BROAD HORIZON
TUITION

11+ Tuition

Year 4

Mock Exam 04

Week 50

ANSWERS

BROAD HORIZON
— TUITION CENTRE —

Teacher's Guide

Mock Exams

1) Timing

Each section is individually timed. Timings are written on the teachers answer sheet (at the end of this guide).

Practice questions are completed outside of the time limit.

Students must get used to working out their **start and end times** and jotting them down on their exam paper, for every single section. Teachers must not tell students the start and end times, they need to work it out for themselves.

E.g.
Start 11:07
End 11:22

Might be a good idea to stop their time 30 seconds into the section and check who did and did not work out their start and end times (the vast majority won't have, or they will only do it for the first section and forget about it for the rest of the mock). This calculation must **only** be done once their time has started, because they're not allowed to write anything outside of the time limit.

Students **cannot** manage their time if they don't even know what time they're going to finish, and they cannot know what time they're going to finish if they don't know what time they started.

Every few minutes students should be **looking at the clock** so they know whether they're working too fast or too slow.

Also, for the really short sections, like NVR 3 minutes we don't advise they spend time writing down start and end times, since the time is so short, they can't afford to waste it, they should just look at the clock and know what time they're going to finish.

In the 11 plus exam, they won't have a digital timer on the board, they need to **get used to keeping an eye on the clock**.

The teacher should have their own digital timer which only they can see, maybe on their phone, or even on the tablet. Please turn off the TV screens so students can not use the digital time as they won't have this in their real exams.

Time limits are not so strict at this stage. It's their first mock exam. If they need a few extra minutes to finish, we can give them that. Timings will become stricter as the months go on with absolute strict timings around July/August.

You should **go straight into the mock exam** at the start of the lesson, do not start with marking homework, you'll run out of time on the mock.

Keep in mind it will take about 25/30 minutes to read out the answers and collect in the scores.

The mock exam itself will take about 90 minutes plus 30 minutes marking and collecting scores plus break in between, plus the extra time, this will easily take up the majority of the lesson.

Time management is a huge component of what students need to get used to with these mock exams.

Students are to be given a **time warning** when there is 1 minute remaining – this is the only time warning they are given.

2) Scores

Scores must be logged on the excel sheet.

The level of these mocks is very similar to the real 11 plus exam, and the students are about 10 months away from the 11 plus, so they're not expected to get really high scores right from the start. On the first mock exam, they're not expected to get higher than about 50%. If they get approx. 50% on the first mock they've done quite well. Anything below 40% would be a concern.

The next mock exam is at the end of January, with 1 at the end of February and another one at the end of March (after which they will have a mock exam almost every week). Their scores should typically go up by about 5-10% each month, eventually achieving about 75-85% around July/August.

Students must write down their score breakdown on their exam paper, as shown below:

Attempt 1

English

VR

Maths

NVR

TOTAL =	**/ 142**	**%**

3) Marking and Cheating

The pressure of achieving good scores **will** cause students to cheat whilst marking their work even if they seem like the type not to cheat. We've learnt over the years there isn't a type who cheat, when the pressure is on – they are all capable of it. Every year we see some of the most intelligent students, very capable, yet perform poorly on the exams because they cannot handle the pressure. Unfortunately, the pressure comes hand in hand with exams like the 11 plus and this is something we need students to get over as quickly as possible.

Anyone who gets over 45% their papers will be collected in and one of the admin team will re-mark their exam paper to double check them.

Please warn students about marking their work correctly before you start marking.

We need to get cheating out of their system very early on. We cannot help the students if we think they are doing really well, when the reality is otherwise.

All mock exams are self-marked in a different coloured pen (no peer marking, that has its own issues), so nobody should be seen holding a pencil whilst marking. They will often leave the boxes blank during the exam and then fill them in whilst you read out the answers and then tick them. Another common one is for them to write in multiple answers for 1 question and then tick them. Quite often they might only cheat on a few questions per section thinking it won't arouse suspicion, but those marks add up.

It might be a good idea to **collect in all the answering sheets** once you're done marking, and just have a quick flick through the pages.

4) Lesson Format

It is likely the entire lesson will be spent on the mock exam.

Students must complete the entire mock exam before we mark. We don't mark after each section like in a normal lesson; students need to **get used to the intensity** of sitting two-1-hour papers. They can have their break around their usual break time, however, please ensure it's at the end of a section and we're not stopping in the middle of a section to have a break.

They'll be given a 2nd blank answering sheet, which they take home and re-attempt the entire paper again from scratch – this is the homework on a mock exam week.

At the start of the following lesson, you'll mark their 2nd attempt, log their 2nd attempt scores on excel, and then go through the entire mock exam **question by question and explain anything they've got wrong**. (If there happens to be time left, you'll start the next lesson pack.)

5) Parent-Teacher Meetings

Meetings with parents will follow the first few mock exams, so we can **address any issues early on**.

We need to put plans in place for students who are struggling in specific areas, we can print extra content for them to cover at home, extra work for them to do during their holidays etc. Please let the manager know what work is needed and for which students so we can get this printed for them and **put a plan of action in place**.

Any plans put in place, please log them on **Trello** so the whole team is onboard and aware.

6) Students Answering Sheets

There is to be **no** working out on the answering sheet itself, answering sheets need to be clean. Working out on the exam paper only.

Students must rub out wrong answers and not cross them out.

Students must tick the answering sheet as they go along and not transfer their answers at the end, if they get used to transferring answers at the end and they run out of time, they could end up losing marks for entire sections.

Again, it might be a good idea to collect in all the answering sheets once you're done marking, and just have a quick flick through the pages.

7) Equipment

There is to be **no** use of **any** other equipment such as highlighters, pens, rulers, protractors etc.

Pencils and erasers only.

Set B — Paper 1

Section 1: Verbal Reasoning — Comprehension

1) C
Lines 6-8 state that Aristotle "looked at the sky and observed that it was possible to see different constellations depending on where you were in the world." Constellations are groups of stars, and because Aristotle could see different groups of stars in different parts of the world, it caused him to wonder "if the surface of the world could be curved."

2) C
Lines 10-11 state that the theory that the world is round was difficult to prove "Without a way of viewing the world from above". This wasn't possible until the invention of "technology such as aeroplanes, satellites and space stations" (line 1), which didn't exist when Aristotle was alive.

3) C
Line 19 states that the Spice Islands are "a group of islands in South East Asia".

4) D
Lines 20-22 state that exotic spices "were considered very valuable in Europe because they could only be found in faraway places that were expensive and dangerous to travel to." This means the spices weren't common in Europe and it was difficult to get hold of them.

5) B
Lines 25-26 state that Magellan wanted to lead "a westward voyage to the Spice Islands".

6) C
Line 27 states that "Magellan moved from Portugal to Spain".

7) C
Line 27-28 state that Magellan "convinced the King of Spain to fund the expedition".

8) D
Lines 35-36 state that Magellan was searching for a route "that would save him from having to sail all the way around" South America. Eventually, he "found a sea channel" that allowed him to do this (line 37), so it is not true that the expedition had to sail all the way around.

9) D
If something is described as "smooth sailing", it means that it is 'easy' or 'free from problems'. Magellan's journey was "far from smooth sailing", which suggests that many problems occurred and the journey was eventful.

10) B
Lines 41-42 state that "The expedition also lost two of its five ships before they reached the other side of the Americas". This means that there were three ships remaining after the crossing of the Strait of Magellan.

11) B
Line 44 states that "Magellan gave" the Pacific Ocean "the name that is still used today".

12) C
The sailors faced "dwindling supplies and extreme hunger" (line 49), while "Magellan had to put an end to a mutiny" (line 40), but there is no mention of attacks from pirates.

13) B
The phrase suggests that Magellan and his men had faced many difficulties while at sea, but reaching land "did not mean" that the difficulties ended. This means that Magellan and his men faced more difficulties when they reached land.

14) B
Lines 33-34 state that "the ocean on the other side" of the Americas (the Pacific Ocean) "had never been reached by boats sailing from Europe", so Magellan's "journey across the Pacific Ocean" (line 47) was the first European voyage to cross it.

15) C
Line 50 states that the ships arrived in "South-East Asia in March 1521". Lines 51-53 then state that Magellan was killed in battle roughly "a month later", so he must have died around April 1521.

16) B
Line 28 states that "the expedition left Spain" on "September 20th 1519". Lines 55-56 state that they arrived back in Spain on "September 8th 1522". This means that the journey took just under three years.

17) C
"exotic" can mean 'unfamiliar' or 'different to what you are used to'.

18) B
A "mutiny" is 'an attempt to overthrow the captain and take command', so Magellan had to stop or "put an end to" an uprising against him.

19) A
"persevere" means 'to keep going'.

20) D
"perilous" means 'full of danger'.

Section 2: Verbal Reasoning — Shuffled Sentences

1) cut
The words can be rearranged into the sentence 'Don't run when you're holding scissors.'

2) swam
The words can be rearranged into the sentence 'The island is only accessible by boat.'

3) many
The words can be rearranged into the sentence 'You should practise the piano every day.'

4) climb
The words can be rearranged into the sentence 'The squirrel jumped out of the tree.'

5) smelling
The words can be rearranged into the sentence 'Julie hates the taste of rotten eggs.'

6) health
The words can be rearranged into the sentence 'The children don't eat enough fruit and vegetables.'

7) gloves
The words can be rearranged into the sentence 'I got a new hat for my birthday.'

8) heat
The words can be rearranged into the sentence 'He always feels happy when the sun is shining.'

9) write
The words can be rearranged into the sentence 'Priya read a short story on Sunday night.'

10) raining
The words can be rearranged into the sentence 'Dima could hear thunder rumbling in the distance.'

11) were
The words can be rearranged into the sentence 'Everyone we met there was really friendly.'

12) photograph
The words can be rearranged into the sentence 'Tom drew a picture of a green dinosaur.'

13) holiday
The words can be rearranged into the sentence 'Send me a postcard when you get to France.'

14) right
The words can be rearranged into the sentence 'There are no biscuits left in the jar.'

15) illness
The words can be rearranged into the sentence 'My father works in the hospital near the roundabout.'

Section 3: Verbal Reasoning — Synonyms

1) grow
Both words mean 'to get bigger'.

2) rule
Both words mean 'the period of time when a person, usually a king or queen, is in charge'.

3) proper
Both words mean 'appropriate'.

4) cosy
Both words mean 'relaxing and pleasant'.

5) petrified
Both words mean 'terrified'.

6) free
Both words mean 'not taken'.

7) noticeable
Both words can mean 'able to be seen'.

8) naughty
Both words mean 'causing trouble'.

9) opportunity
Both words mean 'a time when you can do something'.

10) job
Both words mean 'a line of work'.

11) unbroken
Both words mean 'without breaks or interruptions'.

12) fault
Both words mean 'an imperfection'.

13) idol
Both words mean 'someone who you admire'.

14) generate
Both words mean 'to make'.

15) insult
Both words mean 'to upset or disrespect'.

16) logical
Both words mean 'sensible and reasonable'.

17) exchange
Both words mean 'to swap'.

18) extravagant
Both words mean 'excessively nice or expensive'.

19) examine
Both words mean 'to look at something closely'.

20) consequence
Both words mean 'a result'.

Section 4: Verbal Reasoning — Cloze

1) famous
'one of the most **famous** characters in British mythology.'

2) Although
'**Although** it is likely that a ruler called Arthur really did exist'

3) fictional
'most of the stories about him are completely **fictional**.'

4) recorded
'The first **recorded** mention of Arthur'

5) written
'a collection **written** in around 1470 by Thomas Malory'

6) prison
'a nobleman and criminal who wrote his manuscript from **prison**.'

7) describes
'One of the most commonly retold tales **describes** how'

8) heir
'the rightful **heir** to the throne'

9) declared
'and **declared** that whoever could remove the sword'

10) proved
'and so **proved** his right to the throne.'

11) According
'**According** to legend, King Arthur lived in a great castle'

12) believe
'Some people **believe** that Tintagel Castle in Cornwall'

13) designed
'his Round Table, which was **designed** so that each knight'

14) loyal
'Arthur's most **loyal** knight and greatest friend'

15) quest
'set out on a **quest** for the Holy Grail'

16) Despite
'**Despite** his friendship with Arthur'

17) forbidden
'Their **forbidden** romance sparked a chain of events'

18) brought
'a chain of events that **brought** about Arthur's downfall.'

19) based
'Many books, poem and films have been **based** on the various tales'

20) recognisable
'one of the most **recognisable** characters in the Western world.'

21) historical
'However, the **historical** facts suggest'

22) image
'the modern-day **image** of Arthur as a glorious king'

Section 5: Non-Verbal Reasoning

1) C
Shape C has been rotated 90 degrees anticlockwise in the plane of the page.

2) D
Shape D has been rotated 90 degrees right-to-left.

3) F
Shape F has been rotated 90 degrees left-to-right. It has then been rotated 90 degrees away from you, top-to-bottom.

4) B
Shape B has been rotated 90 degrees left-to-right.

5) A
Shape A has been rotated 90 degrees away from you, top-to-bottom.

6) E
Shape E has been rotated 90 degrees anticlockwise in the plane of the page.

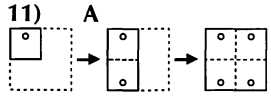
7) A
There are four blocks visible from above, which rules out options B and D. There are two blocks visible on the right, which rules out option C.

8) C
There are six blocks visible from above, which rules out options B and D. There are two blocks visible on the right, which rules out option A.

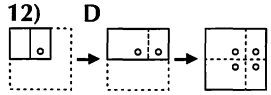
9) C
There are six blocks visible from above, which rules out options A and D. There are two blocks visible on the right, which rules out option B.

10) B
There are five blocks visible from above, which rules out options A and C. There are three blocks visible at the back, which rules out option D.

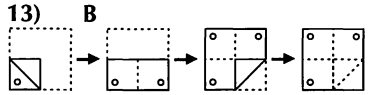
11) A



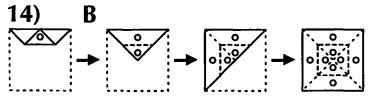
12) D



13) B



14) B



15) D
Option A is ruled out because the net does not have two white squares. Option B is ruled out because the grey oval and the spiral must be on opposite sides. Option C is ruled out because the net does not have two arrows.

16) B
Option A is ruled out because the grey triangle and the spotted circle must be on opposite sides. Option C is ruled out because the grey star and the three diagonal lines must be on opposite sides. Option D is ruled out because the net does not have a four-pointed star.

17) D
Option A is ruled out because the three circles and the two arrows must be on opposite sides. Option B is ruled out because the net does not have a white arrow and a grey arrow. Option C is ruled out because if the three circles are on the front and the star is on the top, then the two white rectangles must be on the right.

18) C
Option A is ruled out because the two grey rectangles have been rotated. Option B is ruled out because the net does not have two circles. Option D is ruled out because the black diamond and the circle with the cross must be on opposite sides.

Set B — Paper 2

Section 1: Verbal Reasoning — Odd One Out

1) carrot
The other three are all fruit.

2) whiteboard
The other three are paper-based items you write in.

3) connection
The other three mean 'deadlock'.

4) duster
The other three mean 'to have cleaned'.

5) sphere
The other three are 2D shapes.

6) vulture
The other three are all mammals and cannot fly.

7) route
The other three mean 'off course'.

8) loud
The other three are examples of onomatopoeia.

9) hopscotch
The other three are games you play with a pen and paper.

10) mixture
The other three mean 'to join together'.

11) jelly
The other three are desserts that are baked.

12) invisible
The other three mean 'clean' or 'unblemished'.

Section 2: Non-Verbal Reasoning

1) A
The outline of the small inner shape changes from solid to dotted.

2) D
The shadings on the figure swap round.

3) D
Three-quarters of the figure disappears. The hatching on the remaining quarter rotates 45 degrees anticlockwise.

4) A
The figure rotates 180 degrees. The large black shape moves behind the large white shape.

5) B
The figure rotates 45 degrees clockwise.
The direction of the arrows is reversed.

6) C
The four white shapes move further away from the hatched circle. The grey shapes take on the shape of the black shapes.

7) B
The shapes on opposite sides of the hexagonal grid are identical apart from shading. One of the shapes is shaded white and the other is shaded black.

8) C
Going in a clockwise direction from the bottom right hexagon, one more grey circle is added. The circles are added in a clockwise direction around the corners of the hexagon.

9) B
The hexagons on opposite sides of the hexagonal grid are identical, except that the white crosses have been rotated 45 degrees.

10) A
The whole hexagonal grid has a horizontal line of symmetry.

11) D
Going in a clockwise direction from the top hexagon, the amount of black shading in the ring increases in an anticlockwise direction, and the hatching rotates 45 degrees clockwise.

12) D
Going in an anticlockwise direction from the top left hexagon, the line is extended to one more circle. The arrowhead moves to the end of the extended line. The white shading moves one circle along the line.

13) A
The figure is rotated 45 degrees clockwise. Options B and D have the wrong shading. In option C, the shapes inside the square are wrong.

14) B
The figure is rotated 180 degrees. In option A, the triangle has the wrong rotation. In option C, the triangle is in the wrong place. Option D has the wrong shading.

15) C
The figure is rotated 135 degrees anticlockwise. In option A, the white diamond has the wrong rotation. In option B, the white diamond is in the wrong place. Option D is a rotated reflection.

16) C
The figure is rotated 90 degrees clockwise. Option A is a rotated reflection. Options B and D are the wrong shape.

17) D
The figure is rotated 90 degrees clockwise. In option A, the black line is in the wrong place. In option B, the grey rectangle is in the wrong place. Option C is a downwards reflection.

18) B
The figure is rotated 90 degrees anticlockwise. In option A, the arrow is in the wrong place. Option C is a rotated reflection. In option D, the circle and the square have swapped places and shadings.

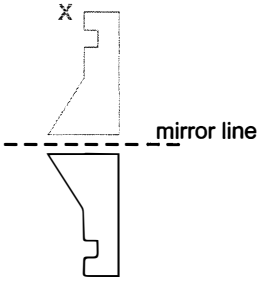
Section 3: Numerical Reasoning

1) 48
Subtract 32 from 80 to find the missing number. Partition 32 into 30 and 2: 80 – 30 = 50 and 50 – 2 = 48.

2) 1800 g
There are four divisions between 800 g and 1200 g.
1200 – 800 = 400, so each division represents
400 ÷ 4 = 100 g. The arrow is pointing at one division past 800 g, so this is 800 g + 100 g = 900 g.
Jonah needs twice as much as this so multiply 900 by 2:
9 × 2 = 18, so 900 × 2 = 1800 g.

3) Right-angled
The shaded part of the table is for triangles that have fewer than three equal sides and that cannot contain any obtuse angles. Equilateral triangles have three equal sides so this is ruled out. Scalene triangles can have angles of any size as long as they're all different and add up to 180°. Isosceles triangles must have two angles less than 90° that are the same size, but the third angle can be obtuse. Right-angled triangles have one angle equal to 90°, so the other two must be less than 90°.

4) C
The reflection of X in the mirror line is shown below.
The reflection matches shape C.



5) $^{12}/_{20}$
Reduce each of the answer options to its simplest form to see if it's equivalent. $^{12}/_{20}$ can be simplified to $^{3}/_{5}$ by dividing the numerator and the denominator by 4.

6) 8815 miles
Only numbers from 8815 up to (but not including) 8825 round to 8820 to the nearest 10. So the correct answer is 8815 miles.

7 a) 28 July
19 + 7 = 26, so 26th July is a Thursday. Saturday is two days later, so the date is 26 + 2 = 28th July. There are 31 days in July, so this is the last Saturday in the month.

7 b) Friday

26th July must be a Saturday. There are 31 days in July, so 7 days after 26th July is 2nd August. This means 2nd, 9th and 16th August are Saturdays, so 15th August is a Friday.

7 c) 2014

Subtract 17 from 2031 by partitioning 17 into 10 and 7:
2031 – 10 = 2021 and 2021 – 7 = 2014.

8 a) 0.09

Compare the place value of the digits, from left to right. There are four numbers with 0 in the ones place, so now look at the tenths place. The smallest option is 0, and the only number with this digit is 0.09.

8 b) 0.96

The hundredths place is two to the right of the decimal point. The only number with a 6 here is 0.96.

8 c) 1.68 and 0.32

No two numbers that are less than 1 add up to make 2, so 1.68 must be one of the numbers. The number that adds on to 1.68 to give 2 is 0.32.

9 a) 5

 represents 2 tops, so  represents 1 top.
Count up the symbols in the T-shirts and polo shirts rows.
T-shirts: 2 + 2 + 2 + 2 + 1 = 9. Polo shirts: 2 + 2 = 4.
So Selasi has 9 – 4 = 5 more T-shirts than polo shirts.

9 b) 2

Work out the number of jumpers that Selasi has:
2 + 2 + 2 + 2 = 8. To find $\frac{1}{4}$, divide by 4: 8 ÷ 4 = 2.

9 c) £11.50

Selasi has 3 formal shirts, so divide £34.50 by 3. You can partition £34.50 into £33 and £1.50 = 150p. £33 ÷ 3 = £11 and 150p ÷ 3 = 50p. So £34.50 ÷ 3 = £11 + 50p = £11.50.

10) 4053

You can use short multiplication:

$$\begin{array}{r} 5\ 7\ 9 \\ \times \qquad 7 \\ \hline 4\ 0\ 5\ 3 \\ \ \ 5\ 6 \end{array}$$

11 a) 22 °C

The difference between 0 °C and 4 °C is 4 °C. The difference between 0 °C and –18 °C is 18 °C. So the total difference is 18 °C + 4 °C = 22 °C.

11 b) –6 °C

The temperature is rising so add 12 to –18 by partitioning 12 into 10 and 2: –18 + 10 = –8 and –8 + 2 = –6.

12 a) £15.30

1 plant costs £4.90 so 3 plants cost 3 × £4.90.
Start by adding 10p to £4.90 to get £5.
3 × £5 = £15. Then you need to subtract 3 lots of 10p:
£15 – 30p = £14.70.
Then subtract £14.70 from £30 to get the amount of money left on the gift card: £30 – £14.70 = £15.30.

12 b) £12.00

20% = $\frac{1}{5}$ so find $\frac{1}{5}$ of £15 by dividing by 5: £15 ÷ 5 = £3.
Then subtract this from the original price to find the sale price:
£15 – £3 = £12.

13 a) 13

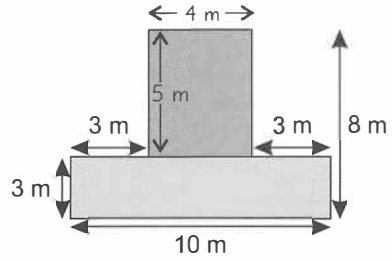
To get from each pattern to the next, you add two squares and one circle. There are 10 shapes in the fourth pattern, so the fifth will have 10 + 3 = 13 shapes.

13 b) 75%

Count up how many squares there are in the first four patterns:
0 + 2 + 4 + 6 = 12. So she colours in 9 out of 12 squares.
This is the same as $\frac{9}{12} = \frac{3}{4} = 75\%$.

14 a) 50 m²

Split the patio into two rectangles, as shown in the diagram below.
The horizontal side length of the top rectangle is
10 – 3 – 3 = 4 m, and the vertical side length is 8 – 3 = 5 m.



Work out the area of each rectangle using area = length × width.
Top rectangle: 5 × 4 = 20 m².
Bottom rectangle: 3 × 10 = 30 m².
So the total area of the shape is 20 + 30 = 50 m².

14 b) 34.5 m

Add up the lengths of all the sides to find the perimeter of the whole patio: 4 + 5 + 3 + 3 + 10 + 3 + 3 + 5 = 36 m.
Then subtract 1.5 m for the gate: 36 – 1.5 = 34.5 m.

15 a) (8, 6)

Read down from the librarian's position to get the *x*-coordinate, and left from the librarian's position to get the *y*-coordinate.
The coordinates read (8, 6).

15 b) 3 squares north, 5 squares west

Use the *x*-coordinates to work out the east/west movement.
Beth goes from 9 to 4, so this is 9 – 4 = 5 squares west.
Use the *y*-coordinates to work out the north/south movement.
Beth goes from 2 to 5, so this is 5 – 2 = 3 squares north.
So the correct description is 3 squares north, 5 squares west.

16 a) 120°

The angle between the 8 and 12 is $\frac{4}{12}$ of the full circle, which is the same as $\frac{1}{3}$. So the angle is 360° ÷ 3 = 120°.

16 b) 18:18

The time shown is 8 pm. Partition 1 hour and 42 minutes into 1 hour, 40 minutes and 2 minutes, and count back from 8 pm. 1 hour before 8 pm is 7 pm, 40 minutes before 7 pm is 6:20 pm and 2 minutes before 6:20 pm is 6:18 pm. Now convert into the 24-hour clock. The times are in the evening, so you need to add 12 to the hours to get 18:18.

17 a) $2\frac{2}{3}$

$\frac{3}{3}$ is 1 whole and $\frac{6}{3}$ is 2 wholes. This leaves 8 – 6 = 2 thirds.
So the answer is $2 + \frac{2}{3} = 2\frac{2}{3}$ sides.

17 b) $\frac{5}{14}$

$\frac{1}{7}$ is the same as $\frac{2}{14}$ (multiply the numerator and denominator by 2). To add two fractions with the same denominator, just add the numerators. 2 + 3 = 5, so $\frac{2}{14} + \frac{3}{14} = \frac{5}{14}$.

17 c) 2

She has $1 - \frac{3}{4} = \frac{1}{4}$ of 8 pots left. $\frac{1}{4}$ of 8 = 8 ÷ 4 = 2 pots.

18 a) 12

Numbers in the left circle should be multiples of 4, numbers in the right circle should be factors of 60 and numbers in the overlap should be both. 12 is in the wrong place since it's a multiple of 4 (4 × 3 = 12) and a factor of 60 (60 ÷ 12 = 5), so it should be in the overlap.

18 b) 4, 12, 20, 60

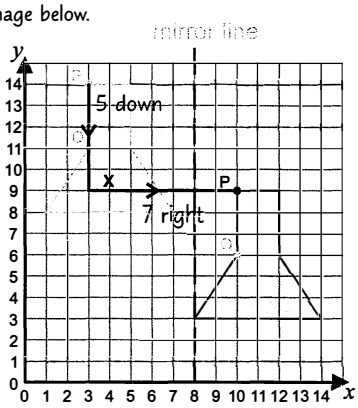
The shaded section is the overlap of the circles, so all the numbers in the correct list must be both multiples of 4 and factors of 60.
4 = 1 × 4, 12 = 3 × 4, 20 = 5 × 4 and 60 = 15 × 4, so all the numbers in the second list are multiples of 4.
60 ÷ 4 = 15, 60 ÷ 12 = 5, 60 ÷ 20 = 3 and 60 ÷ 60 = 1, so all the numbers in the second list are factors of 60.

19 a) Hexagon

The shape has six sides, so it's a hexagon.

19 b) (10, 9)

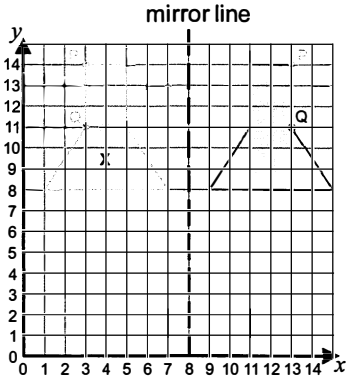
To translate something, just slide it up/down and left/right. Moving the shape five units down and seven units right gives the image below.



Read down from the new position of P to get the x-coordinate, and left from the new position of P to get the y-coordinate.
The coordinates read (10, 9).

19 c) (13, 11)

For a reflection, all the points on the new shape should be the same distance from the mirror line as the corresponding points on the original shape. Q was originally 5 units to the left of the mirror line, so it should now be 5 units to the right of the mirror line after the reflection.



Read down from the new position of Q to get the x-coordinate, and left from the new position of Q to get the y-coordinate.
The coordinates read (13, 11).

20 a) 16

The Sheffield part of the pie chart takes up half of the area.
So half of the trains are going to Sheffield: 32 ÷ 2 = 16.

20 b) 25%

The Huddersfield part of the pie chart takes up a quarter of the area and $\frac{1}{4}$ = 25%.

21) 24

Work backwards through Barney's steps. He takes back 2 cards, so before this he had 20 − 2 = 18 cards. This means 18 is $\frac{3}{4}$ of the original number, so $\frac{1}{4}$ of the original number is 18 ÷ 3 = 6.
So Barney started with 18 + 6 = 24 cards.

22) 9

If 9◇ = 81, then ◇ = 81 ÷ 9 = 9. Replace ◇ with 9 in the equation to check your answer: 9 × 9 = 81, so 9 is correct.

23 a) 47 minutes

If Abigail boards the 09:42 ferry, then she gets off at 10:29.
09:42 → 10:00 is 18 minutes, 10:00 → 10:29 is 29 minutes.
So she's on the ferry for 18 + 29 = 47 minutes.

23 b) 96 minutes

The 09:05 ferry from Lakefoot arrives at Crawlside at 09:29 and the ferry that arrives at Lakecrown at 11:31 leaves Crawlside at 11:05.
So Lillian is in Crawlside between 09:29 and 11:05.
09:29 → 10:00 = 31 minutes
10:00 → 11:00 = 1 hour = 60 minutes
11:00 → 11:05 = 5 minutes
So Lillian is in Crawlside for 31 + 60 + 5 = 96 minutes.

23 c) 09:10

Bodhi needs to arrive in Edelness no later than 10:30, so the latest ferry that he can catch is the one which arrives at 09:42. This means he must board it at Lakefoot at 09:30. Allowing for the 20 minutes it will take him to walk to the ferry port, he needs to leave his house no later than 09:10.

24 a) 210 ml

Divide 560 by 8 to find how much coconut milk is needed for 1 person: 56 ÷ 8 = 7, so 560 ml ÷ 8 = 70 ml. Then multiply this by 3 to find how much is needed for 3 people: 3 × 7 = 21, so 3 × 70 ml = 210 ml.

24 b) 2.5 kg

2 kg are needed for 8 people, so 1 kg is needed for 4 people and $\frac{1}{2}$ kg is needed for 2 people. So for 10 people you need 2 + $\frac{1}{2}$ = 2.5 kg.

24 c) 5

16 people is twice as many as 8 people, so double the amount of vegetable stock: 900 × 2 = 1800 ml. 1 stock cube makes 400 ml of stock, so 4 stock cubes make 4 × 400 = 1600 ml. This isn't enough. 5 stock cubes make 5 × 400 = 2000 ml, which is enough. So Rani needs to unwrap 5 stock cubes.

25 a) 2196

Use a method of long multiplication:

$$\begin{array}{rr} & 6\ 1 \\ \times & 3\ 6 \\ \hline & 3\ 6\ 6 \\ + & 1\ 8\ 3\ 0 \\ \hline & 2\ 1\ 9\ 6 \\ & {\scriptstyle 1} \end{array}$$

25 b) 64

Look for a square number that is greater than 61 but less than 70.
The first few square numbers are 1, 4, 9, 16, 25, 36, 49, 64, 81.
So the answer must be 64.

25 c) 9

The number of trees in each row must be a factor of both 36 and 63, so look for common factors of these numbers. The factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18 and 36, and the factors of 63 are 1, 3, 7, 9, 21 and 63. So the common factors are 1, 3 and 9. But you're told that the number of trees is more than 5, which only leaves 9.

25 d) $\frac{5}{12}$

15 out of 36 trees can be written as $\frac{15}{36}$. To write this fraction in its simplest form, divide both the numerator and the denominator by 3.
15 ÷ 3 = 5 and 36 ÷ 3 = 12, so $\frac{15}{36} = \frac{5}{12}$.