

## **GRADE 5 MATHEMATICS LESSON NOTES**

### **NUMBERS**

#### **Numbers: Place Value of Whole numbers**

To understand the place value of different numbers, we are going to use a place value table shown below:

| <b>Number</b> | <b>Hundreds of<br/>Thousands</b> | <b>Tens of<br/>Thousands</b> | <b>Thousands</b> | <b>Hundreds</b> | <b>Tens</b> | <b>Ones</b> |
|---------------|----------------------------------|------------------------------|------------------|-----------------|-------------|-------------|
|               |                                  |                              |                  |                 |             |             |

#### **Practice Question 1**

What is the place value of 7 in the number 513 764

**Answer:**

| Number  | Hundreds of Thousands | Tens of Thousands | Thousands | Hundreds | Tens | Ones |
|---------|-----------------------|-------------------|-----------|----------|------|------|
| 513 764 | 5                     | 1                 | 3         | 7        | 6    | 4    |

The place value of 7 in 513 764 is **Hundreds**

### Answer Hint:

The place value of 5 is **Hundreds of Thousands**

The place value of 1 is **Tens of Thousands**

The place value of 3 is **Thousands**

The place value of 7 is **Hundreds**

The place value of 6 is **Tens**

The place value of 4 is **Ones**

### Practice Question 2

John is a farmer. Last year, he produced 981 732 kg of maize. What is the place value of 8 in the number?

**Answer:**

| Number  | Hundreds of Thousands | Tens of Thousands | Thousands | Hundreds | Tens | Ones |
|---------|-----------------------|-------------------|-----------|----------|------|------|
| 981 732 | 9                     | 8                 | 1         | 7        | 3    | 2    |

The place value of 8 in 981 732 is **Tens of Thousands**

### Practice Question 3

What is the place value of the digits in red and underlined, in the numbers below:

- a) 893
- b) 4 830
- c) 29 786
- d) 197 853
- e) 809 467

**Answer:**

| Number  | Hundreds of Thousands | Tens of Thousands | Thousands | Hundreds | Tens | Ones |
|---------|-----------------------|-------------------|-----------|----------|------|------|
| 893     |                       |                   |           | 8        | 9    | 3    |
| 4830    |                       |                   | 4         | 8        | 3    | 0    |
| 29 786  |                       | 2                 | 9         | 7        | 8    | 6    |
| 197 853 | 1                     | 9                 | 7         | 8        | 5    | 3    |
| 809 467 | 8                     | 0                 | 9         | 4        | 6    | 7    |

The place value of 9 in 893 is **Tens**

The place value of 4 in 4 830 is **Thousands**

The place value of 7 in 29 786 is **Hundreds**

The place value of 3 in 197 853 is **Ones**

The place value of 8 in 809 467 is **Hundreds of Thousands**

### Decimals: Place Value up to Thousandths

$\frac{1}{10}$  can be written as **0.1**. This is known as **Tenth**

$\frac{1}{100}$  can be written as **0.01**. This is known as **Hundredths**

$\frac{1}{1000}$  can be written as **0.001**. This is known as **Thousandths**

$\frac{1}{10}$ ,  $\frac{1}{100}$ ,  $\frac{1}{1000}$  are fractions.

**0.1, 0.01, 0.001** are decimals.

### Practice Question 1

What is the place value of each of the following numbers?

a) 0.089

b) 0.518

c) 9.713

Answer:

For this question, let us draw a place value chart.

| Number       | Ones | Decimal Point | Tenths | Hundredths | Thousandths |
|--------------|------|---------------|--------|------------|-------------|
| <b>0.089</b> | 0    | .             | 0      | 8          | 9           |
| <b>0.518</b> | 0    | .             | 5      | 1          | 8           |
| <b>9.713</b> | 9    | .             | 7      | 1          | 3           |

Look at the last number, 9.713. We can state the place values of all the numbers as:

- a. 9 → Ones
- b. 7 → Tenths
- c. 1 → Hundredths
- d. 3 → Thousandths

For the number 0.518, can you tell the place value of **1** from the chart?

If you have said **Hundredths**, you are correct.

## Practice Question 2

Let's go a step further.

What is the place value of each of the following numbers?

- a) 45.089
- b) 192.931

Answer:

For this question, let us draw a place value chart.

| Number  | Hundreds | Tens | Ones | Decimal Point | Tenths | Hundredths | Thousandths |
|---------|----------|------|------|---------------|--------|------------|-------------|
| 45.089  |          | 4    | 5    | .             | 0      | 8          | 9           |
| 192.931 | 1        | 9    | 2    | .             | 9      | 3          | 1           |

### Practice Question 3

What is the place value of the underlined and red digit the following numbers?

a) 20.041

b) 9.21

Answer:

For this question, let us draw a place value chart.

| Number | Tens | Ones | Decimal Point | Tenths | Hundredths | Thousandths |
|--------|------|------|---------------|--------|------------|-------------|
| 20.041 | 2    | 0    | .             | 0      | 4          | 1           |
| 9.21   |      | 9    | .             | 2      | 1          |             |

Hence,

The place value of 4 in 20.041 is **Hundredths**

The place value of 2 in 9.21 is **Tenths**

## Decimals: Ordering Decimals

Decimals can be order from:

- a) Smallest to Largest (Ascending order)
- b) Largest to Smallest (Descending order)

### Practice Question 1 (Ascending order)

Arrange the following numbers in ascending order:

0.049, 0.591, 0.87, 0.348

Answer:

**0.049, 0.348, 0.591, 0.87**

### Practice Question 2 (Descending order)

Arrange the following numbers in descending order:

0.128, 0.069, 0.598, 0.285

Answer:

**0.598, 0.285, 0.128, 0.069**

### Practice Question 3

A group of Grade 5 pupils walked from their homes to the market.

Mary walked 1.35 km, John walked 1.025 km, Stacey walked 1.089 km, and Mark walked 1.592 km.

- a) Arrange the distances in ascending order.
- b) Which student walked the least distance?
- c) Which student walked the most distance?

Answer a)

**1.025 km, 1.089 km, 1.35 km, 1.592 km**

Answer b)

**John (1.025 km)**

Answer c)

**Mark (1.592 km)**

**MEASUREMENT**

## Measuring Length in Kilometres

- A kilometre is a unit of measurement used to measure long distances such as length of a road.
- Here is an example of a road sign that you might have seen:

### Practice Question 1

Assume that this road sign is at a **Point A**

- a) Can you tell the distance from **Point A** to **Nairobi**?
- b) Can you tell the distance from **Point A** to **Eldoret**?
- c) Can you tell the distance from **Point A** to **Mombasa**?

Answer:

- a) Point A to Nairobi: 9 km
- b) Point A to Eldoret: 320 km
- c) Point A to Mombasa: 496 km

Always remember: 1000 metres(m) = 1 kilometre(km)

Here is a better demonstration of length:

### Practice Question 2

- a) What is the distance from Home to School using a direct route?
- b) What is distance from the Shop to Home using a direct route?
- c) Today, Susan walked from home to school. In the evening, she walked to the shop to buy milk and walked back home. How many kilometres did she cover?

Answer:

- a) Home to School: 4 km
- b) Shop to Home: 2 km
- c) Home to School - 4 km, school to shop - 5 km and shop to home - 2 km

Therefore:  $4 \text{ km} + 5 \text{ km} + 2 \text{ km} = 11 \text{ km}$

**Susan covered 11 km today.**

### Practice Question 3

Each day Susan walks 11 km. If Susan goes through the same route for 5 days, what far does she cover?

Answer:

Each day she walks 11 km, for 5 days she will walk:

$11 \text{ km} + 11 \text{ km} + 11 \text{ km} + 11 \text{ km} + 11 \text{ km}$

$11 \text{ km} \times 5 \text{ days}$

**55 km**

### Converting Kilometres into Metres

Remember:  $1000 \text{ metres(m)} = 1 \text{ kilometre(km)}$

### Practice Question 4

Martin rides a bicycle to work every day covering a distance of 5 kilometres. How many metres does he ride his bicycle everyday?

Answer:

Distance covered = 5 km

5 km = 5 x 1000 m

5 km = 5000 m

**Martin covers 5000 m everyday.**

### Practice Question 5

Martha ran 4 kilometres and 260 metres today at school during sports day. How many metres did she run?

Answer:

Distance covered = 4 km 260 m

4 km = 4 x 1000 m

4 km = 4000 m

Total distance = 4000 m + 260 m

**Martha ran 4260 m.**

### Converting Metres into Kilometres

Do you remember that 1000 metres(m) = 1 kilometre(km)?

### Practice Question 6

Over the school holidays, Trisha visited her grandparents who lived 2000 m away. How many kilometres did she travel?

Answer:

Distance covered = 2000 m

1000 m = 1km

2000 m  $\div$  1000 m

2000 m = 2 km

**Trisha covered 2 km.**

### Practice Question 7

Convert 4600 m into kilometres

Answer:

Distance = 4600 m

4600 m = 4000m + 600 m

$$4000 \text{ m} \div 1000 \text{ m}$$

$$4000 \text{ m} = 4 \text{ km}$$

**4 km 600 m**

## Addition involving Length in Kilometres and Metres

### Practice Question 1

The map below shows Mary's route. Let us use it to answer the question below:

Mary cycled from school to the shop through home. What distance did she cover?

Answer:

**Mary cycled 7 km 100 m.**

Answer Hint:

- Start from the right:  $600 \text{ m} + 500 \text{ m} = 1\,100 \text{ m}$
- Convert  $1\,100 \text{ m}$  to km: You get **1 km** 100 m
- Write the 100 in the metres column and carry the **1 km** into the

kilometres column.

- Lastly, calculate:  $4 \text{ km} + 2 \text{ km} + 1 \text{ km} = 7 \text{ km}$ .

## Practice Question 2

The distance from Rachel's house to the market is 4 km and 400 m while the distance from the market to the church is 3 km and 800 m.

What is the total distance from Rachel's house to the church, through the market?

Answer:

- To understand the question being asked, start by drawing a rough sketch of the distances as shown below.

-Hence, the calculation will be:

|   | km | m   |
|---|----|-----|
|   | 4  | 400 |
| + | 3  | 800 |
|   | 8  | 200 |

**Rachel travelled 8 km 200 m.**

### Answer Hint:

- Start from the right:  $400 \text{ m} + 800 \text{ m} = 1\,200 \text{ m}$
- Convert  $1\,200 \text{ m}$  to km: You get **1 km**  $200 \text{ m}$
- Write the 200 in the metres column and carry the **1 km** into the kilometres column.
- Lastly, calculate:  $4 \text{ km} + 3 \text{ km} + \mathbf{1 \text{ km}} = 8 \text{ km}$ .

### Subtraction involving Length in Kilometres and Metres

#### Practice Question 3

Work out:

|   | km    | m   |
|---|-------|-----|
|   | 18    | 250 |
| - | 11    | 100 |
|   | <hr/> |     |
|   | <hr/> |     |

Answer:

|   | km | m   |
|---|----|-----|
|   | 18 | 250 |
| - | 11 | 100 |
|   | 7  | 150 |

**Answer is 7 km 150 m.**

Answer Hint:

- Start from the right: 250 m - 100 m = **150 m**
- Write the 150 in the metres column
- On the km column, calculate: 18 km - 11 km = **7 km**

#### Practice Question 4

Work out:

|   | km | m   |
|---|----|-----|
|   | 72 | 134 |
| - | 36 | 234 |
|   |    |     |
|   |    |     |

Answer:

|   | km | m   |
|---|----|-----|
|   | 72 | 134 |
| - | 36 | 234 |
|   | 35 | 900 |

**Answer is 35 km 900 m.**

**Answer Hint:**

- Start from the right: Since 134 m is smaller than 234 m, we borrow 1 km from the kilometres column.
- Remember that 1 km = 1000m, we convert the 1km we borrowed to m and add it to the 134 m on the right column:  $1000 \text{ m} + 134 = 1134 \text{ m}$
- Now calculate:  $1134 \text{ m} - 234 \text{ m} = 900 \text{ m}$
- On the km column, remember that we borrowed 1 km, therefore we remain with  $72 \text{ km} - 1 \text{ km} = 71 \text{ km}$
- Calculate,  $71 \text{ km} - 36 \text{ km} = 35 \text{ km}$

### Practice Question 5

A driver started a 55 km 40 m journey to a town. He got a puncture 40 km 60 m from his destination. Calculate the distance he covered

before the puncture.

Answer:

|   | km | m   |
|---|----|-----|
|   | 55 | 40  |
| - | 40 | 60  |
|   | 14 | 980 |

**Answer is 14 km 980 m.**

Answer Hint:

- Start from the right; the metres column: Since 40 m is smaller than 60 m, we borrow 1 km from the kilometres column.
- Remember that 1 km = 1000m, we convert the 1km we borrowed to m and add it to the 40 m on the right column:  $1000 \text{ m} + 40 = 1040 \text{ m}$
- Now calculate:  $1040 \text{ m} - 60 \text{ m} = 980 \text{ m}$
- On the km column, remember that we borrowed 1 km, therefore we remain with  $55 \text{ km} - 1 \text{ km} = 54 \text{ km}$
- Calculate,  $54 \text{ km} - 40 \text{ km} = 14 \text{ km}$

ALGEBRA

## Algebra: Solving Simple Equations Involving Addition and Subtraction

### Forming Simple Equations with One Unknown

Consider the following:

#### Practice Example 1:

We can form a simple equation to represent the total number of apples as:

$$4 + 5 = b$$

which can also be written as:

$$b = 4 + 5$$

#### Practice Example 2:

The number of boys in a school is  $n$ . The number of girls in the same school is 120. If the total number of student in the school is 330, form a simple equation that can be used to find the value of  $n$ .

Answer:

$$n + 120 = 330$$

which can also be written as:

$$n = 330 - 120$$

**Note**

When we take the + 120 to the other side of the equation, the sign changes to minus (-) becoming - 120. The + and - signs change to the other when moved to either side of the equation.

**Practice Example 3:**

John had 14 mangoes and Newton had  $p$  mangoes. If the total number of mangoes they had was 45, form a simple equation that can

be used to find the value of  $p$ .

Answer:

John had 14 mangoes.

Newton had  $p$  mangoes.

Total number of mangoes was 45.

$$14 + p = 45.$$

$$p = 45 - 14$$

Practice Example 4:

The number of bags of beans harvest on Monday was 90. On Tuesday,  $y$  bags of beans were harvested. If the total number of bags harvested on Monday and Tuesday was 210, for a simple equation to show the number of bags harvested on Tuesday.

Answer:

Monday: 90 bags

Tuesday:  $y$  bags

Total: 210 bags

$$90 + y = 210$$

$$y = 210 - 90$$

### Practice Example 5:

A grade 5 pupil in your school bought  $k$  mangoes from the market. On his way home, he ate 4 mangoes. If he arrived home with 6 mangoes, form a simple equation to show how many mangoes he bought from the market

Answer:

Total number of mangoes:  $k$

Ate: 4 mangoes

Arrived with 6 mangoes

*If we subtract the number of mangoes he ate, from the total number of mangoes, we get the number of mangoes he was left with.*

$$k - 4 = 6.$$

The above equation can also be written as:

$$k = 6 + 4$$

## Solving Simple Equations Involving Addition and Subtraction

In the previous section, we learnt how to form simple equations. In this section, let's learn how to solve them.

### Practice Example 6:

Solve:  $40 + m = 90$

Answer:

The equation can be written as:

$$m = 90 - 40$$

$$m = 50$$

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### Practice Example 7:

Martha had 10 kg of beans and  $y$  kg of maize. Altogether, she had 25 kg of both maize and beans. How many kilograms of maize did Martha have?

Answer:

→ 1. Lets form a simple equation:

$$10 \text{ kg} + y \text{ kg} = 25 \text{ kg}$$

The above equation can also be written as:

$$y \text{ kg} = 25 \text{ kg} - 10 \text{ kg}$$

→ 2. Lets solve the simple equation above:

$$y \text{ kg} = 25 \text{ kg} - 10 \text{ kg}$$

$$y \text{ kg} = 15 \text{ kg}$$

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Practice Example 8:

Solve:  $d - 4 = 9$

Answer:

The equation can be written as:

$$d = 9 + 4$$

$$d = 13$$

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### Practice Example 9:

Solve:  $f - 419 = 210$

Answer:

The equation can be written as:

$$f = 210 + 419$$

$$f = 629$$

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Solve:  $20 - t = 12$

Answer:

→ Step 1:


$$20 - t = 12$$

→ Step 2:


$$20 = 12 + t$$

The above equation can be written as:

$$t + 12 = 20$$

$$t = 20 - 12$$

$$t = 8$$

## Algebra: Forming and Solving Simple Equations Involving

### Multiplication and Division

#### Forming Simple Equations with One Unknown

##### Practice Example 1: Multiplication

Mary bought 7 box of apples. Each box has 6 apples. If the total number of apples bought was  $y$ . Form a simple equation that can be used to find the value of  $y$ .

Answer:

Total number of boxes: 7

Number of apples in each box: 6

Total number of Apples bought:  $y$

**Equation:  $7 \times 6 = y$**

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##### Practice Example 2: Division

Patricia has 40 pens. She wants to back the pens equally into 5 boxes. Once packed, each box will contain  $t$  pens. Form an equation to find the value of  $t$ .

Answer:

Total Number of Pens: 40

Number of boxes packed: 5

Number of pens in each box: t

**Equation:  $40 \div 5 = t$**

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Practice Example 3: **Try it!**

In a Grade 5 class, a teacher shared 24 books equally among the learners. Each learner got 3 books. There are a total of n learners in the class. Form a simple equation to use to find the total number of learners, n.

Answer:

Total Number of books: 24

Number of books per learner: 3

Total number of Grade 5 learners: n

To create the equation, we have to determine the sign to use. Is it multiplication or division?

We use division ( $\div$ )

**Equation:  $24 \div 3 = n$**

## Solving Simple Equations Involving Multiplication and Division

### Practice Example 4: Multiplication

Find the value of  $p$  in

$$p \times 3 = 12$$

Answer:

#### Note

$a \times b = c$  is the same as  $ab = c$

Hence:  $p \times 3 = 12$  is the same as  $p3=12$  which is the same as  $3p = 12$ .

We divide both sides by the known value 3:

$$3p/3 = 12/3$$

$$p = 12/3$$

**$p = 4$**

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### Practice Example 5: Division

Find the value of  $y$  in

$$y \div 4 = 5$$

Answer:

Note

$a \div b = c$  is the same as  $\frac{a}{b} = c$

Hence:  $y \div 4 = 5$  is the same as  $\frac{y}{4} = 5$ .

We multiply both sides by the known value 4:

$$4 \times \frac{y}{4} = 5 \times 4$$

$$y = 5 \times 4$$

$$\mathbf{y = 20}$$

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### Practice Example 6: Try it!

Brian had 18 marbles. He shared them equally among 3 friends. If each friend got  $p$  marbles, how many marbles did each friend get?

Answer:

Total Number of marbles: 18

Number friends: 3

Total number of marbles per student: p

To create and solve the equation, we have to determine the sign to use: multiplication or division.

The simple equation is:

$3 \times p = 18$  which is the same as  $3p = 18$

We divide both sides by the known value 3:

$$3p/3 = 18/3$$

$$p = 18/3$$

$$p = 6$$

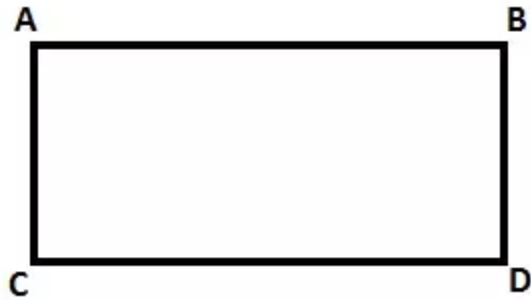
## GEOMETRY

### Horizontal Lines

A horizontal line is a straight line that runs from left to right.

### Practice Question 1

Can you identify the horizontal line in the shape below:



Answer:

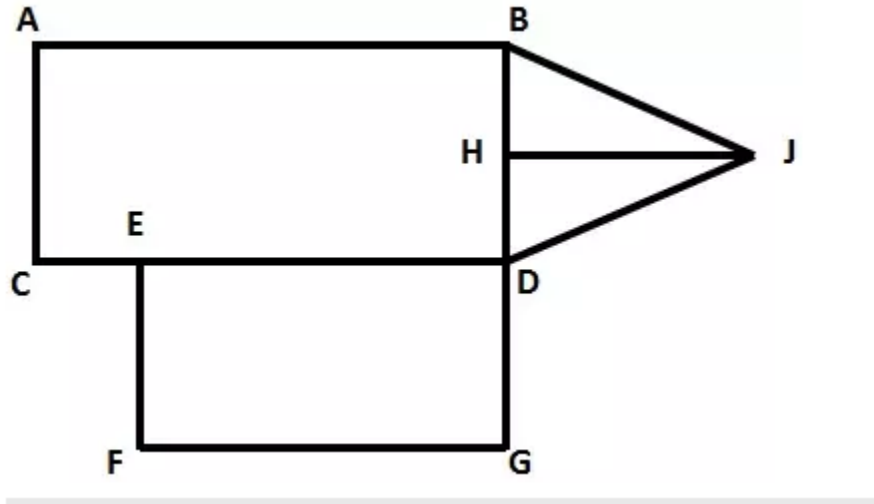
The horizontal lines are:

**A to B (Also written as AB)**

**C to D (Also written as CD)**

## Practice Question 2

Can you identify the horizontal line in the complex shape below:



Answer:

The horizontal lines are:

AB

CD

FG

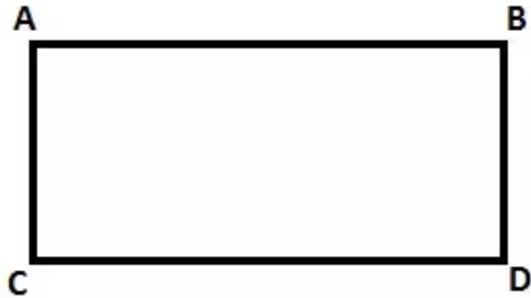
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## Vertical Lines

A vertical line is a straight line that runs from top to bottom.

### Practice Question 3

Can you identify the vertical line in the shape below:



Answer:

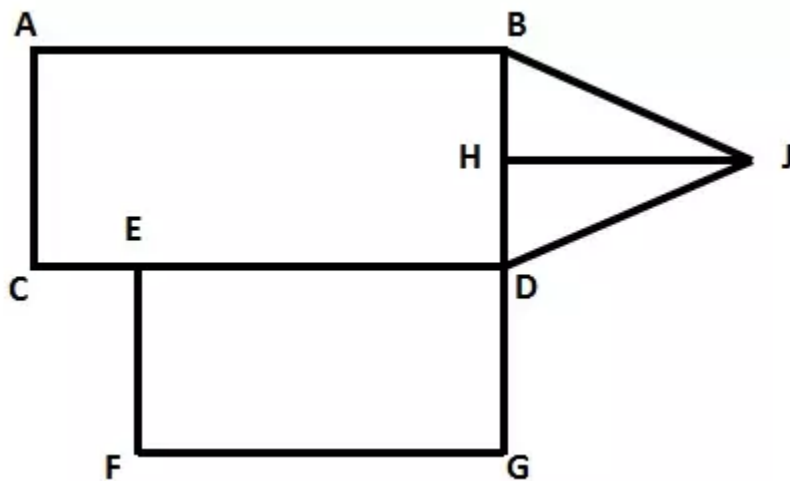
The vertical lines are:

**AC**

**BD**

### Practice Question 4

Can you identify the vertical line in the complex shape below:



Answer:

The vertical lines are:

**AC**

**BD**

**EF**

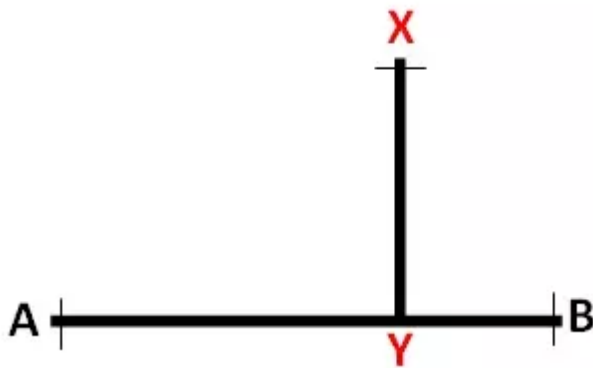
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### Perpendicular Lines

Perpendicular lines are two straight lines that meet at a right angle or at  $90^\circ$ .

### Practice Question 5

Can you identify the perpendicular lines in the shape below:



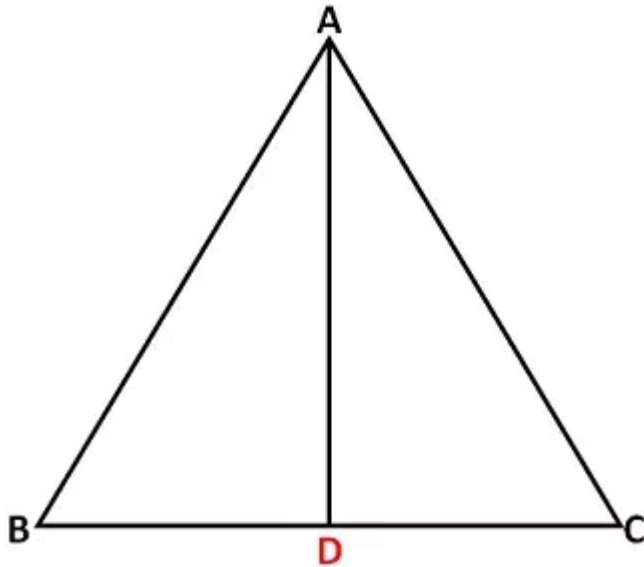
Answer:

The Perpendicular lines are:

**Line XY is perpendicular to line AB**

### Practice Question 6

Can you identify the perpendicular lines in the complex shape below:



Answer:

**Line AD is perpendicular to line BC**

### Parallel Lines

Parallel lines are two straight lines which do not meet or intersect.

### Practice Question 7

Are the lines below parallel to each other?

A  B

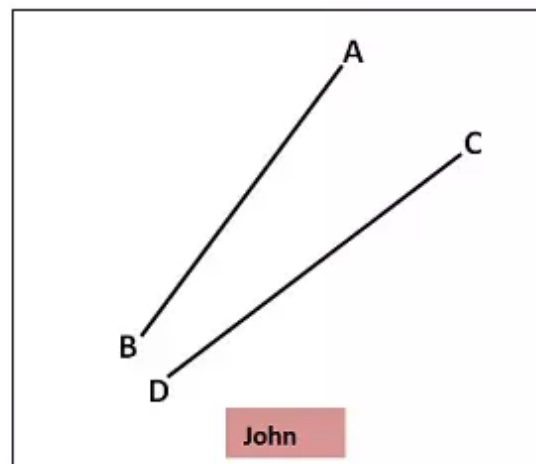
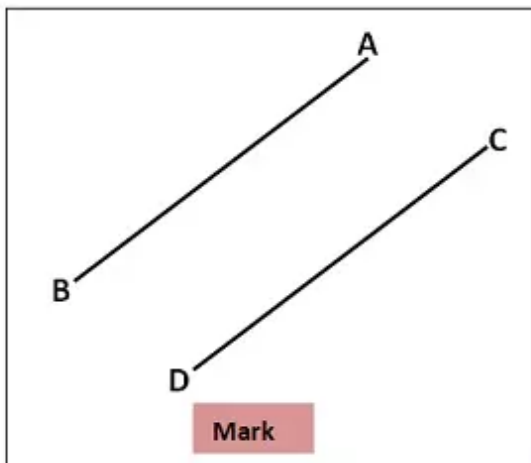
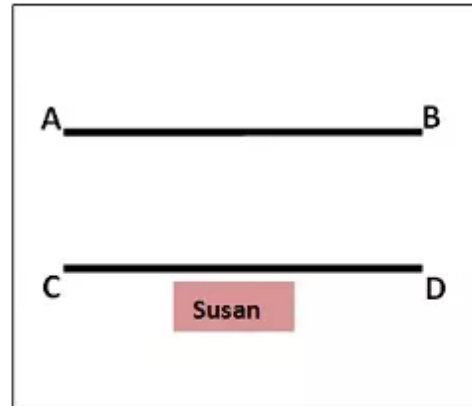
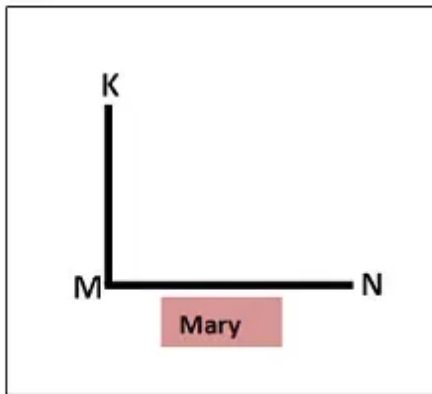
C  D

Answer:

**Line AB is Parallel to line CD**

### Practice Question 8

Grade 5 pupils - Mary, Susan, Mark and John, were asked by they teacher to draw parallel lines on a paper. Which pupils drew parallel lines?



Answer:

**Susan and Mark**

Answer Hint:

- Mary drew perpendicular lines as they meet at  $90^\circ$
- John drew lines that would meet. To prove this, extend the lines as shown. The lines would meet at point t, hence they are not parallel to

each other.

