

11+

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

The
Answer Book

Pack 1

CGP

The 11+ Practice Test Papers

For the CEM (Durham University) test

11+

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

— A Dog is for Life

1. B

The first sentence says that "people often find that they are poorly prepared for the difficulties of pet ownership." They aren't prepared for the big responsibility of owning a dog.

2. D

The RSPCA tell people about the responsibilities of owning a dog by promoting "the view of dog ownership as a serious undertaking".

3. D

In the passage it says that the NCDL was "rebranded as 'Dogs Trust'".

4. C

Although dogs may be abandoned after a few days or weeks, the passage says that dogs are "usually abandoned after a period of between seven and fourteen months."

5. B

The slogan means that owning a dog is a lifelong commitment because you will have to care for a dog for its entire life, not just on Christmas Day.

6. C

In the passage it says that "if you adopt an older dog" it will need "plenty of reassurance" in case it has been badly treated in the past.

7. B

The passage lists the two reasons: "if you went on holiday, or if there was an emergency."

8. A

Paying for kennels is the only cost that is not mentioned anywhere in the passage.

9. C

The passage lists a number of different costs that you have to cover after buying a dog.

10. C

This tells the reader that dogs are being treated like belongings instead of animals with feelings because a 'commodity' means 'an object that can be bought or sold'.

11. D

The questions help readers to think about how a dog would fit into their life, so to make sure they are ready for a dog they need to give "realistic" answers.

12. B

In the passage it says that dogs from rescue centres "may have been neglected or even abused" by their previous owners.

13. C

In the passage it says that dogs "should not be left untended for long periods of time", and that this is "especially true of puppies".

14. B

In the passage it says that looking after a dog demands a lot of time, as well as money.

15. C

The passage is full of information, and it is written in a style that is designed to help "first-time" owners.

16. B

The phrase means that a dog's behaviour is learned from and controlled by its owner, so it is the owner's responsibility.

17. B

"invaluable" means the same as 'very valuable'.

18. D

"pertinent" means the same as 'relevant' or 'important'.

19. B

"hefty" means the same as 'large' or 'considerable'.

20. A

'having the means' to do something means that you have the money to pay for it.

Section 2: Verbal Reasoning

— Shuffled Sentences

1. an

The words can be rearranged into the sentence 'I wear a watch to tell the time.'

2. splash

The words can be rearranged into the sentence 'The children laughed as they swam round the lake.'

3. always

The words can be rearranged into the sentence 'Dad never does anything around the house.'

4. from

The words can be rearranged into the sentence 'Patrick used to eat salmon sandwiches every Saturday.'

5. break

The words can be rearranged into the sentence 'Be careful making wishes in case they come true.'

6. hers

The words can be rearranged into the sentence 'They never knew that it was me who took the ball.'

7. where

The words can be rearranged into the sentence 'They left me alone in the park yesterday afternoon.'

8. under

The words can be rearranged into the sentence 'The actors asked me to light up the stage.'

9. top

The words can be rearranged into the sentence 'They watched a film about a building that was on fire.'

10. us

The words can be rearranged into the sentence 'Ted and I have always done everything together.'

11. demand

The words can be rearranged into the sentence 'I hate people who pretend to be something they are not.'

12. tooth

The words can be rearranged into the sentence 'Regular trips to the dentist are important when you are young.'

13. day

The words can be rearranged into the sentence 'I try to avoid bossy people at all costs.'

14. when

The words can be rearranged into the sentence 'Do not pretend that you cannot remember me.'

15. supermarket

The words can be rearranged into the sentence 'It was not a fair fight at all.'

16. presents

The words can be rearranged into the sentence 'There is only one thing I want for Christmas.'

Section 3: Verbal Reasoning

— Synonyms

1. smirk

Both words mean 'smile'.

2. strength

Both words mean 'might'.

3. skilful

Both words mean 'gifted'.

4. phantom

Both words mean 'spirit'.

5. definite

Both words mean 'certain'.

6. rhyme

Both words mean 'a piece of writing written in lines'.

7. champion

Both words mean 'victor'.

8. separate

Both words mean 'to split up'.

9. shovel

Both words mean 'a tool for digging'.

10. ancient

Both words mean 'aged'.

11. ponder

Both words mean 'to consider'.

12. amble

Both words mean 'to move on foot'.

13. vault

Both words mean 'to leap'.

14. burden

Both words mean 'something that is carried'.

15. utter

Both words mean 'to say something'.

16. breeze

Both words mean 'moving air'.

17. forbid

Both words mean 'refuse to allow'.

18. depart

Both words mean 'go away'.

Section 4: Verbal Reasoning

— Antonyms

1. unfaithful

'dedicated' means 'loyal', whereas 'unfaithful' means 'disloyal'.

2. tentative

'certain' means 'without doubt', whereas 'tentative' means 'uncertain'.

3. active

'passive' means 'not participating', whereas 'active' means 'directly involved'.

4. disadvantage

'benefit' means 'an advantage', whereas 'disadvantage' means 'a drawback'.

5. amplify

'muffle' means 'to make quieter', whereas 'amplify' means 'to make louder'.

6. concise

'rambling' means 'long-winded', whereas 'concise' means 'to the point'.

7. forthright

'tactful' means 'acting sensitively', whereas 'forthright' means 'blunt'.

8. commend

'condemn' means 'to express disapproval', whereas 'commend' means 'to express approval'.

9. prosperity

'poverty' means 'having little money', whereas 'prosperity' means 'having lots of money'.

10. natural

'artificial' means 'fake' or 'unnatural', whereas 'natural' means 'real' or 'existing in nature'.

11. cacophonous

'quiet' means 'not loud', whereas 'cacophonous' means 'noisy'.

12. tempestuous

'calm' means 'not stormy', whereas 'tempestuous' means 'stormy'.

13. craven

'heroic' means 'courageous', whereas 'craven' means 'cowardly'.

14. poised

'flustered' means 'agitated', whereas 'poised' means 'composed'.

15. appropriate

'give' means 'to present someone with something', whereas 'appropriate' means 'to take something'.

16. courteous

'abrupt' means 'rude', whereas 'courteous' means 'polite'.

17. solidify

'soften' means 'to become softer', whereas 'solidify' means 'to become harder'.

18. emerge

'disappear' means 'to vanish from sight', whereas 'emerge' means 'to appear'.

Section 5: Numerical Reasoning

1. 54

$100 - 46 = 54$, so $54 + 46 = 100$.

2. 70

$4 \times 7 = 28$, so to get 280, you need to multiply by a number 10 times bigger than 7. $7 \times 10 = 70$, so $4 \times 70 = 280$.

3. -16

$-13 - 3 = -16$, so $-16 + 3 = -13$.

4.



The box with 8 squares shaded has two thirds shaded.

The box is made up of 12 squares. One third of 12 is $12 \div 3 = 4$, so two thirds of 12 is $4 \times 2 = 8$.

5. $\frac{5}{6}$

To compare fractions, you need to make the number at the bottom the same. 4, 3 and 6 all go into 12 easily, so the first three fractions become $\frac{9}{12}$, $\frac{8}{12}$ and $\frac{10}{12}$. The biggest one is $\frac{10}{12}$, which is $\frac{5}{6}$, so this has to be compared to $\frac{4}{7}$. If you put them both over their lowest common multiple (42), you get $\frac{35}{42}$ and $\frac{24}{42}$. The largest is $\frac{35}{42}$, which is $\frac{5}{6}$.

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

To compare fractions, you need to make the number at the bottom the same. The lowest common multiple of 5, 3, 7 and 4 is very large, so compare pairs of fractions to find the answer. The lowest common multiple of 5 and 3 is 15, so $\frac{2}{5}$ and $\frac{1}{3}$ are the same as $\frac{6}{15}$ and $\frac{5}{15}$. $\frac{6}{15}$ is the biggest, so you can rule out $\frac{2}{5}$. The lowest common multiple of 5 and 4 is 20, so $\frac{1}{3}$ and $\frac{1}{4}$ are the same as $\frac{4}{12}$ and $\frac{3}{12}$. $\frac{4}{12}$ is the biggest, so you can rule out $\frac{1}{3}$. The lowest common multiple of 7 and 4 is 28, so $\frac{2}{7}$ and $\frac{1}{4}$ are the same as $\frac{8}{28}$ and $\frac{7}{28}$. The smallest is $\frac{7}{28}$, so $\frac{1}{4}$ is the answer.

7. 1.508

First look at the units. 0.158 and 0.1058 can be ruled out because they have no units and 1.508 and 1.058 each have one unit. Then look at the tenths. 1.058 can be ruled out because it has no tenths, whereas 1.508 has five tenths.

8. 18

First find one quarter of 24 by dividing it by 4. $24 \div 4 = 6$. Peter gives 6 stickers to his friend, so he has $24 - 6 = 18$ stickers left.

9. 5

$\pounds 2 = 200p$ so you need to work out how many times 36 goes into 200. $200 \div 36 = 5$ remainder 20, so Michelle can buy 5 pens. (She will have 20p left over.)

10. 8:35

You need to add 50 minutes to 7:45. It takes 15 minutes to get to 8:00. Then you need to add $50 - 15 = 35$ minutes to 8:00, which is 8:35.

11. 4:47

Count back 20 minutes from 5:07, which is 4:47.

12. 420 m

To find the total distance Simon swam, multiply the length of the pool by the number of lengths he swam. $35 \times 12 = 420$ m.

13. 750 g

First, work out what you need to multiply the amount of potato by. $12 \div 4 = 3$. Then multiply the amount of potato by this number. $250 \times 3 = 750$ g of potato.

14. 7

To find out how many sets of shelves she needs, divide 612 by 90. $612 \div 90 = 6$ remainder 72. Gita's books will fill 6 shelves, but she needs one more shelf to hold the remainder of the books. She needs 7 shelves.

15. 263

You are told how many adult tickets were sold, so the rest of the tickets sold must be child tickets. The number of child tickets is the difference between 587 and 324. $587 - 324 = 263$ child tickets.

16. 36

$6^2 = 6 \times 6 = 36$.

17. 64

$8^2 = 8 \times 8 = 64$.

18. 8

$2^3 = 2 \times 2 \times 2 = 8$.

19. 36

First replace x with 4: $y = (8 \times 4) + 4$.
Then do the calculation: $y = 32 + 4 = 36$.

20. 14

First replace x with 4: $y = (7 \times 4) \div 2$.
Then do the calculation: $y = 28 \div 2 = 14$.

21. 48

First replace x with 4: $y = 4^2 \times 3$.
Then do the calculation: $y = 4 \times 4 \times 3 = 16 \times 3 = 48$.

22. 4b

This expression is the same as saying there are 4 lots of b .

23. 3a + 6d

First gather the letters that are the same together: $(5a - 2a) + (2d + 4d)$. Then do the additions and subtractions: $5a - 2a = 3a$ and $2d + 4d = 6d$. Then put these together to make the expression: $3a + 6d$.

Set A — Paper 2

Section 1: Numerical Reasoning

1 a) £7.50

Read off the graph.

1 b) 4 litres

Read off the graph.

1 c) £60.00

From the graph, you know that 4 litres costs $\pounds 6$.
40 litres is 10×4 litres, so it costs $10 \times \pounds 6 = \pounds 60.00$.

1 d) 20 litres

To find the number of litres used, divide the number of miles travelled by the number of miles travelled using one litre. $24 \div 12 = 2$, so $240 \div 12 = 20$.

2 a) Jousting

The jousting starts at 12.30 pm and finishes at 1.15 pm.

2 b) Viking display

The musket firing finishes at 11.30 am.

The Viking display is on from 10.30 am until 11.45 am.

2 c) 5 hours and 30 minutes

They start at 10.30 am and end at 4.00 pm.

2 d) 1 hour and 40 minutes

Hunting dogs is on from 1.40 pm until 2.30 pm, which is 50 minutes. Medieval music is on from 2.30 pm until 3.20 pm, which is another 50 minutes.

$50 \text{ minutes} + 50 \text{ minutes} = 100 \text{ minutes}$

$= 1 \text{ hour and } 40 \text{ minutes}$

3 a) 56

There are 8 years between 2013 and 2021.

$48 + 8 = 56$ years

3 b) 1965

$2013 - 48 = 1965$

(It's easier to do the sum if you add 2 onto both numbers, so do $2015 - 50$.)

3 c) 1989

Mr Pink was 48, so Mr Brown was $48 \div 2 = 24$.

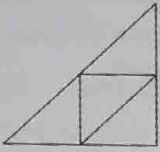
$2013 - 24 = 1989$

(You could also have added 24 onto 1965.)

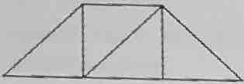
3 d) 2089

Add 100 onto the year he was born.

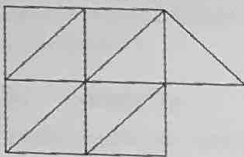
4 a) 4 tiles



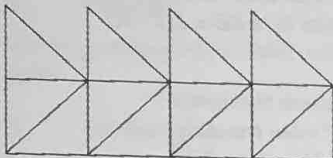
4 b) 4 tiles



4 c) 9 tiles



4 d) 12 tiles



5 a) 3 days

Visiting attractions takes up $\frac{1}{4}$ of the pie chart.
 $\frac{1}{4}$ of 12 days is 3 days.

5 b) 1 day

Shopping takes up $\frac{1}{6}$ of the pie chart.
 $\frac{1}{6}$ of 6 days is 1 day.

5 c) Debbie

Debbie spent $\frac{1}{3}$ of 12 days = 4 days on the beach.
Alex spent $\frac{1}{2}$ of 6 days = 3 days on the beach.

6 a) Liverpool and Nottingham

Reading off the table, the cell containing 112 lines up with Liverpool above and Nottingham to the side.

6 b) 154 miles

Read off the table.

6 c) 89 miles

The distance from York to Norwich is 180 miles.
The distance from Norwich to Cambridge is 63 miles.
So the total distance is 243 miles.
Compare this with the direct route: $243 - 154 = 89$ miles

7 a) £14.00

$£2.80 \times 5 = £14$.

(An easy way to work it out is to say that it would be $£2.80 \times 10 = £28$ for 10 days. Then divide by 2 for five days.)

7 b) 9

$52 \div 6 = 8$ remainder 4. So they need 9 rooms.

7 c) £9.25

For the coach, they save $£10 - £3 = £7$

For the minibus, they save $£4.50 - £2.25 = £2.25$

So in total they save $£7 + £2.25 = £9.25$.

7 d) £85

Using the day prices from the table:

13 motorbikes pay $13 \times £1 = £13$

21 cars pay $21 \times £2 = £42$

3 lorries pay $3 \times £10 = £30$

So the total is $£13 + £42 + £30 = £85$.

8 a) 55 m²

Area = length \times width = $10 \times 5.5 = 55$ m²

8 b) 62 m²

Each long side is 10 m long by 2 m deep = 20 m²

Each short side is 5.5 m long by 2 m deep = 11 m²

So, the total area = $(20 \times 2) + (11 \times 2) = 62$ m²

8 c) 59 packs

The total area is $55 + 62 = 117$ m².

Each pack covers 2 m² so you need to divide 117 by 2. First do $100 \div 2 = 50$. Then do $17 \div 2 = 8.5$. $50 + 8.5 = 58.5$ packs, but you can't buy half a pack, so you need 59 packs.

8 d) £531

First find the cost of 60 packs: $£9 \times 60 = £540$

Then subtract £9 to get the cost of 59 packs:

$£540 - £9 = £531$

Section 2: Verbal Reasoning — Cloze

1. unique

'Most owners think that their pet is **unique**'

2. flooded

'the internet has been **flooded** with videos of cats'

3. feline

'the domestic **feline** seems to have'

4. tendency

'a **tendency** to do unusual things.'

5. famous

'Blackie was a cat who became **famous** in the 1980s'

6. exploited

'a skill which Blackie's owners **exploited** for money.'

7. unusual

'Another cat with an **unusual** skill was a cat named Nora'

8. teacher

'Her owner, who was a piano **teacher**, woke up one night'

9. **tapping**
'to find Nora sitting on the piano stool and **tapping** the keys'
10. **often**
'Nora **often** joined her owner for duets'
11. **field**
'Some cats have become famous in the **field** of politics.'
12. **elected**
'Cat Mandu was a cat who was **elected** joint leader'
13. **until**
'He was leader for three years **until** he was'
14. **campaigned**
'the party has **campaigned** for cat-crossings'
15. **embarked**
'Another cat who **embarked** on a political career'
16. **mayor**
'Stubbs, who in 1997 was elected **mayor** of a small town'
17. **citizens**
'When the **citizens** of the town decided'
18. **candidates**
'they didn't like any of the human **candidates**'
19. **official**
'a cat named Tama became an **official** station master in 2007.'
20. **passengers**
'Her main duty is to welcome **passengers**'
21. **uniform**
'Tama has her own **uniform**'
22. **salary**
'she is paid her **salary** in cat food.'

Section 3: Non-Verbal Reasoning

1. **B**
In all other options the shading has not been reflected correctly.
2. **D**
Option A is the wrong shape. Options B and C have the wrong rotation.
3. **B**
Option A is a downwards reflection. Option C is a 180 degree rotation. Option D is identical to the original figure.
4. **B**
Option A is a downwards reflection. Option C is a reflection, but the two grey triangles have been swapped over. Option D is a 180 degree rotation.
5. **A**
Option B is a 45 degree clockwise rotation. Option C is a 45 degree rotation, with incorrect shading. Option D is a 45 degree anticlockwise rotation.
6. **B**
Option A is a downwards reflection. Option C is a 180 degree rotation. Option D is identical to the original figure.
7. **D**
Option A is a downwards reflection. Option B is a 90 degree clockwise rotation. Option C is a 180 degree rotation.
8. **A**
All figures are reflected across and get smaller.
9. **B**
The two shapes in each figure swap shadings. The shape at the front of each figure moves to the back.
10. **D**
The lined shading in each figure rotates 90 degrees.
11. **B**
All figures are reflected across. In each figure, the two small shapes swap between being black and white.
12. **C**
All figures get smaller. The two shapes in each figure swap shadings.
13. **B**
All figures rotate 90 degrees clockwise. The small shape in each figure gains a side.
14. **A**
All figures rotate 90 degrees clockwise. All of the straight sides become curved.
15. **C**
The two lines stay the same length and move anticlockwise around the corners of the pentagon.
16. **B**
In a clockwise pattern, the inner circle loses a one-sixth segment in each series square. The circles move clockwise around the four corners of the series squares.
17. **C**
The triangle gets shorter and wider in each series square.
18. **D**
The circle rotates 90 degrees clockwise in each series square.

19. A

In each series square, the circle and the triangle rotate together 45 degrees clockwise. After rotation the triangle rotates 180 degrees on its own, alternating between the inside and outside of the circle's perimeter.

20. B

In each series square, the two black rectangles become grey, and two new rectangles become black.

21. B

An extra point is added to the star in each series square. The star alternates between being grey with a solid outline, and white with a dashed outline.

22. D

Each shape must only appear once in each row and column. The different shading types (hatched, white and black) must also only appear once in each shape, and once in each row and column.

23. F

The shapes in the top two grid squares in each column are added together to make the bottom grid square.

24. B

Each shape (diamond, circle and triangle) only appears once in each row. Each row has two big shapes and one small shape.

25. A

Working from top to bottom, the arrow rotates 90 degrees clockwise. The number of lines that cross the arrow is the same along each row.

26. E

Working from top to bottom, each shape moves one grid square left. The shape in the left hand grid square disappears, and a new shape appears in the right hand grid square.

27. A

Working from left to right, the contents of each grid square rotate 45 degrees anticlockwise.

28. B

In each row, the shape in the middle grid square is the smaller of the shapes from the right hand grid square, rotated 45 degrees anticlockwise, with the shading from the large shape in the right hand square. (The big shape in the right hand grid square is the shape from the left hand grid square, rotated 90 degrees anticlockwise, with the shading of the shape from the middle grid square).

Set B — Paper 1

Section 1: Verbal Reasoning

— Comprehension 1

— The Fiend of the Fens

1. B

The newspapers reported sightings but did not print a photograph of the beast.

2. D

"material things" is closest in meaning to 'possessions'.

3. C

In the passage it says that there was "ultimately" a chicken coop. This means that it was the last thing in the garden.

4. D

He was trying to make the story more dramatic by hesitating, whispering and pretending to be afraid of being overheard.

5. C

In the passage it says that she "didn't believe the nonsense about a beast".

6. C

William is pretending to consider the boys' idea but he has already thought of his plan to trick them.

7. A

In the passage it says they "ambushed" their father early the next morning. This suggests that they were anxious to get started on the pit quickly.

8. B

William wants to keep the boys interested in the mystery of the beast so they will dig him a large rubbish pit.

9. B

In the passage it says that the boys started digging on Wednesday, were still digging on Monday and finished "the following day". This means they finished on Tuesday, so the pit took them a week.

10. D

In the passage it says that the boys covered the first pit with "sticks and old sacking and then added a layer of grass". For the second pit they "reused the sticks and the sacking, and this time added a layer of soil". Leaves are not mentioned.

11. C

The boys were shivering with excitement. They were anticipating their father falling into the pit and getting their own back.

12. A

"fleetingly" means that the beast was only 'briefly' seen.

13. B

"skittish" is closest in meaning to 'agitated' in the sense that the animals had become jumpy and nervous because they were afraid of the beast.

14. D

"tottered" is similar in meaning to 'walking unsteadily'. The man was walking unsteadily because he was carrying a large box and could not see where he was going.

15. C

To "profit from" means to gain something, not necessarily money.

16. A

Dusk is the time when the sun sets, so "Dusk fell swiftly" suggests that it got dark quickly.

Section 2: Verbal Reasoning

— Comprehension 2 —

ZigZag — the Double Agent

1. C

In the passage it says that Chapman was trained by the Germans, but then went to work for the British as a double agent. Both sides thought he was working for them, so his codename was 'ZigZag'.

2. B

According to the passage, Chapman was sent to prison in Jersey in 1938. He was sent back to Britain in 1942 and he trained in Germany for a year before that, so he couldn't have been in Jersey for four years.

3. B

In the passage it says that Chapman "offered to blow up a British ship", so the British faked an explosion on the ship "The City of Lancaster".

4. A

The passage mentions Chapman's "future wife Betty Farmer", so she must be the "pre-war sweetheart" that he married.

5. D

Chapman was born on 16th November, 1914, and he was sacked on 2nd November, 1944, so he was 29 when he was sacked.

6. D

In the passage it says that the Iron Cross was a "military award".

7. A

The passage doesn't say anything about the gang's enemies, or the way they walk. It says they used explosives to get into safes, which wouldn't make entire buildings wobble. This means it must be to do with the fact that "gelatin" sounds like 'jelly'.

8. C

The passage says that most of the bombs hit Kent and South London suburbs, which would have caused less damage than if they had hit Central London.

Section 3: Verbal Reasoning

— Odd One Out

1. gold

The other three are all types of jewellery.

2. coffee

The other three are all cold drinks.

3. entertain

The other three are things you would find in a theatre.

4. meadow

The other three are groups of trees.

5. pit

The other three all mean a stack or clump of things.

6. muscle

The other three are all parts of the skeleton.

7. root

The other three are all above the ground.

8. orange

The other three are all primary colours.

9. fly

The other three are all insects which can sting.

10. beg

The other three all mean to take without permission.

11. stride

The other three all mean to walk in a leisurely way.

12. prod

The other three all mean to pull.

13. roast

The other three all mean to cook something in water.

14. smoky

The other three are all types of weather.

15. mistake

The other three are all verbs that mean to take something away, or rub it out.

16. fence

The other three all mean the outside of something.

17. hidden

The other three all mean not very clear.

18. copy

The other three all mean to change.

Section 4: Verbal Reasoning

— Antonyms

1. scarce

'plentiful' means 'abundant', whereas 'scarce' means 'insufficient'.

2. occasionally

'frequently' means 'often', whereas 'occasionally' means 'not often'.

3. merciful

'vengeful' means 'unforgiving', whereas 'merciful' means 'forgiving'.

4. arid

'humid' means 'moist', whereas 'arid' means 'dry'.

5. drought

'flood' means 'an abundance of water', whereas 'drought' means 'a shortage of water'.

6. din

'silence' means 'an absence of noise', whereas 'din' means 'a loud noise'.

7. discard

'keep' means 'to retain', whereas 'discard' means 'to throw away'.

8. yonder

'here' means 'in this spot', whereas 'yonder' means 'far away'.

9. sombre

'playful' means 'fun-loving', whereas 'sombre' means 'very serious'.

10. constant

'changeable' means 'irregular', whereas 'constant' means 'regular'.

11. feasible

'impossible' means 'not able to happen', whereas 'feasible' means 'possible'.

12. volatile

'stable' means 'unchanging', whereas 'volatile' means 'very changeable'.

13. obtain

'lose' means 'to misplace something', whereas 'obtain' means 'to gain something'.

14. hindrance

'help' means 'something that assists', whereas 'hindrance' means 'something that obstructs'.

15. perilous

'safe' means 'not dangerous', whereas 'perilous' means 'dangerous'.

16. succinct

'wordy' means 'long-winded', whereas 'succinct' means 'brief' or 'concise'.

17. haphazard

'neat' means 'ordered', whereas 'haphazard' means 'disordered'.

18. absurd

'wise' means 'sensible', whereas 'absurd' means 'ridiculous'.

Section 5: Verbal Reasoning

— Synonyms

1. docile

Both words mean 'submissive'.

2. swindle

Both words mean 'to trick out of money'.

3. dawdle

Both words mean 'to waste time'.

4. limited

Both words mean 'having limits'.

5. reason

Both words mean 'a basis for doing something'.

6. **positive**

Both words mean 'certain'.

7. **desert**

Both words mean 'to leave behind'.

8. **genuine**

Both words mean 'sincere'.

9. **commence**

Both words mean 'to start'.

10. **amaze**

Both words mean 'to astonish'.

11. **frenzied**

Both words mean 'frantic and out of control'.

12. **connect**

Both words mean 'to attach'.

13. **sombre**

Both words mean 'gloomy'.

14. **provisional**

Both words mean 'for the time being'.

15. **vacant**

Both words mean 'unoccupied'.

16. **submerge**

Both words mean 'to go below the surface of water'.

17. **dice**

Both words mean 'to cut into small chunks'.

Section 6: Non-Verbal Reasoning

1. **F**

Shape F has been rotated 90° towards you, top-to-bottom.

2. **A**

Shape A has been rotated 90° clockwise in the plane of the page. Then it has been rotated 90° towards you, top-to-bottom.

3. **B**

Shape B has been rotated away from you by 90° , top-to-bottom. Then it has been rotated 180° left-to-right.

4. **C**

Shape C has been rotated 90° left-to-right.

5. **E**

Shape E has been rotated 90° left-to-right. Then it has been tilted away from you so you are looking at it from the bottom, not the top.

6. **D**

Shape D has been rotated 90° anticlockwise in the plane of the page. Then it has been rotated 90° towards you, top-to-bottom.

7. **B**

The bottom left block of set B rotates away from you by 90° , top-to-bottom to become the bottom right block of the figure. The shorter block in the set moves to the left of the figure. The block at the top of set B rotates by 90° left-to-right and moves to the top of the figure.

8. **C**

The block on the left of set C rotates 90° away from you, top-to-bottom. It then rotates 90° clockwise in the plane of the page to become the bottom shape of the figure on the left. The block in the top right of set C moves to the middle and back of the figure, and the block in the bottom right moves to the middle and front of the figure.

9. **B**

The block on the left of set B becomes the back block in the figure on the left. The block on the right of set B rotates 90° clockwise, left-to-right and moves in front of the back shape to become the front right hand part of the figure on the left. The block at the bottom of set B moves to the left side of the figure, at the front.

10. **A**

There are only five blocks visible from above, which rules out options B and D. The five blocks visible from above join up in the bottom-right corner, which rules out option C.

11. **C**

There is a gap between the closest block on the right and the next closest block. This rules out options A and D. The six blocks furthest away make a cross shape from above, which rules out option B.

12. **D**

There are only seven blocks visible from above, which rules out options A, B and C.

13. **C**

Option A and option D are ruled out because the white cube face and the spot cube face must be on opposite sides. Option B is ruled out because the black cube face and the double-cross cube face must be on opposite sides.

14. **B**

Option A is ruled out because the grey cube face and the hatched cube face must be on opposite sides. Options C and D are ruled out because the '3' cube face and the '=' cube face must be on opposite sides.

15. **A**

Options B and D are ruled out because the cube doesn't have two identical faces. Option C is ruled out because the white cube face and the grey triangle cube face must be on opposite sides.

16. **D**

Option A is ruled out because the cube doesn't have two identical faces. Option B is ruled out because the 'U' shaped cube face and the cube face with four black lines must be on opposite sides. Option C is ruled out because the grey cube face and the hatched cube face must be on opposite sides.

17. **B**

Option A is ruled out because the cube doesn't have two identical faces. Option C is ruled out because the black cube face and the grey arrow cube face must be on opposite sides. Option D is ruled out because the black star cube face and the cube face with the arrow head must be on opposite sides.

18. **A**

Option B is ruled out because the black stripe on the right-hand face should be horizontal, not vertical, with this rotation. Option C is ruled out because the cube doesn't have two identical faces. Option D is ruled out because the three spots cube face and the black circle cube face must be on opposite sides.

Set B — Paper 2

Section 1: Numerical Reasoning

1. **180**

$300 - 120 = 180$, so $300 - 180 = 120$.

2. **32**

$50 - 18 = 32$, so $18 + 32 = 50$.

3. **60**

$54 \div 9 = 6$, so to get 540 you need to multiply 9 by a number 10 times bigger than 6. $6 \times 10 = 60$, so $9 \times 60 = 540$.

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

To see which fraction is equivalent to $\frac{3}{12}$, multiply the fractions so all the numbers on the bottom are 12.
 $\frac{3}{4} = \frac{9}{12}$, $\frac{2}{3} = \frac{8}{12}$, $\frac{1}{4} = \frac{3}{12}$, $\frac{1}{2} = \frac{6}{12}$. The answer is $\frac{1}{4}$.

5. **$\frac{2}{3}$**

To compare fractions, you need to make the number at the bottom the same. 18, 9, 6 and 3 all go into 18.

$\frac{15}{18} = \frac{5}{6}$, $\frac{7}{9} = \frac{14}{18}$, $\frac{5}{6} = \frac{15}{18}$ and $\frac{2}{3} = \frac{12}{18}$.

So the smallest is $\frac{12}{18}$, which is $\frac{2}{3}$.

6. **£3.18**

$£2.29 + £0.89 = £3.18$

7. **8**

First find one third of 12 by dividing it by 3.
 $12 \div 3 = 4$. Alexander gives 4 bars of chocolate to his sister, so he has $12 - 4 = 8$ bars of chocolate left.

8. **£7.83**

$£40 - £32.17 = £7.83$ change.

9. **7**

$£4 = 400p$ so you need to work out how many times 54 goes into 400. $400 \div 54 = 7$ remainder 22, so Isaac can buy 7 whole apples. (He will have 22p left over.)

10. **19**

First replace x with 5: $y = 5^2 - 6$.
Then do the calculation: $y = 5 \times 5 - 6 = 19$

11. **36**

Replace x with 5: $y = 9(5 - 1)$.
Then do the calculation: $y = 9 \times 4 = 36$

12 a) **40**

Each symbol represents 5 cups. There are 8 symbols.
 $8 \times 5 = 40$ cups

12 b) **10**

There are two more symbols for milk than for hot chocolate.
 $2 \times 5 = 10$

12 c) **£24.00**

The café sold $4 \times 5 = 20$ cups of coffee.
 $20 \times £1.20 = £24.00$

12 d) **£5.80**

2 cups of tea at 90p = £1.80. 2 cups of hot chocolate at £1.40 = £2.80. One cup of coffee = £1.20.
 $£1.80 + £2.80 + £1.20 = £5.80$

13 a) **Every 45 minutes**

09:30 until 10:00 is 30 minutes. 10:00 until 10:15 is 15 minutes. That's 45 minutes in total.

13 b) **90 minutes**

9:30 until 11:00 is 1 hour and 30 minutes. That's 60 minutes + 30 minutes = 90 minutes.

13 c) **11:17**

Read from the timetable.

13 d) **10:50**

This will get you to the High Street at 11:31.

14 a) **14 cm**

Read off the graph.

14 b) **23 minutes**

Read off the graph - accept answers between 22 and 24 minutes.

14 c) **50 minutes**

That's when the level starts to decrease.

15 a) **6:00 pm**

1½ hours before 7:30 pm.

15 b) 6 months
September to February is 6 months.

15 c) 6 hours
He stays from 10:00 am until 4:00 pm, which is 6 hours.

15 d) 63 hours
He works from 9:00 am until 6:00 pm each day, which is 9 hours. He works for 7 days. $9 \times 7 = 63$ hours

16 a) 8 cm
Each side of the square is the length of the long side of the tile minus the short side of the tile. $6 - 4 = 2$ cm. The square has 4 sides, so the perimeter is $4 \times 2 = 8$ cm.

16 b) 40 cm
Each side of the outer edge is $6 \text{ cm} + 4 \text{ cm} = 10$ cm long. So the perimeter is $4 \times 10 = 40$ cm.

16 c) larger than for the first pattern
The perimeter of the outside edge of the pattern includes one length, one width and an extra bit from each tile. In the first pattern, it just includes one length and one width from each tile.

17 a) 2
The recipe is for 4 people, so she needs $16 \div 4 = 4$ times as much of everything for 16 people. $4 \times \frac{1}{2} = 2$ onions

17 b) 12
 $450 \text{ g} \div 150 \text{ g} = 3$.
So she can make $4 \times 3 = 12$ servings

17 c) 100 g
 $50 \text{ ml} + 20 \text{ ml} = 2\frac{1}{2}$
 $2\frac{1}{2} \times 40 \text{ g} = 100 \text{ g}$

17 d) 3 radishes
Replace 1 onion with 4 radishes. The recipe for 4 people uses $\frac{1}{2}$ an onion, so Helen would need 2 radishes in the recipe for 4 people. So you need half a radish for each person. So for 6 people, you need 3 radishes.

18 a) 9 chocolates
The decorated box cost £1.50, so the chocolates cost $\pounds 2.22 - \pounds 1.50 = 72\text{p}$ in total.
 $72\text{p} \div 8\text{p} = 9$ chocolates

18 b) 10p
25% is the same as $\frac{1}{4}$. $\frac{1}{4}$ of 8p is 2p.
So the new price is $8\text{p} + 2\text{p} = 10\text{p}$.

18 c) £1.65
To find 10%, divide by 10.
So 10% of £1.50 is 15p.
The new price is $\pounds 1.50 + 15\text{p} = \pounds 1.65$.

18 d) 13
 $\pounds 3 - \pounds 1.65 = \pounds 1.35$ to spend on chocolates.
Each chocolate costs 10p, so he can buy 13 chocolates with 5p left over.

19 a) right-angled
The angle marked x is one corner of a rectangle, so it must be a right angle.

19 b) 90°
A right angle is 90°.

19 c) 40°
The corner of the rectangle is 90°.
So $y + 50^\circ = 90^\circ$, $y = 40^\circ$

19 d) 80°
The angles in a triangle add up to 180°.
So $z + 40^\circ + 60^\circ = 180^\circ$, $z = 80^\circ$

20 a) (6,2)
An isosceles triangle is symmetrical, which means that Melissa is halfway across the triangle. The difference between the x-coordinates of Isobel and Melissa's locations is $4 - 2 = 2$. So Naseem's location must have the x-coordinate $4 + 2 = 6$. For Naseem's y-coordinate, you can see on the diagram that he is straight across from Isobel, so they must have the same y-coordinate, which is 2. So Naseem's coordinates are (6,2).

20 b) (8,7)
Ben is east (in other words, to the right) of Melissa, so you are working with the x-coordinate, which is always the first number. This means adding 4 to Melissa's x-coordinate: $4 + 4 = 8$. The y-coordinate stays the same, so Ben's coordinates are (8,7).

20 c) Naseem
First, compare the x-coordinate of the treasure (5) with everyone's x-coordinates. Naseem and Melissa's x-coordinates are both one unit away from the treasure, whereas Isobel and Ben's are three units away. So either Naseem or Melissa must be closest. Next, compare the y-coordinate of the treasure with Naseem and Melissa's y-coordinates. Naseem's y-coordinate is two units away from the treasure and Melissa's is three units away. This means that Naseem is closest.

20 d) Melissa and Ben
Ben's location forms a second isosceles triangle with Naseem and Melissa's locations. The shortest side of the triangle is between Melissa and Ben, so the distance between Melissa and Naseem, and the distance between Ben and Naseem, must be the same.

Section 2: Verbal Reasoning — Cloze

- Becoming**
'Becoming a professional referee'
- requires**
'requires a lot of hard work'
- complete**
'you need to complete various qualifications'
- range**
'There is a range of different refereeing courses'

5. **prospective**
'prospective referees usually have to complete'
6. **least**
'at least one'
7. **charge**
'before they can take charge of their first match.'
8. **young**
'as young as fourteen'
9. **isn't**
'although refereeing isn't just a young person's game.'
10. **considering**
'if you are considering becoming a referee'
11. **assess**
'you should assess whether or not'
12. **mental**
'the right mental and physical characteristics.'
13. **remain**
'they should always remain calm.'
14. **abuse**
'most referees experience a lot of abuse'
15. **fit**
'an excellent way of keeping fit'
16. **pursue**
'it's an unusual hobby to pursue'

Section 3: Non-Verbal Reasoning

1. **A**
The figure is rotated 225 degrees clockwise. Options B and D are the wrong shape. Option C is a rotated reflection.
2. **B**
The figure is rotated 120 degrees clockwise. Option A has incorrect shading. Options C and D are rotated reflections.
3. **C**
The figure is rotated 270 degrees clockwise. Option A is missing the grey triangle. In option B, the white square and grey triangle are positioned incorrectly. In option D, the grey triangle is positioned incorrectly.
4. **A**
The figure is rotated 270 degrees clockwise. In option B, the arrow is positioned incorrectly. In option C, the arrowhead is the wrong colour. In option D, the white shape has too many sides.
5. **C**
The figure is rotated 225 degrees clockwise. In option A, the circle is in front of the arrow. In option B, the black line in front of the circle is incorrectly rotated. Option D is a rotated reflection.
6. **B**
The figure is rotated 90 degrees clockwise. Options A and D are reflections. The curved lines in option C are pointing in the wrong direction.
7. **D**
The figure is rotated 135 degrees clockwise. The black triangles in option A are positioned incorrectly. In option B the blunt end of the arrow is not symmetrical. In option C, the end part of the figure has been inverted.
8. **A**
The figure is rotated 90 degrees clockwise. The black triangles in options B and C are rotated incorrectly. Option D is missing the black triangles.
9. **A**
The bug's eyes change colour from black to grey, and wings are added to the bug's back.
10. **B**
The bug gains two extra legs and two extra small white shapes on its back. The legs must all point in the same direction.
11. **D**
The bug gains two black eyes, and the spots on its back are reflected across.
12. **D**
The stripes on the bug must curve down in the centre. The legs must all point away from the middle of the bug.
13. **B**
The shell reflects across and gets smaller. The outline of the bug's body must become jagged.
14. **E**
The shield shapes are reflected across the middle of the hexagonal lattice.
15. **B**
Each outer hexagon has three semicircles and three half-crosses. The three semicircles must face outwards, and the three half-crosses must face inwards.
16. **C**
Going in a clockwise direction from the top middle hexagon, each heptagon gains an extra black triangle.
17. **A**
Going in an anticlockwise direction from the top middle hexagon, the zig zag gets thicker and loses a line.
18. **B**
Going in a clockwise direction from the top-left hexagon, the black circle gets bigger and the grey line moves to the left in each hexagon.
19. **F**
Going in an anticlockwise direction from the top-left hexagon, the star loses a point. The triangle moves round one corner anticlockwise in each hexagon.