



**Preparation for the National Grade Six Assessment**  
Guide #2 | Mathematics Free Response

**Who are you?**

If you are in grade 5 or 6 and will be taking the next National Grade Six Assessment, then this packet is for you. This packet has past exam questions which have been solved with explanations to help you learn how to solve similar questions. Completing this packet will increase your chances of passing the exam with the highest possible score.

**Who are we?**

This packet was created by the Caribbean Education Project, a team of students and teachers from universities in the United States and the Caribbean. Our goal is to help you with your preparations for the next exam and to help you better understand each topic. We want you to achieve your best score on the exam. If you are not clear on concepts after reading the material, ask your parent or guardian for help. If they cannot help, ask another family member or a friend. If no one can help you, then ask your parents to send us a message on Facebook or WhatsApp or e-mail us.

- To reach us through Facebook, go on Facebook and search for “Shawn Shivdat.” Then send me a message using Facebook Messenger.
- To reach us by WhatsApp, save this number “Shawn Shivdat, +1 404-406-9638” and message me on WhatsApp.
- To reach us by e-mail, send a message to this e-mail address: [info@caribed.org](mailto:info@caribed.org).

**Keep in contact**

If you are using this packet to prepare, we would like to hear from you. Please keep in touch with us so we can help you with any questions you may have. We can also provide updates when future materials are posted. Send us your name and contact information through WhatsApp, Facebook Messenger, or e-mail (listed above), or send a picture of this sheet filled out through WhatsApp, Facebook Messenger, or e-mail.

Name: \_\_\_\_\_

Parent’s phone number: \_\_\_\_\_

Parent’s e-mail address: \_\_\_\_\_

**PLEASE SHARE THIS GUIDE WITH OTHERS WHO MAY BENEFIT FROM USING IT.**



**How to use this guide:**

1. The following pages have a total of 6 past exam questions. Try to answer these questions in the prescribed 55 minutes. If you are not able to answer a question, skip it and go on to the next question. When you are done answering all the questions, you can return to the ones you are having trouble with during your remaining time.
2. It is okay if you were not able to answer all the questions correctly on your first try. Keep practicing the questions, and you will get better. Soon, you will be able to answer all the questions in the 55 minutes. (**TIP:** Practice makes you perfect, so keep practicing.)
3. Answers to all the questions are on the pages immediately after the practice test. When you finish answering the questions, compare your answers to the answers on these pages.
4. Mark the questions which you got wrong.
5. Read our guide to solving each question. Even for questions you got correct, read the explanations we provided because you will likely learn something from them. Our explanations provide valuable information which can provide you with additional skills to solve other problems.
6. Always read the instructions for each question carefully before attempting to answer. Also, read the question itself carefully and pay attention to what the question is asking you to do before attempting to answer it.
7. We provide the answers to all the questions in the practice exams to help you. Do not look at the answers before you attempt the questions. If you look at the answers before, you will not learn a lot from this packet. So, do we have a deal? Okay, I heard you say yes.



**MINISTRY OF EDUCATION  
NATIONAL GRADE SIX ASSESSMENT  
PRACTICE TEST  
MATHEMATICS  
PAPER 2  
2013**

**Reading Time: 10 minutes  
Writing Time: 45 minutes**

**Read these instructions carefully before you attempt to answer the questions.**

1. **Write your candidate number clearly on each page.**
2. This paper contains **six** questions. You are required to answer **QUESTION ONE** and **THREE** others. **EACH** question is worth **5** marks.

**Note: You must answer ONLY FOUR questions.**

Be sure to answer **FULLY** the **FOUR** questions.

3. Write the answer for each question in the space provided in this booklet.
4. Answers **must** be written in complete sentences where possible.
5. Each step of your work **must** be **clearly** shown in this booklet.
6. If you have to erase, do so cleanly.
7. Look over your work when you have finished.
8. **Do not** take away any part of this booklet.

**DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.**



**CANDIDATE NUMBER:** \_\_\_\_\_

1. (a) Divide 4.8 by 1.2. (2 marks)

(b) Find the value of  $68 \times 2.4$ . Round your answer to the nearest whole number. (3 marks)

**Total (5 marks)**



**CANDIDATE NUMBER:** \_\_\_\_\_

2. (a) The length of a ribbon is  $\frac{4}{5}$  metre. How many  $\frac{1}{5}$  metre pieces can be cut from the ribbon? (2 marks)

- (b) Five packets of parboiled rice cost \$4280. How much will 25 packets cost? (3 marks)

**Total (5 marks)**



**CANDIDATE NUMBER:** \_\_\_\_\_

3. A farmer had 40 tomatoes in a basket. 18 tomatoes were green and the rest were red.

(a) (i) How many tomatoes were red? (1 mark)

(ii) What fraction of the tomatoes was red? (1 mark)

(b) (i) What is the ratio of red tomatoes to green tomatoes? (2 marks)

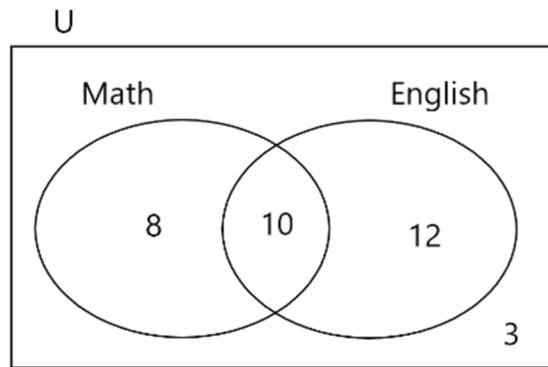
(ii) Write your ratio in its simplest form. (1 mark)

**Total (5 marks)**



CANDIDATE NUMBER: \_\_\_\_\_

The Venn Diagram in **Figure 1** shows the number of children in Grade 5. Study the diagram, then answer **question 4**.



**Figure 1**

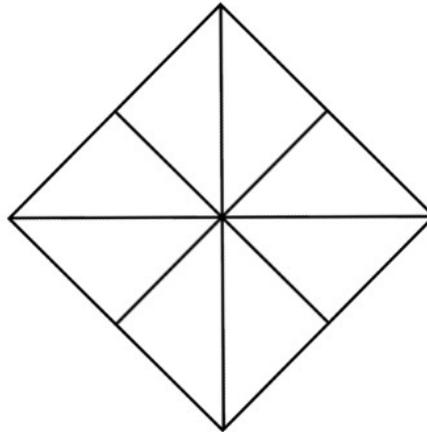
4. (a) How many children like **Mathematics and English**? (1 mark)
- (b) How many children like **Mathematics only**? (1 mark)
- (c) How many children **do not** like **Mathematics and English**? (1 mark)
- (d) How many children are in Grade 5? (2 marks)

**Total (5 marks)**



CANDIDATE NUMBER: \_\_\_\_\_

Study **Figure 2**, then answer **question 5**.



**Figure 2**

5. (a) How many triangles are there in the figure? (3 marks)

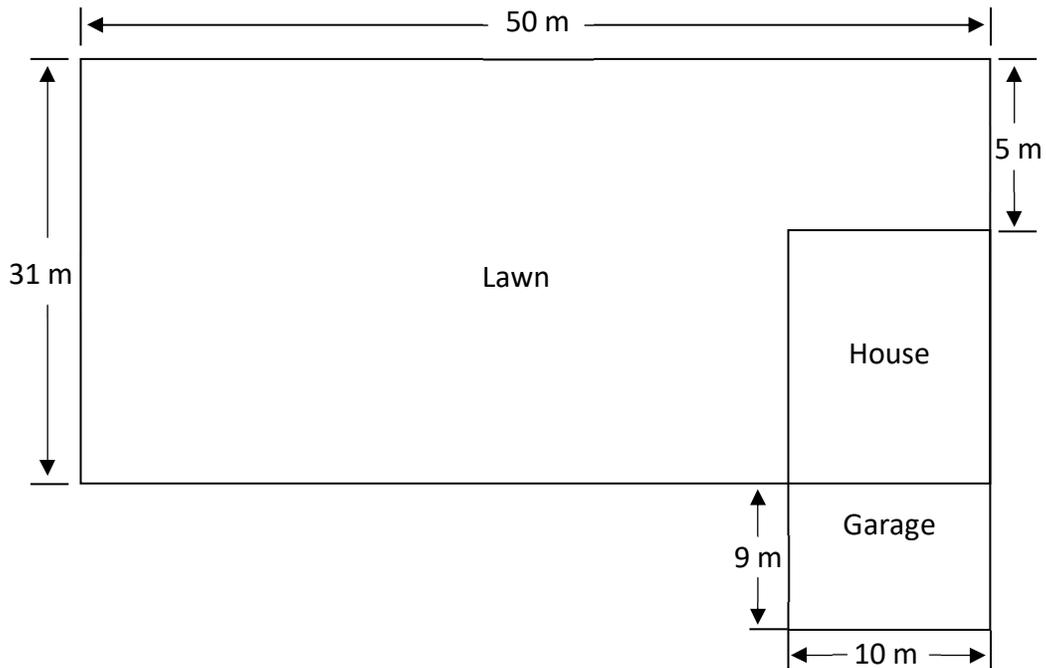
(b) How many lines of symmetry are there on the figure? (2 marks)

**Total (5 marks)**



CANDIDATE NUMBER: \_\_\_\_\_

Study the diagram of a house, garage and lawn shown in **Figure 3** carefully, then answer **question 6**.



**Figure 3**

6. (a) Find the area of the **house and garage**. (3 marks)

(b) Find the perimeter of the **lawn**. (2 marks)

**Total (5 marks)**

**END OF TEST**



ANSWER EXPLANATIONS

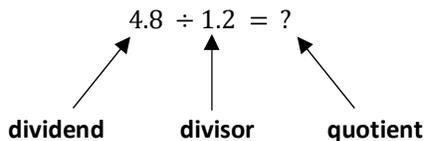
QUESTION 1.(a) ANSWER EXPLANATION

Question 1

1. (a) Divide 4.8 by 1.2.

(2 marks)

For division, the number which is divided is called the dividend, the number which divides is called the divisor, and the number which is the result of the division is called the quotient. If there is any number left over, it is called the remainder.



If the problem had been set up as a fraction, it would read  $\frac{4.8}{1.2}$  and the dividend would be the numerator while the divisor would be the denominator.

The first step in dividing decimals is to get any decimal point in the divisor to be at the very end of the number by moving it however many positions is necessary. Because our divisor is 1.2, we need to move the decimal point over 1 position to the right to get the decimal point to the very end of that number.

In addition to moving the decimal over in the divisor, we also move the decimal over the same number of positions in the dividend. In other words, we move the decimal point the same number of positions in both numbers, *but it is the divisor that determines how many positions we move it*. Now, instead of doing the math with  $4.8 \div 1.2$ , we are going to solve the problem as  $48 \div 12$  because we moved the decimal point over 1 position in **both** the divisor (1.2) and the dividend (4.8).

This action of moving the decimal point over 1 position in both the divisor and the dividend is the same as doing this multiplication:

$$\frac{4.8}{1.2} \times \frac{10}{10} = \frac{48}{12}$$

Since  $\frac{10}{10}$  is equal to 1, we are overall multiplying by one, and this does not change the relative values, it just makes it easier for us to solve the problem.

Now we have to solve  $48 \div 12$ , and these are numbers you have probably encountered in division/multiplication tables you are expected to learn/memorize.

$$48 \div 12 = 4$$

**Answer: 4**



**QUESTION 1.(b) ANSWER EXPLANATION**

**Question 1**

1. (b) Find the value of  $68 \times 2.4$ . Round your answer to the nearest whole number. (3 marks)

When multiplying decimals, you do not need to shift the decimal the way you did with division. You can simply multiply as usual, then put the decimal into the final product at the end. The position of the final decimal point in the product needs to be the same number of places to the left as the **total** number of places the decimals are to the left in **both** factors combined. For the factors presented, 68 already has the decimal at the very end, but 2.4 has the decimal one position to the left. This means when we sum up the decimal positions to the left for **both** 68 and 2.4, we have  $0 + 1 = 1$ , so our final answer will require us to insert the final decimal one place to the left of the final figure.

Start by multiplying 68 by 4:

$$\begin{array}{r} 68 \\ \times 2.4 \\ \hline 272 \end{array}$$

Now multiply 68 by 20, we will be adding this product to the 272.

$$\begin{array}{r} 68 \\ \times 2.4 \\ \hline 272 \\ + 1360 \\ \hline 1632 \end{array}$$



**Not finished yet!** Need to insert the decimal point.

At this stage, we have the value 1632, but we said we must insert the decimal point one position to the left from the end! This means we our actual product is 163.2.

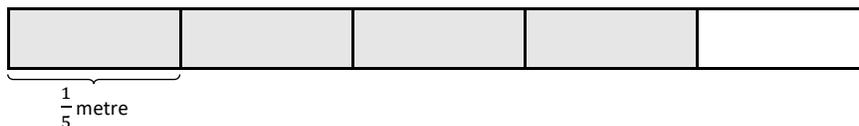
The answer we need to write is supposed to be rounded to the nearest whole number; because the first number after the decimal is a number lower than 5, we round down.

**Answer: 163**

**QUESTION 2.(a) ANSWER EXPLANATION**

2. (a) The length of a ribbon is  $\frac{4}{5}$  metre. How many  $\frac{1}{5}$  metre pieces can be cut from the ribbon? (2 marks)

Here is a visual representation of a ribbon that is  $\frac{4}{5}$  of a metre:



This problem requires us to divide the fractions! When we divide fractions, we need to multiply by the reciprocal of the fraction being divided. The reciprocal is simply the fraction flipped upside down. So, the reciprocal of  $\frac{1}{5}$  is  $\frac{5}{1}$ . When we multiply the fractions across and simplify, we get 4.

$$\frac{4}{5} \times \frac{5}{1} = \frac{4 \times 5}{5 \times 1} = \frac{20}{5} = 4$$

**Answer: 4**



**QUESTION 2.(b) ANSWER EXPLANATION**

**Question 2**

2. (b) Five packets of parboiled rice cost \$4280. How much will 25 packets cost? (3 marks)

To solve this problem, we need to set up a **proportion**. A proportion is a comparison between two quantities where the ratios stay the same. Then we need to solve for the missing variable,  $x$ , and we have a few different ways we could do this.

The most time-consuming way to do this is to not use any opportunities to do any reducing. That would look like the following:

First, set up the proportion: we know 5 packets cost 4280, so we set that up as a fraction and make this equal to 25 over  $x$  where  $x$  equals the total amount it costs for 25 packets.

$$\frac{5}{4280} = \frac{25}{x}$$

Here is the proportion.



Then, we do the cross-multiplication

These crisscrossed arrows are showing the cross-multiplication.

$$5x = 25 \times 4280$$

← Yuck, having to multiply really big numbers. (That is usually a signal there is an easier way.)

$$5x = 107\,000$$

Next, we would have to divide each side by 5:

$$\frac{5x}{5} = \frac{107\,000}{5}$$

$$x = 21\,400$$

We would now have our answer of 25 packets of parboiled rice costs **\$21 400**.

But can we do this faster and easier? Yes. When we started the cross-multiplication and had the equation  $5x = 25 \times 4280$ , we could consider that 25 is actually  $5 \times 5$ , so we could change this equation to the following:

$$(5)(x) = (5)(5)(4280)$$

Now we can cancel out a 5 on each side and get the following:

$$(\cancel{5})(x) = (\cancel{5})(5)(4280)$$

$$(x) = (5)(4280)$$

Now we have a much easier set of numbers to multiply.

$$5 \times 4280 = 21\,400$$

**Answer: \$21 400**



**QUESTION 3.(a)(i) ANSWER EXPLANATION**

**Question 3**

A farmer had 40 tomatoes in a basket. 18 tomatoes were green and the rest were red.

- (a) (i) How many tomatoes were red? (1 mark)

To solve this problem, we need to subtract the known number of green tomatoes from the known total number of tomatoes in the basket.

$$\begin{array}{r} 40 \text{ (total number of tomatoes)} \\ - 18 \text{ (total number of green tomatoes)} \\ \hline ? \text{ (total number of red tomatoes)} \end{array}$$

Right away we see we are supposed to subtract 8 from 0, but that would give us a negative number. Instead, we use a subtraction technique where we “borrow a 10” from the tens position. Instead of saying do  $0 - 8$ , we now say do  $10 - 8$ , but we also need to turn the 4 in the original 40 into a 3 when we “borrow a 10”.

$$\begin{array}{r} \begin{array}{|c|c|} \hline 3 & 10 \\ \hline \end{array} 40 \text{ (total number of tomatoes)} \\ - 18 \text{ (total number of green tomatoes)} \\ \hline 22 \text{ (total number of red tomatoes)} \end{array}$$

The illustration above is trying to show how it is now like we have two separate subtractions to do: first, with the “borrowed 10”, we do  $10 - 8$  to get 2, then we do  $3 - 1$  to get another 2. Our final answer is 22!

**Answer: 22 red tomatoes**

**QUESTION 3.(a)(ii) ANSWER EXPLANATION**

**Question 3**

A farmer had 40 tomatoes in a basket. 18 tomatoes were green and the rest were red.

- (a) (ii) What fraction of the tomatoes was red? (1 mark)

Fractions represent a partial quantity over the total. Using our answer from part (a)(i), we can solve this problem.

$$\frac{\text{number of red tomatoes}}{\text{total number of tomatoes}} = \frac{22}{40}$$

You could submit the answer as  $\frac{22}{40}$  for full credit, and you could also simplify the fraction by seeing that both the numerator and the denominator could be divided by 2, the greatest common factor for both 22 and 40.

$$\frac{22}{40} = \frac{11}{20}$$

**Answer: either  $\frac{22}{40}$  or  $\frac{11}{20}$**



**QUESTION 3.(b)(i) ANSWER EXPLANATION**

**Question 3**

A farmer had 40 tomatoes in a basket. 18 tomatoes were green and the rest were red.

- (b) (i) What is the ratio of red tomatoes to green tomatoes? (2 marks)

A ratio is similar to a fraction. It can be written using a fraction bar or a colon “:”. A ratio is a comparison between two quantities. **It is very important that we put the numbers in the order that the question asks.** The question asks for the ratio of red tomatoes to green tomatoes, so we must put the numbers in that order. Since there are 22 red tomatoes and 18 green tomatoes, the ratio is 22:18 or  $\frac{22}{18}$ .

**Answer: 22:18 or  $\frac{22}{18}$**

**QUESTION 3.(b)(ii) ANSWER EXPLANATION**

**Question 3**

A farmer had 40 tomatoes in a basket. 18 tomatoes were green and the rest were red.

- (b) (ii) Write your ratio in its simplest form. (1 mark)

Being asked to solve the ratio in the simplest form is like solving for the simplest form of a fraction. To find the simplest form, look for the value that is the greatest common factor for both numbers in the ratio, then divide both numbers of the ratio by this greatest common factor.

For our ratio of 22:18, we examine the multiples for both 22 and 18 and see the following:

22 is divisible by 1, 2, 11, 22  
18 is divisible by 1, 2, 3, 6, 9, and 18

We see that the greatest common factor is 2, so we divide both 22 and 18 by 2 to get our simplest form of the ratio. Our final answer is 11:9 or  $\frac{11}{9}$ .

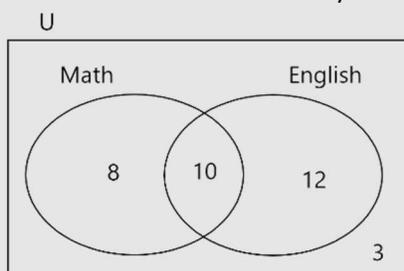
**Answer: 11:9 or  $\frac{11}{9}$**



**QUESTION 4.(a) ANSWER EXPLANATION**

**Question 4**

The Venn Diagram in **Figure 1** shows the number of children in Grade 5. Study the diagram, then answer **question 4**.



**Figure 1**

4. (a) How many children like **Mathematics and English**? (1 mark)

To solve this problem, you need to understand how to interpret a Venn Diagram. The oval labelled “Math” encircles all the children who like Mathematics, and the oval labelled “English” encircles all the children who like English. The middle oval is the intersection of both categories, and that is the group of children that belong to both. We need to find how many children like *both* Mathematics and English, so that’s the middle value (10).

**Answer: 10 children like Mathematics and English.**

**QUESTION 4.(b) ANSWER EXPLANATION**

**Question 4**

4. (b) How many children like **Mathematics only**? (1 mark)

The children that like Mathematics only will be located in the math category but will not overlap with the children that like English.

**Answer: 8 children like Mathematics only.**

**QUESTION 4.(c) ANSWER EXPLANATION**

**Question 4**

4. (c) How many children **do not like Mathematics and English**? (1 mark)

The children that do not like either subject will not be located in either circle. Since they do not belong to either category, the group will be located within the rectangle but not within the Venn Diagram.

**Answer: 3 children do not like Mathematics and English.**

**QUESTION 4.(d) ANSWER EXPLANATION**

**Question 4**

4. (d) How many children are in Grade 5? (2 marks)

The total number of children can be calculated by adding up the four numbers in the figure.

$$8 + 10 + 12 + 3 = 33$$

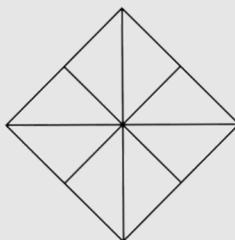
**Answer: There are 33 children in Grade 5.**



**QUESTION 5.(a) ANSWER EXPLANATION**

**Question 5**

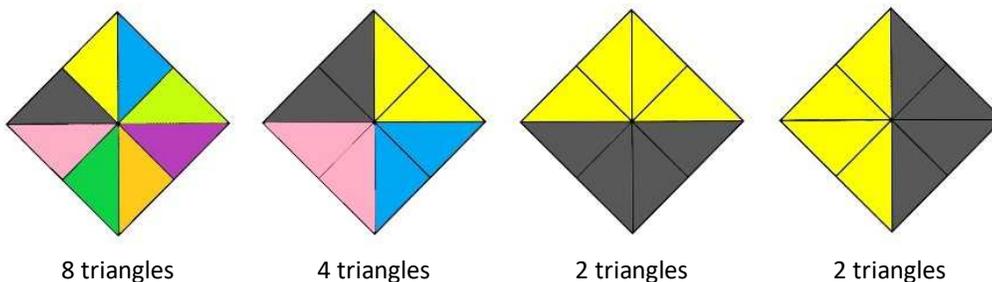
Study **Figure 2**, then answer **question 5**.



**Figure 2**

5. (a) How many triangles are there in the figure? (3 marks)

There are **16** triangles in this figure. The easiest way to explain it is to show them.



8 triangles

4 triangles

2 triangles

2 triangles

**Answer: There are 16 triangles.**

**QUESTION 5.(b) ANSWER EXPLANATION**

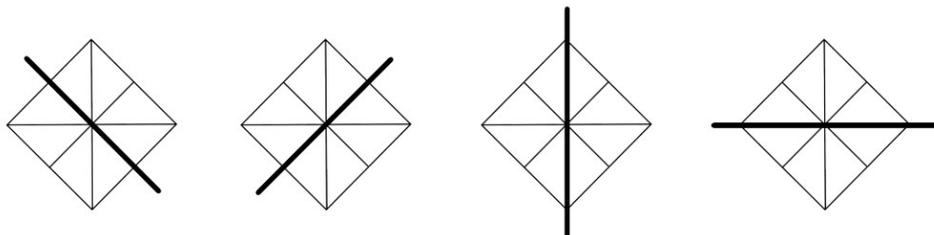
**Question 5**

5. (b) How many lines of symmetry are there on the figure? (2 marks)

A line of symmetry occurs when we can draw a line through the middle of our shape, fold the shape on this line, and now have both halves of the folded shape touching each other like an exact mirror image. All the edges of one side need to be lined up exactly with the edges on the other side.

An easy way to get these types of questions correct every time is to know that the number of lines of symmetry of a regular polygon is equal to the number of sides of the polygon. **Regular polygons** are defined as shapes that are equiangular (all angles are equal in measure) and equilateral (all sides have the same length). For regular polygons, we can say that we have the same number of lines of symmetry as we have sides of the shape. For example, a square will have four sides of equal length, so a square will have 4 lines of symmetry.

Because the figure is overall a square, it has 4 lines of symmetry as shown by the bolded lines in the diagram to the right.

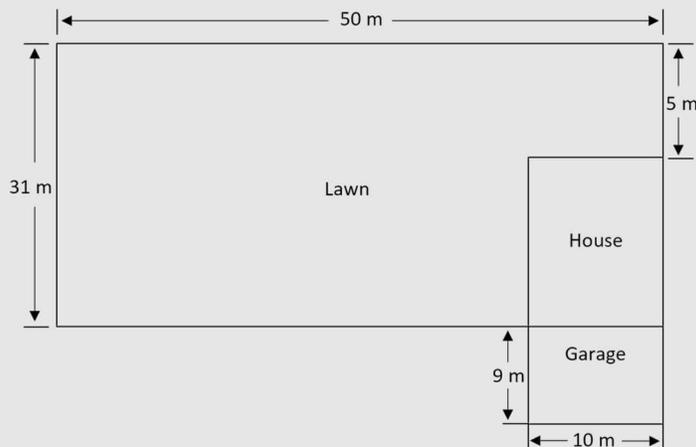


**Answer: There are 4 lines of symmetry on the figure.**

**QUESTION 6.(a) ANSWER EXPLANATION**

**Question 6**

Study the diagram of a house, garage and lawn shown in **Figure 3** carefully, then answer **question 6**.



**Figure 3**

6. (a) Find the area of the **house and garage**.

(3 marks)

Area is the space contained within a boundary. Because the house and garage combine to make a rectangle, we will use the formula for area of a rectangle which is  $A = (w)(l)$  where  $w$  = width and  $l$  = length. The final units of the area will be reported as metres<sup>2</sup>.

The diagram shows us that one side is 10 m long (we can call this the width). Now we need to figure out how long the other side is. We see in the diagram that the house and lawn share a side, but the house is not as long as the lawn, it is 5 m less than the side measuring 31 m. From that, we can subtract 5 from 31 to find the length of the house.

$$\text{length of house} = 31\text{m} - 5\text{m} = 26\text{m}$$

At this point, we have two options for how we could solve this.

**Option 1: sum of the individual areas of the house and the garage**

We now know the house is 26 m in length and 10 m in width. We also can see the garage is 9 m in length and 10 m in width. We can calculate the areas separately, then add the individual areas together for the final total.

$$\text{Area of house} = (26\text{m})(10\text{m}) = 260\text{m}^2$$

$$\text{Area of garage} = (9\text{m})(10\text{m}) = 90\text{m}^2$$

$$\text{Total area of house and garage} = 260\text{m}^2 + 90\text{m}^2 = 350\text{m}^2$$

**Option 2: combine the length of the house and the garage into one long length, then calculate area**

Equally correct would have been saying the length of the house and garage together is 35 m when we add 26 m to 9 m. With this approach, we could solve the total area using one formula.

$$\text{Total area of house and garage} = (35\text{m})(10\text{m}) = 350\text{m}^2$$

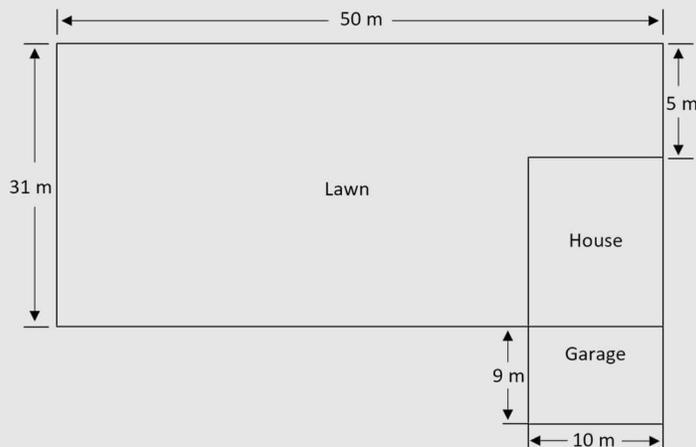
**Answer: 350 m<sup>2</sup>**



**QUESTION 6.(b) ANSWER EXPLANATION**

**Question 6**

Study the diagram of a house, garage and lawn shown in **Figure 3** carefully, then answer **question 6**.

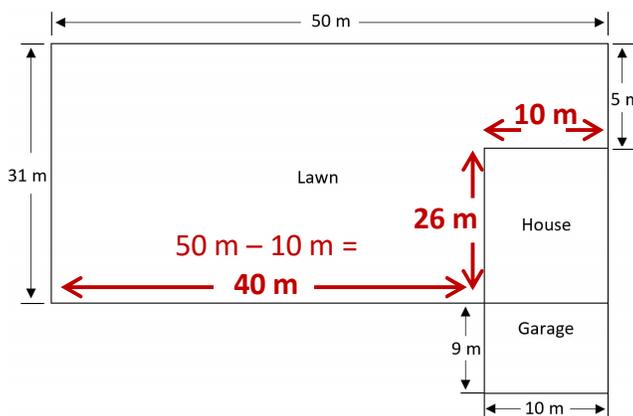


**Figure 3**

6. (b) Find the perimeter of the **lawn**. (2 marks)

The perimeter is a measurement of the distance around a two-dimensional shape. We are asked to solve for the perimeter of the lawn, so we need to add up all the lengths that create the border of the lawn. The units for the perimeter are metres (m) because we are only adding, and all the values have the same units. The units are only subject to change if we are multiplying or dividing.

Because the house is taking up space on the lawn, we need to calculate the lengths around the house. Here is a diagram that shows the calculations of all the sides making up the lawn:



With this information, we can now sum all the sides of the lawn. Starting at the top and working around clockwise, we have

$$\text{perimeter of lawn} = 50m + 5m + 10m + 26m + 40m + 31m = \mathbf{162m}$$

Now, if you examine this calculation carefully, you see we can get the same value by adding up the four sides of the largest rectangle that encompasses the lawn and the house. In other words, we could have gotten this same answer doing the following:

$$\text{perimeter of lawn} = 50m + 31m + 50m + 31m = \mathbf{162m}$$

We can solve it this second way because two sides of the house make up part of that larger rectangle, but we still have to cover the same distance to get all the way around the lawn even if the house were not there.

**Answer: 162 m**

