you added.
£6.50 – 6p = £6.44.
The change from £10 is £10 – £6.44 = £3.56.

18. 252

10% of 560 is 56, so 5% of 560 is 28.
50% of 560 is 280.
45% of 560 is 50% – 5%, so 280 – 28 = 252.

19. (10, 7)

You need to find the x-coordinate first, then the y-coordinate. Look down from point B and read off the value on the x-axis (10). Then look across from B and read off the value on the y-axis (7). So the answer is (10, 7).

20. £3.10

Find the difference between the two amounts they have:
£21.60 – £15.40 = £6.20
Divide this by 2 to give you the amount Andrew should give to Julie: £6.20 ÷ 2 = £3.10

21. $2n + 15$

He saves £2 each week, so after n weeks he will have saved $2n$ pounds. He already had £15, so the total amount he will have is $2n + 15$.

22. 3 hours 5 minutes

The length of Jay's morning at school is 8.40 am until 12 noon which is 3 hours 20 minutes. Morning break is the only time Jay doesn't spend in lessons. This is 15 minutes long.
So the time he spends in lessons is:
3 hours 20 minutes – 15 minutes = 3 hours 5 minutes.

23. 66

There are twice as many hard-centred chocolates as soft-centred ones, so there are 2 × 22 = 44 hard-centred chocolates. The total is 22 + 44 = 66.

Set A — Paper 2

Section 1: Verbal Reasoning — Cloze

1. rarest

*'Giant pandas are the **rarest** bear species on the planet.'*

2. native

*'They are **native** to China'*

3. considered

*they are **considered** to be a national treasure'*

4. symbolise

*'are often used to **symbolise** the country.'*

5. reputation

*'Their distinctive black and white markings and **reputation** for eating vast amounts of bamboo'*

6. recognised

*'they are **recognised** all over the world.'*

7. like

*'Giant pandas may look **like** massive teddy bears'*

8. strength

*'but their **strength** should not be underestimated.'*

9. although

*'Giant pandas have been known to attack humans, **although** rarely without provocation.'*

10. destruction

*'the **destruction** of the bamboo forests where they live'*

11. only

*'they are an endangered species, and **only** 1 600'*

12. recorded

*'1 600 were **recorded** as living in the wild in 2004.'*

13. role

*'pandas play an essential **role** in the forests where they reside.'*

14. disperse

*'They **disperse** seeds in their waste'*

15. growth

*'without these bears, the **growth** of the forest would suffer.'*

16. preserve

*'an attempt to **preserve** the giant panda and its habitat.'*

Section 2: Numerical Reasoning

1 a) 140 m²

Calculate the whole area of the garden and then subtract the area of the patio. The area of a rectangle = length × width. The total area of the garden is 20 × 10 = 200 m² and the patio is 6 × 10 = 60 m². So the lawn is 200 – 60 = 140 m². Alternatively, break the shape of the lawn into separate rectangles and add their areas.

1 b) $\frac{1}{7}$

In part a), you found that the area of the lawn is 140 m². You can write 20 m² as a fraction of his lawn as $\frac{20}{140}$. The highest common factor of both 20 and 140 is 20. So 20 ÷ 20 = 1 and 140 ÷ 20 = 7, leaving a fraction of $\frac{1}{7}$.

1 c) 24 m²

The area of the lawn left is 140 – 20 = 120 m². You can work out 10% of the area of the lawn by calculating 120 ÷ 10 = 12 m². 20% is 10% × 2, so 20% of 120 m² is 12 × 2 = 24 m².

2 a) 12

The key tells you that 1 symbol = 4 ladybirds. On Wednesday Robbie counted 14 ladybirds and on Thursday he counted 18. 14 + 18 = 32 ladybirds. On Saturday Robbie counted 12 ladybirds and on Sunday he counted 8. 12 + 8 = 20 ladybirds. So, 32 – 20 = 12 ladybirds.

2 b) 14

14 ladybirds (3½ ladybird symbols) were counted on both Wednesday and Friday.

2 c) 14

You need to add up the individual number of ladybirds found on each day, and divide this by the number of days in the week, 7. 22 + 10 + 14 + 18 + 14 + 12 + 8 = 98 ladybirds. 98 ÷ 7 = 14.

3 a) Lille and Paris

Read off the column and row which correspond to 224 km.

3 b) 353 km

Read off from the table how far away Tours and Calais are from Lille. Tours is 464 km away from Lille. Calais is 111 km away from Lille. Tours is 464 – 111 = 353 km further away than Calais from Lille.

3 c) 126 km

Read off from the graph the distance between Lille and Dijon, 504 km. Juliette travels ¾ of the distance on the first day. She travels 1 – ¾ = ¼ on the second day. ¼ of the total distance is 504 ÷ 4 = 126 km.

3 d) 5

The distance between Calais and Nice can be read off the table as 1258 km. You need to count up in steps of 250 km until you reach 1258 km or greater:
250, 500, 750, 1000, 1250, 1500. This is 6 steps, but by the sixth step he will have arrived in Calais, so you don't need to count that step as a fuel stop. So he stops for fuel 5 times.

4 a) £64

To find the next value in the pattern, double the last value.
So the 6th value is 32 × 2 = £64.

4 b) 24*m* – 10

*The sequence goes up in steps of 24 each time. Therefore the expression involves 24**m**, where **m** is the month. The difference between the number generated from 24**m** and the actual value is 10, so the expression for the sequence is 24**m** – 10.*

4 c) Robert

To work out how much Robert will have saved by the end of the 8th month, count up to the 8th term by doubling the previous term each month:
2, 4, 8, 16, 32, 64, 128, 256.
So after 8 months, Robert will have saved £256.
To find the amount of money Dave will have saved after 8 months, count up in steps of 24 from 14:
14, 38, 62, 86, 110, 134, 158, 182.
*(Alternately you could use the expression in part 4 b), with **m** = 8 for the 8th month: 24 × 8 – 10 = £182.)*
So Robert has saved more (£256) than Dave (£182) after 8 months.

5 a) 75

First you need to find the missing percentage.
22 + 28 + 35 = 85%. 100% – 85% = 15%.
So 15% of the plants sold were tulips.
Find 10% and 5% (as 10% + 5% = 15%):
10% of the number of plants sold is 500 ÷ 10 = 50.
5% of the number of plants sold is 50 ÷ 2 = 25.
The number of tulips sold is 50 + 25 = 75.

5 b) 140

First you need to work out how many roses were sold in total by finding 35% of 500.
You can work out 10% by calculating 500 ÷ 10 = 50.
5% is half of 10%, so 5% of 500 = 50 ÷ 2 = 25.
35% is 10% + 10% + 10% + 5%.
This is 50 + 50 + 50 + 25 = 175.
To ratio of red to white roses is 4:1. There are 4 + 1 = 5 shares in total. 1 share is equal to 175 ÷ 5 = 35. Red roses are worth 4 shares, so 35 × 4 = 140 red roses were sold.

5 c) £630

First you need to calculate how many pansies were sold by calculating 28% of 500.
10% is 50, 5% is 25, and 1% is 5 plants.
28% = 10% + 10% + 5% + 1% + 1% + 1%.
This is 50 + 50 + 25 + 5 + 5 + 5 = 140 pansies.
Pansies sell for £4.50 each. The total value of the pansies sold is 4.5 × 140. This can be done through partitioning.
140 = 100 + 40.
4.5 × 100 = 450, 4.5 × 40 = 180, 450 + 180 = £630.

6 a) Zebra Feeding

You need to work out how long each event lasts:
Penguin Feeding = 30 minutes
Big Cat Talk = 35 minutes
Gorilla Feeding = 25 minutes
Zebra Feeding = 20 minutes
Camel Rides = 55 minutes.

6 b) 75 minutes

The African Adventure is 1 hour 40 minutes long. This is equal to 60 + 40 = 100 minutes.
The Gorilla Feeding is 25 minutes.
The African Adventure is therefore
100 – 25 = 75 minutes longer than the Gorilla Feeding.

6 c) Lunch with Lions

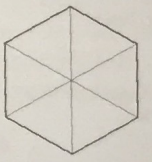
The first tour after Jane arrives starts at 13:30 (there is a break for lunch from 11:55 - 13:30). The afternoon tours last 15 minutes so Jane will finish the tour at 13:45. This is 5 minutes before the Lunch with Lions finishes.

6 d) 45 minutes

The Big Cat Talk finishes at 12:45. There is a pause in tours between 11:55 and 1:30 pm. The first tour she can go on is at 1:30 pm. This is a wait of 45 minutes.

7 a) A

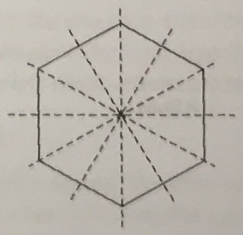
The pieces fit into the puzzle as follows:



This creates 6 identical equilateral triangles. A is the only shape that is an equilateral triangle which will fit into the frame with no overlap, filling all the space.

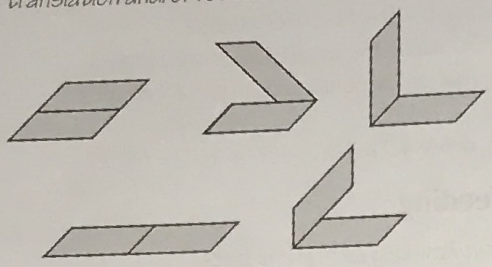
7 b) 6

The lines of symmetry for a regular hexagon are shown below:



7 c) C

The shapes are made with the two puzzle pieces. The shape in C requires the upper shape to be flipped/reflected in order to generate the shape. The others can be made through simple translation and/or rotation.

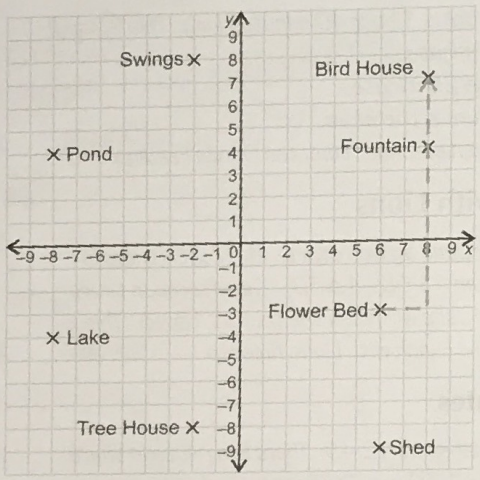


8 a) (–2, 8)

When reading off coordinates, remember to give the value of the x-axis before the value of the y-axis.

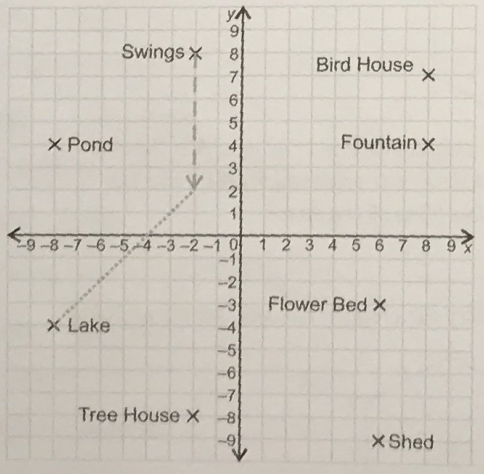
8 b) Bird House

The route Vernon took is shown on the map below.



8 c) Lake

Vernon walks 6 metres south to arrive at point (–2, 2). From this point he turns to face south west. He will be able to see everything that lies on the dotted line, which includes the lake. The route Vernon took is shown on the map below.



8 d) Lake

The x-axis is the axis that runs horizontally across the grid. The coordinates of the pond can be read off as (–8, 4). A reflection in the x-axis changes the sign of the y-coordinate. So, the coordinates of the reflected point are (–8, –4). This point corresponds to the lake.

9 a) £2.50

The combined mass of Jill's parcel is 1.55 + 0.05 = 1.6 kg. You need to find this mass on the x-axis and read up vertically until you reach a line. The first line you reach is Speedydrop. To find the price, read across from this point to the y-axis. The cost to send a 1.6 kg parcel with Speedydrop is £2.50.

9 b) £5.00

Firstly, you need to work out the total mass of the parcel. This is 2.2 + 1.6 + 0.8 = 4.6 kg. You need to find this mass on the x-axis and read up vertically until you reach a line. The first line you reach is Parcelprince. To find the price, read across from this point to the y-axis. The cost to send a 4.6 kg parcel with Parcelprince is £5.00.

9 c) £6.00

You need to find the cost to send the individual parcels with both companies by reading the masses and prices from the graph.
A 0.8 kg parcel costs £2.50 to send with Parcelprince.
A 3.2 kg parcel costs £4.00 to send with Parcelprince.
The total cost of sending both parcels with Parcelprince is £2.50 + £4.00 = £6.50.
A 0.8 kg parcel costs £1.50 to send with Speedydrop.
A 3.2 kg parcel costs £4.50 to send with Speedydrop.
The total cost of sending both parcels with Speedydrop is £1.50 + £4.50 = £6.00.
So Speedydrop is cheaper.

Section 3: Non-Verbal Reasoning

1. C

The figure has been rotated 270 degrees clockwise (or 90 degrees anticlockwise). Option A is a rotated reflection. Options B and D are different spirals.

2. B

The figure has been rotated 180 degrees. Option A is a reflection. In options C and D, the circles have the wrong shadings.

3. A

The figure has been rotated 90 degrees clockwise. Options B and C are different shapes. Option D is a rotated reflection.

4. C

The figure has been rotated 225 degrees clockwise (or 135 degrees anticlockwise). In option A, the triangle is the wrong way round. In option B, the hexagon is the wrong way round. In option D, both the triangle and the hexagon are the wrong way round.

5. D

The figure has been rotated 90 degrees clockwise. Option A is a reflection. Option B has the wrong arrowhead. Option C is a rotated reflection.

6. A

The figure has been rotated 225 degrees clockwise (or 135 degrees anticlockwise). Option B is a different shape. Option C has the wrong hatching. Option D is a rotated reflection.

7. D

The figure has been rotated 270 degrees clockwise (or 90 degrees anticlockwise). In options A and B, the three shapes are layered in the wrong order. In option C, the pentagon and the square have swapped shadings.

8. B

The figure has been rotated 90 degrees clockwise. In option A, the arrows are not pointing towards the centre of the cross and one is positioned incorrectly. In options C and D, the arrows are in the wrong 'arms' of the cross shape.

9. B

Working from left to right, the black circle moves diagonally down to the right in each grid square.

10. C

Working from right to left, the longest line disappears in each grid square.

11. B

Working from top to bottom, the top two grid squares are added together to make the bottom grid square.

12. A

The large shape is the same in all grid squares along each row. In each row, one grid square contains the large shape on its own, shaded white, one grid has a black inner shape and a white outer shape, and one grid square has a white inner shape and a black outer shape.

13. A

Working from left to right, the whole grid square rotates 90 degrees clockwise.

14. A

The three different grid squares (black ellipse in the centre, white ellipse in the top right-hand corner and white ellipse in the bottom left-hand corner) each appears once in each row and column.

15. A

Each direction that the arrow points in only appears once in each row and column. Each different type of arrowhead also only appears once in each row and column.

16. B

Along each row and down each column, the shape in the first grid square is added to the shape in the third grid square to make the shape in the second grid square.

17. E

All other figures have a smaller shape which is a 180 degree rotation of the larger shape. (E has a pentagon inside a hexagon.)

18. A

In all other figures, the arrow and the dot have different shadings.

19. E

All other figures are identical apart from rotation.

20. A

All other figures have four lines inside the shield shape.

21. E

In all other figures, the cross shape is on a corner.

22. E

In all other figures, the small black shape created by the overlap of the two large shapes has four sides.

23. B

The series alternates between a large square and a small triangle, and a large triangle and a small square.

24. A

The small inside shape gets bigger to become the large shape in the next series square and a new small shape appears inside it. (A is the only option where the large shape is a square with a dotted line.)

25. D

In each series square an extra line is added in an alternating pattern of a diagonal line and then a vertical line. The dot moves one place to the right and alternates colours between black and white.

26. C

Apart from the shadings, the entire figure rotates 90 degrees clockwise in each series square. The shading of the top left shape alternates between black and grey.

27. B

In each series square, the arrow rotates 180 degrees. The circle moves left along the top of the curved line.

28. B

In each series square, the inner shape rotates 90 degrees clockwise. The outer shape rotates 90 degrees anticlockwise.

29. D

Option A has not been reflected and it has the wrong shading. Option B has not been reflected and the black shape has been rotated. In option C, the shading is wrong.

30. B

Option A has been reflected across and downwards. In options C and D, the white arrow is pointing the wrong way.

31. C

Option A has been reflected downwards and rotated. Options B and D are the wrong shape.

32. B

In option A, the triangle has moved to the front. In option C, the triangle and the star have swapped positions and the triangle has moved to the front. In option D, the shapes at the front have moved to the back and the shapes at the back have moved to the front. The circle also has the wrong shading.

33. A

Option B has the wrong number of arrows. Option C has the wrong arrows. In option D, the arrows are in the wrong place.

34. D

In option A, the black square is in the wrong place. Option B has the wrong hatching. Option C has two black squares and the wrong hatching.

Set B — Paper 1

Section 1: Verbal Reasoning — Comprehension: an extract from 'Oliver Twist'

1. C

In the passage it says that Oliver kept hiding, "fearing that he might be pursued" — he expects someone to be coming after him.

2. C

Oliver thinks of London as "that great place!", and it is the possibility of going to London that makes him keep going — he "jumped upon his feet".

3. D

When Oliver is considering going to London, his first thought is that "nobody — not even Mr. Bumble — could ever find him there!". His main aim is to stay away from Mr Bumble.

4. A

Oliver has "a crust of bread, a coarse shirt, and two pairs of stockings, in his bundle", but the penny is "in his pocket".

5. A

"to no purpose" means 'with no results', so after all of his thinking about "how much he must undergo...to reach his place of destination", he still doesn't know how he will get to London.

6. C

In the passage, it says that the penny was "a gift of Sowerberry's" because Oliver had "acquitted himself more than ordinarily well" at a funeral. This means that he earned the money.

7. B

In the passage it says "He felt frightened at first, for the wind moaned dismally".

8. D

The passage says that "Oliver walked twenty miles that [first] day" and on the second day "he had walked no more than twelve miles, when night closed in again", so after the first two days Oliver had walked a total of 32 miles.

9. A

The text says that Oliver "tried to keep up with the coach" but was "unable". This means he couldn't run fast enough.

10. A

The passage mentions warning signs stating that all beggars "would be sent to jail".

11. A

In the passage it says that generally the landladies had Oliver sent away as they were "sure he had come to steal something". This shows that they were suspicious of him.

12. D

The passage says that Oliver has "a few draughts of water, which he begged at the cottage-doors" — the people living in the cottages are the only ones who help him.

13. C

Oliver is thinking about the "difficulties" that he faces and decides that his possessions aren't very useful things for such a long walk in wintertime.

14. C

Oliver realises "how much he must undergo" to get to London, and it is when the scale of his journey becomes clear that he begins to slow down.

15. B

Oliver ran after the coach when he was already tired and hungry, so by the time it leaves he must be exhausted.

16. A

"diminished" means 'reduced'. Oliver has walked further, so he has decreased the distance he must walk.

17. C

"surmounting" means 'overcoming'. Oliver can't think of a way to overcome his problems.

18. D

In this context, "obliged" means 'forced'. Oliver had no choice but to buy some food.

19. B

"awakened a new train of ideas" means 'made him think of a new plan'. The sign to London gives Oliver the idea to go to London.

20. D

"brought Oliver's heart into his mouth" means 'made Oliver frightened'. Oliver is afraid that he will be sent to a workhouse or orphanage.

Section 2: Verbal Reasoning — Cloze

1. Atlantic

*'The Bermuda Triangle, or Devil's Triangle, is an area of the **Atlantic** Ocean'*

2. location

*'There is no formal **location** for the triangle'*

3. official

*'it can't be found on any **official** maps.'*

4. alleged

*'However, many ships and aircraft are **alleged** to have gone missing'*

5. bizarre

*'numerous sailors have had **bizarre** experiences'*

6. between

*'in the triangle of ocean **between** Miami, Puerto Rico and Bermuda.'*

7. known

*'Bermuda itself was once **known** as the 'Isle of Devils"*

8. threat

*'large areas of reefs which surround the island were a serious **threat** to boats'*

9. shores

*'sailed too close to its **shores**.'*

10. peculiar

*'One of the most **peculiar** incidents in the history of the Bermuda Triangle'*

11. planes

*'the disappearance of five bomber **planes** from 'Flight 19' in 1945.'*

12. naval

*'five aircraft left a **naval** base in Florida'*

13. variety

*'a **variety** of strange theories'*

14. theories

*'strange **theories** have been suggested'*

15. years

*'theories have been suggested over the **years**'*

16. rational

*'Some people have attempted to find **rational** explanations'*

17. believe

*'others prefer to **believe** that strange energy fields'*

18. caused

*'supernatural factors have **caused** the large number of unusual occurrences.'*

19. unusual

*'the large number of **unusual** occurrences.'*

20. deny

*'no one can **deny** that the mysterious tales'*

21. curious

*'one of the most **curious** stretches of water on the planet.'*

Section 3: Verbal Reasoning — Odd One Out

1. draft

The other three are ways of displaying data.

2. ripe

The other three mean 'get bigger'.

3. wistful

The other three mean 'happy'.

4. disconnect

The other three mean 'combine'.

5. novel

The other three are reference books.

6. granite

The other three are types of metal.

7. shake

The other three involve using a utensil to create a mixture.

8. crimson

The other three are shades of purple.

9. hornet

The other three are insects that don't sting.

10. seam

The other three are all types of fastening that can be opened.

11. classroom

The other three rooms can be found in a house.

12. receive

The other three mean 'appeal for something'.

13. complicated

The other three mean 'visually unclear'.

14. rose

The other three are types of tree.

15. cube

The other three are two-dimensional shapes.

16. father

The other three are female relatives.

17. grin

The other three are facial expressions that show negative feelings.

18. dishevelled

The other three mean 'ungraceful'.

Section 4: Verbal Reasoning — Antonyms

1. pessimistic

'upbeat' means 'positive', whereas 'pessimistic' means 'negative'.

2. superficial

'significant' means 'important', whereas 'superficial' means 'not important'.

3. comprehensive

'limited' means 'restricted', whereas 'comprehensive' means 'complete'.

4. neglect

'maintain' means 'care for', whereas 'neglect' means 'ignore'.

5. humble

'conceited' means 'arrogant', whereas 'humble' means 'modest'.

6. disturbed

'tranquil' means 'calm', whereas 'disturbed' means 'disrupted'.

7. magnanimous

'selfish' means 'thinking of oneself', whereas 'magnanimous' means 'generous to others'.

8. reasonable

'stubborn' means 'not prepared to compromise', whereas 'reasonable' means 'prepared to compromise'.

9. disapproval

'acceptance' means 'agreement', whereas 'disapproval' means 'refusal to agree'.

10. perplexing

'clear' means 'obvious', whereas 'perplexing' means 'confusing'.

11. reserved

'assured' means 'confident', whereas 'reserved' means 'shy'.

12. lethargic

'lively' means 'energetic', whereas 'lethargic' means 'lacking energy'.

13. daring

'cowardly' means 'fearful', whereas 'daring' means 'brave'.

14. composed

'nervous' means 'anxious', whereas 'composed' means 'calm'.

15. withdraw

'contribute' means 'add', whereas 'withdraw' means 'take away'.

16. chaotic

'organised' means 'in order', whereas 'chaotic' means 'disorderly'.

17. bind

'detach' means 'separate', whereas 'bind' means 'join'.

18. superfluous

'necessary' means 'needed', whereas 'superfluous' means 'more than is needed'.

Section 5: Non-Verbal Reasoning

1. F

Shape F has been rotated 90 degrees left-to-right.

2. C

Shape C has been rotated 180 degrees in the plane of the page.

3. A

Shape A has been rotated 180 degrees left-to-right.

4. D

Shape D has been rotated 90 degrees left-to-right. Then it has been rotated 90 degrees away from you, top-to-bottom.

5. B

Shape B has been rotated 90 degrees towards you, top-to-bottom. Then it has been rotated 90 degrees left-to-right.

6. E

Shape E has been rotated 90 degrees left-to-right. Then it has been rotated 90 degrees towards you, top-to-bottom.

7. D

The top block of set D rotates 90 degrees left-to-right to become the left part of the figure on the left. The bottom block of the set moves to become the top right-hand part of the figure.

8. A

One of the top blocks of set A rotates 90 degrees clockwise in the plane of the page. The other top block of the set rotates 90 degrees towards you top-to-bottom and moves to the right of the first block to become the bottom right block of the figure. The bottom block moves to the back to become the top block of the figure.

9. C

The right-hand block of set C moves in front of the left-hand block to become the front left block of the figure. The top block of the set rotates 90 degrees left-to-right and moves down to become the bottom right-hand block of the figure.

10. B

The bottom left-hand block of set B rotates 90 degrees in the plane of the page to become the block at the back of the figure. The top block of the set rotates 90 degrees in the plane of the page, and then rotates 90 degrees away from you, top-to-bottom. It then moves to become the bottom front block in the figure. The bottom right block of the set rotates 90 degrees in the plane of the page and becomes the top block of the figure.

11. B

There should be four blocks visible from above, which rules out options A, C and D.

12. A

There should be four blocks visible from above, which rules out options B and D. There are two blocks visible at the front of the figure, which rules out option C.

13. C

There should be five blocks visible from above, which rules out options A and D. There is a row of three blocks at the front of the figure, which rules out option B.

14. D

There are three blocks visible at the front of the figure, which rules out option A and B. There are four blocks visible on the right hand side which rules out C.

15. A

Option B is ruled out because if the face with the black stripe was on the top and the face with the triangle was at the front, the circle on the right-hand face would be black, not white. Options C and D are ruled out because they contain shapes that don't appear on the net (option C has a white rectangle and option D has a grey triangle).

16. B

Option A is ruled out because the black square and the letter 'Y' should be on opposite sides. Option C is ruled out because there is only one grey triangle on the net. Option D is ruled out because the letter 'Y' has the wrong rotation.

17. D

Option A is ruled out because the black circle and the three diagonal lines should be on opposite sides of the cube. Option B is ruled out because if the star was on the top and the circle was at the front, the face on the right would be the black stripe. Option C is ruled out because the black stripe and the diagonal lines have the wrong rotation.

18. D

Option A is ruled out because the white circle and the black L-shape should be on opposite sides. Option B is ruled out because there is no white arrow on the net. Option C is ruled out because one of the arrowheads should be pointing at the black L-shape.

Set B — Paper 2

Section 1: Numerical Reasoning

1 a) 42

Jamie picked 3½ punnets of apples. Each punnet contains 12 apples. You need to work out 3½ × 12.
You can do this using partitioning.
3 × 12 = 36. ½ × 12 is equivalent to 12 ÷ 2 = 6.
The total number of apples picked is 36 + 6 = 42.

1 b) 21

Jamie picked 4 punnets of pears. This is equivalent to 4 × 12 = 48 pears. Jamie picked 2¼ punnets of plums. You need to work out 2¼ × 12. You can do this using partitioning. 2 × 12 = 24. ¼ × 12 is equivalent to 12 ÷ 4 = 3. The total number of plums picked is 24 + 3 = 27. Jamie picked 48 − 27 = 21 more pears than plums.

1 c) 8:7

You have already calculated how many pears and apples Jamie picked. He picked 48 pears and 42 apples.
As a ratio, this is 48:42.
The highest common factor of both 48 and 42 is 6.
48 ÷ 6 = 8. 42 ÷ 6 = 7. This gives the ratio of pears:apples as 8:7.
Alternatively you could express the ratio in terms of the number of punnets. Jamie picked 4 punnets of pears and 3½ punnets of apples. As a ratio this is 4:3½. You need to multiply both sides by 2 to get only whole numbers.
4 × 2 = 8. 3½ × 2 = 7.
This is a ratio of 8:7.

1 d) £5.00

The price of ¼ punnet of plums is 60p. So to work out the price of a full punnet you need to multiply that price by 4.
60 × 4 = 240p.
There's a 20p discount for every full punnet, so each full punnet costs 240p − 20p = 220p
Jamie picked 2 whole punnets of plums, plus another ¼ punnet. So the total cost will be:
220p + 220p + 60p = 500p = £5.00

2 a) $\frac{7}{51}$

Derren removes the King of Diamonds. This means the number of Queens or Kings in the pack has decreased by 1. To start with there were 8 Queens and Kings in the pack altogether. There are 8 − 1 = 7 remaining. The number of cards in the pack has also decreased by 1. There are now 52 − 1 = 51 cards in the pack. This gives a fraction of $\frac{7}{51}$.

2 b) $\frac{22}{47}$

The number of cards that have been taken out of the pack has decreased by 5, giving 52 − 5 = 47 cards left. The number of red cards has only decreased by 4. There were 26 red cards to start off with, so the number remaining in the pack is 26 − 4 = 22. This gives a fraction of $\frac{22}{47}$.

2 c) 2

If Derren removes 12 cards from the pack, he will have 52 − 12 = 40 cards remaining. $\frac{1}{20}$ of 40 is equivalent to 40 ÷ 20 = 2. This means there are 2 aces left in the pack. There are 4 aces in a whole pack of cards, so 4 − 2 = 2 must have been removed in the 12 cards.

3 a) 160 000 cm³

The volume of the tank is equal to width × height × depth. You need to calculate 80 × 50 × 40. 80 × 50 = 4000. You then need to work out 4000 × 40 = 160 000 cm³.

3 b) 120 000 cm³

¼ of the tank is 160 000 cm³ ÷ 4.
Start by imagining the calculation without the 0s:
16 ÷ 4 = 4, so 160 000 ÷ 4 = 40 000 cm³.
¼ of 160 000 cm³ is 40 000 cm³, so ¾ of 160000 cm³ is 3 × 40 000 = 120 000 cm³.

3 c) 120 litres

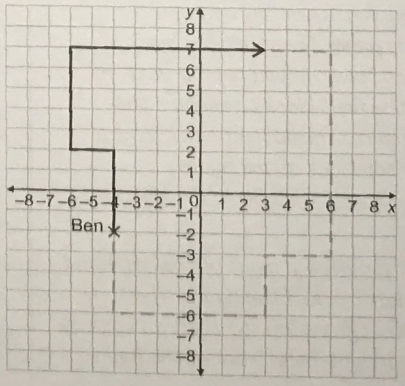
You need to work out 120000 ÷ 1000. To divide by 1000, you need to move the digits 3 places to the right.
120000 ÷ 1000 = 120 litres.

3 d) 12

For every 10 litres, Kim can keep 1 fish. You need to work out how many lots of 10 litres there are in 120 litres. You can do this by doing 120 ÷ 10. To divide by 10, move the digits one place to the right. 120 ÷ 10 = 12. So Kim can keep 12 fish in the tank.

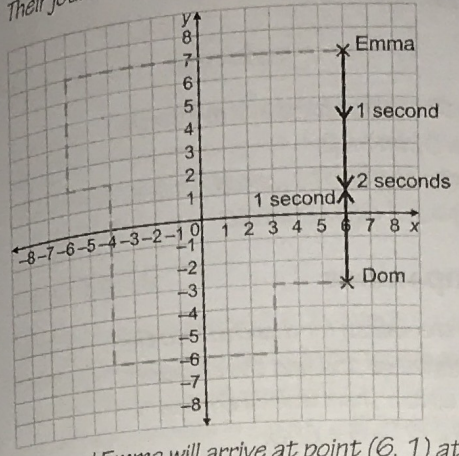
4 a) (3, 7)

Ben moves clockwise at 2 metres a second. If he runs for 10 seconds he will cover 10 × 2 = 20 squares. Ben's journey looks like this, and he will end up at (3, 7).



4 b) (6, 1)

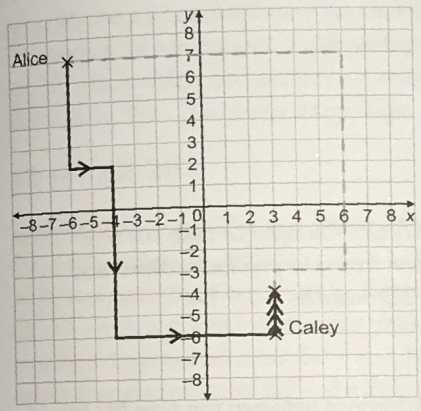
Emma starts running towards Dom. By the time Dom starts running Emma has already covered 3 metres, or 3 squares. Their journey will look like this:



Dom and Emma will arrive at point (6, 1) at the same time.

4 c) (3, –4)

Alice runs at 6 metres per second. Caley runs at 0.5 metres per second. This means Caley only covers half a square in the time it takes for Alice to cover 6. Alice will catch up with Caley at (3, –4):



5 a) 30°

The corner of a rectangle is 90°. Angle x is equal to 90 – 60 = 30°.

5 b) 80°

Angles in a triangle add up to 180°. 60 + 40 + y = 180°. You need to work out 180 – 60 – 40. 60 + 40 = 100, so 180 – 100 = 80°.

5 c) Scalene

The triangle marked A has 3 different angles and 3 different length sides. It is a scalene triangle.

5 d) 130°

Angles in a quadrilateral add up to 360°. The shape has 2 right angles of 90°. It has two unknown angles.
The first unknown angle can be calculated as 90 – 40 = 50°, using the angle from the triangle.
This means angle z must be equal to 360 – 90 – 90 – 50.
90 + 90 + 50 = 230,
so z = 360 – 230 = 130°

6 a) 1800 cm²

You need to work out the area of the overall frame and then subtract the area of the picture. The area of the whole frame is 120 × 40 = 4800 cm². The area of the picture centre is 100 × 30 = 3000 cm². The area of the border is the difference between these two numbers.
4800 – 3000 = 1800 cm².

6 b) 100

You need to work out how many photos you can fit along the length of the picture space. One photo is 5 cm wide. To work out how many you can fit in one row, you need to calculate 100 ÷ 5 = 20 photos. To work out how many rows of 20 photos you fit in the height of the picture space, you need to calculate 30 ÷ 6 = 5 rows. 5 rows of 20 photos is equivalent to 20 × 5 = 100 photos in total.

6 c) 1200 cm²

The area of one photo is 5 × 6 = 30 cm². The area occupied by 40 photos is 30 × 40 = 1200 cm².

6 d) 525 cm²

The area of the picture space of the smaller frame was calculated in part c. The area of the border is equal to the area of the picture space subtracted from the overall area.
1725 – 1200 = 525 cm².

7 a) 39

Each music note symbol represents 6 children. There are 6 full symbols and one half symbol in the row for piano. This is equal to (6 × 6) + (6 ÷ 2). 6 × 6 = 36. 6 ÷ 2 = 3. The total number of children that said the piano was their favourite instrument is 36 + 3 = 39.

7 b) 12

There are $3\frac{1}{2}$ symbols for the guitar. This is equal to (3 × 6) + (6 ÷ 2): 3 × 6 = 18. 6 ÷ 2 = 3. 18 + 3 = 21 children preferred guitar.
There are 1½ symbols for the flute. This is equal to 6 + (6 ÷ 2) = 6 + 3 = 9 children. The number of children who preferred the guitar to the flute is 21 – 9 = 12.

7 c) 30

9 children said the cello was their favourite instrument. 39 children said the piano was their favourite instrument. So there were 39 – 3 = 30 fewer children who said cello than piano.

7 d) Cello, Flute and Guitar

You can answer this question by counting up the number of symbols that each category has:
Piano: $6\frac{1}{2}$
Flute: $1\frac{1}{2}$
Cello: $1\frac{1}{2}$
Drums: 3
Guitar: $3\frac{1}{2}$
You need to find a combination that adds up to $6\frac{1}{2}$. The cello, the flute and the guitar combined are as popular as the piano:
$1\frac{1}{2} + 1\frac{1}{2} + 3\frac{1}{2} = 1 + 1 + 3 + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = 5 + 1\frac{1}{2} = 6\frac{1}{2}$.

8 a) $126 - 6m$

The temperature of the cake decreases by 6 °C every minute. So the expression will involve $-6m$. The only expression that includes this is $126 - 6m$. If you substitute in the values of m you can check that this expression is correct.

8 b) 60 °C

In part a) you worked out that the expression for the cooling of the cake was $126 - 6m$. You can substitute the value of $m = 11$ into this expression to find the temperature after 11 minutes. $126 - (11 \times 6) = 126 - 66 = 60$ °C.
Alternatively you can count down in steps of 6 from 120 until you reach the 11th term:
120, 114, 108, 102, 96, 90, 84, 78, 72, 66, 60.

8 c) 16 minutes

You need the temperature to be equal to 30 °C or lower.
$126 - 6m = 30$.
$126 = 30 + 6m$.
$126 - 30 = 6m$.
$96 = 6m$.
$96 \div 6 = m$. This can be done through partitioning. 90 splits into $60 + 36$. $60 \div 6 = 10$. $36 \div 6 = 6$.
$10 + 6 = 16$. $m = 16$ minutes.
Alternately you can count down in steps of 6 from 120:
120, 114, 108, 102, 96, 90, 84, 78, 72, 66, 60, 54, 48, 42, 36, 30. 30 is the 16th term.

9 a) £65

You need to work out 90×1.5. You can do this using partitioning. $90 \times 1 = £90$. 90×0.5 is equivalent to $90 \div 2 = £45$. The total money raised from selling the magazines is $90 + 45 = £135$. The school paid £70 on printing, so the profit is $135 - 60 = £65$.

9 b) 30

You need to work out $45 \div 1.5$. You can do this by doubling both values so you are dealing with whole numbers.
$45 \times 2 = 90$, $1.5 \times 2 = 3$,
so $45 \div 1.5 = 90 \div 3 = 30$ children.

9 c) £54

The price of the school magazine increases by 20% so you need to work out 20% of £45.
10% of 45 is $45 \div 10 = 4.5$.
20% is double this, so $20\% = 4.5 \times 2 = £9$.
So the cost of the magazines for class A will be $45 + 9 = £54$.

10 a) £28

You need to substitute the values for d and m into the equation for Canine Companions: $4(d + m)$.
Franz has 2 dogs and wants them to be walked 5 miles:
$4 \times (2 + 5) = 4 \times 7 = £28$.

10 b) £30

You need to substitute the values for d and m into the equation for Happy Tails: $5(dm) \div 2$.
Ollie has 3 dogs and wants them to be walked 4 miles:
$5(3 \times 4) \div 2 = (5 \times 12) \div 2 = 60 \div 2 = £30$

10 c) Canine Companions

You need to substitute the values for d and m into the equations for all four companies and find the cheapest.
Oscar owns 5 dogs and wants them walked 6 miles.
Pooch Pals: $(10 \times 5) + 6 = 50 + 6 = £56$.
Barking Buddies: $2 \times 5 \times 6 = 10 \times 6 = £60$.
Canine Companions: $4(5 + 6) = 4 \times 11 = £44$.
Happy Tails: $(5 \times 5 \times 6) \div 2 = (5 \times 30) \div 2 = 150 \div 2 = £75$.

10 d) 8 miles

You need to substitute the cost and the number of dogs into the equation for Pooch Pals:
$58 = (10 \times 5) + m$.
$58 = 50 + m$
$58 - 50 = m$.
$8 = m$.

11 a) 11:14

The buses run every half an hour. You need to take the time that the bus arrives in Sidton from the previous column and add 30 minutes. 10:44 + 30 minutes = 11:14.

11 b) 16 minutes

You need to work out the difference between the time the bus arrived in Halldon and the time the bus arrives in Plymstone. It arrives in Halldon at 11:43 and arrives in Plymstone at 11:59. $59 - 43 = 16$ minutes later.

11 c) Halldon

72 minutes is equivalent to 60 + 12 minutes. This is 1 hour and 12 minutes. 1 hour after 11:01 is 12:01. 12 minutes on from 12:01 is 12:13. This is the time the bus arrives in Halldon.

11 d) 12:43

Firstly, you need to work out the total delay. The bus was delayed by $15 + 8 = 23$ minutes. The bus is due to arrive in Ide at 12:20. It will arrive 23 minutes later, so the bus will arrive at $12:20 + 23 = 12:43$.

12 a) 10 km

The furthest point away from the house was 5 km. Tony ran 5 km out and 5 km home. His total run was $5 + 5 = 10$ km.

12 b) 25 minutes

The points that Tony is resting are shown by the parts of the graph where the line is flat. Tony rests between 10 and 20 minutes, 35 and 45 minutes and 65 and 70 minutes. This is a total of: 10 + 10 + 5 = 25 minutes.

12 c) 0 - 10 minutes

The time at which Tony is running the fastest is the time at which he covers the longest distance in the shortest time. It will be where the line on the graph is the steepest. This is at the start of the run between 0 and 10 minutes.

13 a) £4.70

Large milkshakes cost £3.50. Jake buys one standard topping (strawberries) for 20p extra. He also buys two deluxe toppings (fudge and blueberries) for 50p extra each. The total cost of the milkshake is £3.50 + 20p + 50p + 50p = £4.70.

13 b) 3

Medium milkshakes cost £3.00. If Katie spent £4.10 on a milkshake, she must have spent 4.10 – 3 = £1.10 on toppings. Standard toppings cost 20p. Katie can't spend exactly £1.10 just on standard toppings, so she must have bought at least 1 deluxe topping. If she bought 2 deluxe toppings (£1.00) she also couldn't have spent exactly £1.10. She must have only bought 1 deluxe topping, leaving her with: £1.10 – 50p = 60p to spend on standard toppings. This is 60 ÷ 20 = 3 standard toppings.

13 c) £2.20

Milkshakes have a 20% discount on a Monday. Small milkshakes usually cost £2.00. 10% of £2.00 is 20p, so 20% is equal to 20 × 2 = 40p. Small milkshakes will cost £2.00 – 40p = £1.60. Katie also gets 50% off toppings, so standard toppings will cost 20 ÷ 2 = 10p each and deluxe toppings will cost 50 ÷ 2 = 25p each. Katie buys 1 standard topping and 2 deluxe toppings. In total she will spend £1.60 + 10p + 25p + 25p = £2.20.

14 a) 49.5 acres

You need to work out what 11% of 450 acres is. You can start by calculating 10% which is 450 ÷ 10. To divide by 10, move the digits one place to the right. 10% of 450 = 45 acres. To work out 1% you need to do 450 ÷ 100. To divide by 100, move the digits two places to the right. 450 ÷ 100 = 4.5. 11% = 10% + 1%. 11% of 450 = 45 + 4.5 = 49.5 acres.

14 b) 63 acres

Start by finding $\frac{1}{50}$ of 450 acres: 450 ÷ 50 = 9 acres. Farmer Charles has assigned $\frac{7}{50}$ of 450 acres to wheat. So this is 7 × 9 = 63 acres.

14 c) 10%

You need to work out what 45 acres is as a percentage of 450. 450 ÷ 45 = 10, therefore 45 = 10% of the land.

14 d) Maize

You already know the percentage of land assigned for barley, cows and sheep. You calculated in part c that 10% of the land was assigned to maize. This is less than barley, cows or sheep. You know that wheat had an assignment of 63 acres. This is greater than the 45 acres which were assigned to maize.

Section 2: Verbal Reasoning — Cloze

1. take

'people all over the world **take** phones for granted.'

2. invented

'the first practical telephone wasn't **invented** until the late nineteenth century.'

3. patent

'Bell was awarded a **patent** for the telephone in 1876.'

4. different

'Bell's telephone was very **different** to those we use today.'

5. portable

'It was much bigger, and definitely not **portable**!'

6. research

'Bell's **research** on hearing, elocution and speech'

7. influenced

'was **influenced** by the fact that his mother and wife were both deaf.'

8. created

'before he **created** the telephone.'

9. on

'The first comprehensive sentence that Bell said **on** his telephone was "Mr Watson...come here...I want to see you."'

10. Within

'**Within** ten years, more than 150 000 people in America owned telephones'

11. his

'Bell refused to have a telephone in **his** own study'

12. productive

'he thought it would make him less **productive**.'

13. thought

'Although Bell **thought** his telephone would be a distraction'

14. essential

'most people regard phones as an **essential** part of everyday life.'

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Section 3: Non-Verbal Reasoning

1. A

All figures are reflected across and the outline of the white shape swaps between solid and dashed.

2. C

All figures rotate 90 degrees clockwise. The shading of the head of the arrow-style line swaps between black and white.

3. C

All figures are reflected downwards and the two shapes in each figure swap shadings.

4. B

The shape at the top of the figure moves to the left of the new figure and the shape at the bottom of the figure moves to the right of the new figure. The left hand shape moves to the front and the right hand shape moves to the back.

5. C

The number of sides of the shape goes down by two, and two dots disappear.

6. B

The shapes in each figure move around one place anticlockwise. The shadings stay in their original positions.

7. D

Going in a clockwise direction from the top right-hand hexagon, the number of dots increases by one. The dots alternate between being at the top and the bottom of the hexagon.

8. D

The shapes are reflected across the middle of the hexagonal grid.

9. E

The pattern in each hexagon is reflected across the middle of the hexagonal grid.

10. B

Moving in a clockwise direction around the hexagonal grid, the thick white arrow rotates 60 degrees clockwise. The thin black arrow rotates 60 degrees anticlockwise.

11. C

Moving in a clockwise direction, the big, outside shape becomes the small, inside shape in the next hexagon and a new big shape appears.

12. B

All figures must be triangles with an arrow-style line pointing right.

13. D

All figures must have a circle as the outside shape.

14. A

In all figures, a small white arrow must point towards a black shape.

15. D

In all figures, the small grey shape must be the same as half of the large white shape but rotated.

16. D

In all figures, the middle shape must be identical to the shapes on the right and left, but rotated 180 degrees.