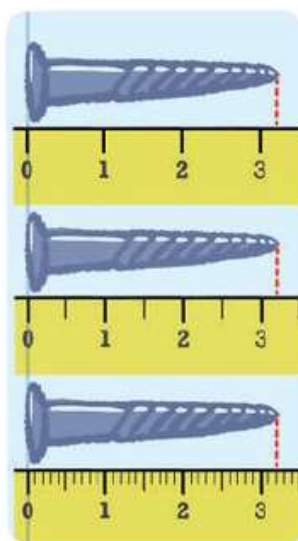
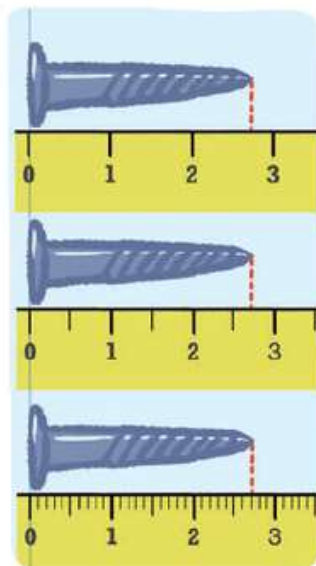


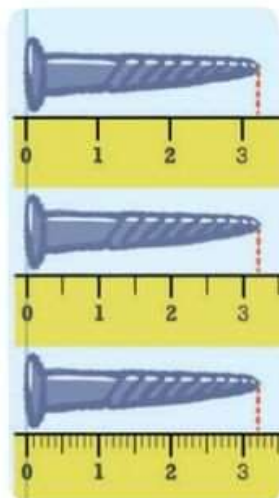
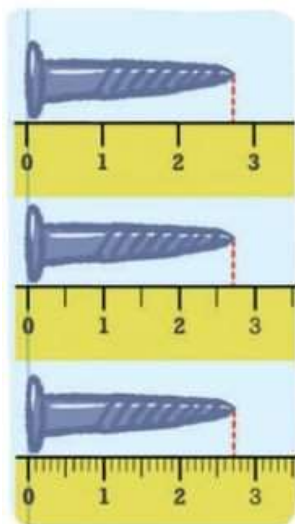
Class 7 Solutions Mathematics Chapter 3 A Peek Beyond the Point

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In the following figure, screws are placed above a scale. Measure them and write their length in the space provided.



Ans:



Q1: Which scale helped you measure the length of the screws accurately? Why?

Ans: The scale that is divided into 10 equal parts between each centimeter mark helped measure the screws accurately. This is because it shows each tenth of a centimeter clearly, helping us measure the screw length precisely.

Q2: What is the meaning of $2\frac{7}{10}$ cm (the length of the first screw)?

Ans: The number $2\frac{7}{10}$ cm means that the screw is 2 centimeters and 7 parts out of 10 of

another centimeter. The ruler is divided into 10 equal parts between each number. So, we count 2 full centimeters and then 7 small parts more. We read it as two and seven-tenth centimeters.

Q3: Can you explain why the unit was divided into smaller parts to measure the screws?

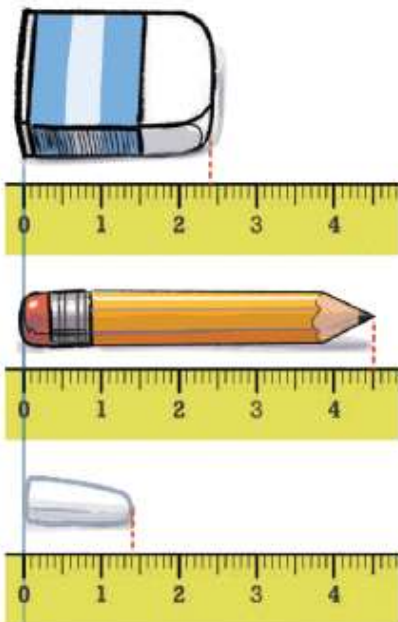
Ans: The unit was divided into smaller parts (tenths of a centimeter) to measure the screws because their lengths differed by a small amount, not detectable with whole centimeter markings. Smaller units allow for more precise measurements, capturing fine differences.

Q4: Measure the following objects using a scale and write their measurements in centimeters (as shown earlier for the lengths of the screws): pen, sharpener, and any other object of your choice.

Ans: (Measurements may vary depending on the actual objects; example answers below)

- Pen: 13.4 cm
- Sharpener: 3.2 cm
- Eraser: 4.7 cm

Q5: Write the measurements of the objects shown in the picture:



Ans: The picture, assuming typical objects:

- First Image Eraser: 2.4 cm
- Second Image Pencil: 4.5 cm
- Third Image Chalk: 1.4 cm

Q2: Arrange these lengths in increasing order:

(a) $\frac{9}{10}$

(b) $1\frac{7}{10}$

(c) $\frac{130}{10}$

(d) $13\frac{1}{10}$

(e) $10\frac{5}{10}$

(f) $7\frac{6}{10}$

(g) $6\frac{7}{10}$

(h) $\frac{4}{10}$

Ans: We

convert all the mixed numbers or improper fractions to decimal form:

Option	Fraction / Mixed Number	Decimal Form
(a)	$\frac{9}{10}$	0.9
(b)	$1\frac{7}{10}$	1.7
(c)	$\frac{130}{10}$	13.0
(d)	$13\frac{1}{10}$	13.1
(e)	$10\frac{5}{10}$	10.5
(f)	$7\frac{6}{10}$	7.6
(g)	$6\frac{7}{10}$	6.7
(h)	$\frac{4}{10}$	0.4

Arrange the decimals in increasing order

$$0.4 < 0.9 < 1.7 < 6.7 < 7.6 < 10.5 < 13.0 < 13.1$$

$$\text{i.e., (h) < (a) < (b) < (g) < (f) < (e) < (c) < (d)}$$

Q1: Arrange the following lengths in increasing order:

Ans: Let's first convert all numbers into decimal form:

$$\frac{4}{10} = 0.4$$

$$1\frac{1}{10} = 1.1$$

$$4\frac{1}{10} = 4.1$$

$$\frac{41}{10} = 4.1$$

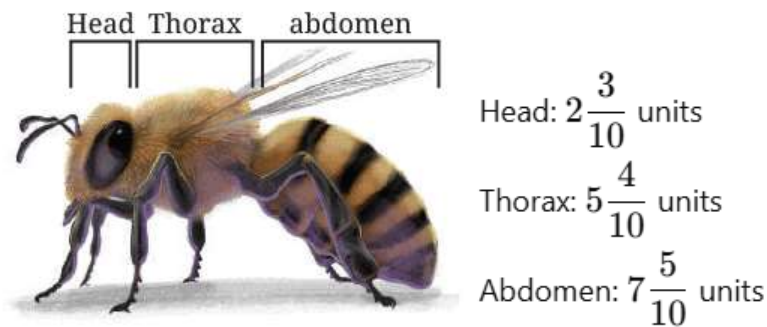
$$41 = 41.0$$

$$(b) < (a) = (c) < (d)$$

i.e.,

$$0.4 < 4.1 = 4.1 < 41.1$$

Q2: The lengths of the body parts of a honeybee are given. Find its total length.



Ans: First, convert all mixed numbers into decimals or like fractions:

$$\text{Head} = 2\frac{3}{10} = 2.3$$

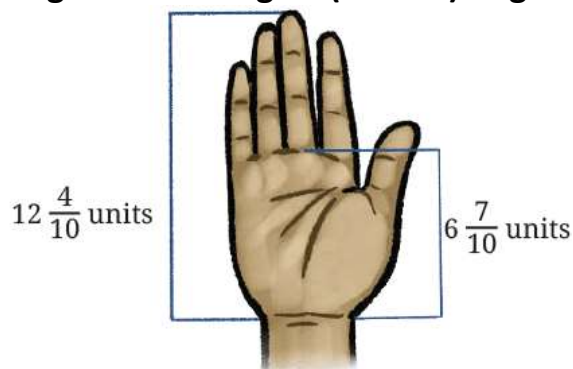
$$\text{Thorax} = 5\frac{4}{10} = 5.4$$

$$\text{Abdomen} = 7\frac{5}{10} = 7.5$$

Now, add them: $2.3 + 5.4 + 7.5 = 15.2$ units

Total length of the honeybee = 15.2 units or $15\frac{2}{10}$ units

Q3: The length of Shylaja's hand is $12\frac{4}{10}$ units, and her palm is $6\frac{7}{10}$ units. What is the length of the longest (middle) finger?



Ans: We subtract the length of the palm from the full hand to get the finger length:

$$\text{Finger length} = 12\frac{4}{10} - 6\frac{7}{10}$$

Ans: Break the subtraction as:

$$\begin{aligned}
& 12\frac{4}{10} - 6\frac{7}{10} \\
&= (12 - 6) + \left(\frac{4}{10} - \frac{7}{10}\right) \\
&= 6 + \left(-\frac{3}{10}\right) \\
&= 5 + 1 - \frac{3}{10} \\
&= 5 + \frac{10}{10} - \frac{3}{10} \\
&= 5 + \frac{7}{10} = 5\frac{7}{10}
\end{aligned}$$

Since we cannot have a negative fraction, we adjust by borrowing 1 from the whole number (6).

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Q1: Try computing the difference by converting both lengths to tenths.

Ans: Convert the mixed number to improper fraction:

$$\begin{aligned}
12\frac{4}{10} &= \frac{124}{10} \\
6\frac{7}{10} &= \frac{67}{10}
\end{aligned}$$

Now subtract:

$$\frac{124}{10} - \frac{67}{10} = \frac{57}{10} = 5\frac{7}{10}$$

So, the length of the finger is $5\frac{7}{10}$ units.

Q2: A Celestial Pearl Danio's length is $2\frac{4}{10}$ cm, and the length of a Philippine Goby is $9/10$ cm. What is the difference in their lengths?

Ans: First, convert the mixed number to decimal:

$$\text{Celestial Pearl Danio} = 2\frac{4}{10} = 2.4 \text{ cm}$$

$$\text{Philippine Goby} = 9/10 = 0.9 \text{ cm}$$

$$\text{Now, subtract: Difference} = 2.4 - 0.9 = 1.5 \text{ cm}$$

So, the difference in their lengths is 1.5 cm or $1\frac{5}{10}$ cm.

Q3: How big are these fish compared to your finger?



Celestial Pearl Danio



Philippine Goby

Ans: The Celestial Pearl Danio is about the size of an average adult finger, around 2-2.5 cm

long.

The Philippine Goby is slightly smaller, about half the length of an average finger, around 1-1.5 cm long.

Q4: Observe the given sequences of numbers. Identify the change after each term and extend the pattern:

- (a) $4, 4\frac{3}{10}, 4\frac{6}{10},$ _____, _____, _____, _____
- (b) $8\frac{2}{10}, 8\frac{7}{10}, 9\frac{2}{10},$ _____, _____, _____, _____
- (c) $7\frac{6}{10}, 8\frac{7}{10},$ _____, _____, _____, _____
- (d) $5\frac{7}{10}, 5\frac{3}{10},$ _____, _____, _____, _____
- (e) $13\frac{5}{10}, 13, 12\frac{5}{10},$ _____, _____, _____, _____
- (f) $11\frac{5}{10}, 10\frac{4}{10}, 9\frac{3}{10},$ _____, _____, _____, _____

Ans:

Part	Sequence in the book	Change each time	Extended pattern (four more terms)
(a)	$4, 4\frac{3}{10}, 4\frac{6}{10}$	$+\frac{3}{10}$	$4\frac{9}{10}, 5\frac{2}{10}, 5\frac{5}{10}, 5\frac{8}{10}$
(b)	$8\frac{2}{10}, 8\frac{7}{10}, 9\frac{2}{10}$	$+\frac{5}{10}$	$9\frac{7}{10}, 10\frac{2}{10}, 10\frac{7}{10}, 11\frac{2}{10}$
(c)	$7\frac{6}{10}, 8\frac{7}{10}$	$+1\frac{1}{10}$	$9\frac{8}{10}, 10\frac{9}{10}, 12, 13\frac{1}{10}$
(d)	$5\frac{7}{10}, 5\frac{3}{10}$	$-\frac{4}{10}$	$4\frac{9}{10}, 4\frac{5}{10}, 4\frac{1}{10}, 3\frac{7}{10}$
(e)	$13\frac{5}{10}, 13, 12\frac{5}{10}$	$-\frac{5}{10}$	$12, 11\frac{5}{10}, 11, 10\frac{5}{10}$
(f)	$11\frac{5}{10}, 10\frac{4}{10}, 9\frac{3}{10}$	$-1\frac{1}{10}$	$8\frac{2}{10}, 7\frac{1}{10}, 6, 4\frac{9}{10}$

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Q: How many one-hundredths make one-tenth? Can we also say that the length is 4 units and 45 one-hundredths?

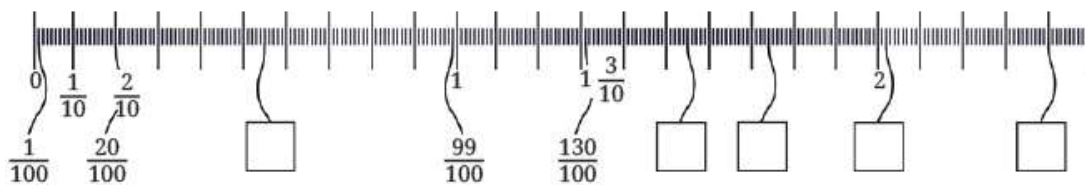
Ans: Yes, we can say that.

If a length is written as 4.45 units, it means 4 whole units and 45 hundredths (or 45/100) of a unit.

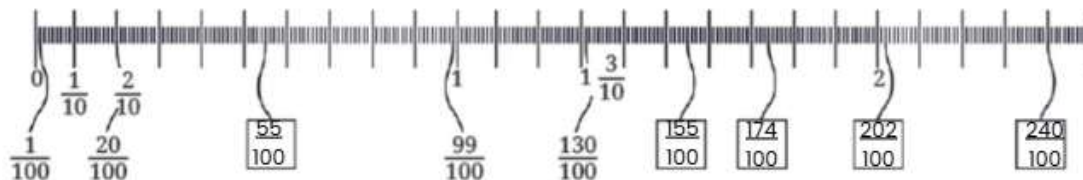
So, "4 units and 45 one-hundredths" is another way of saying 4.45 units.

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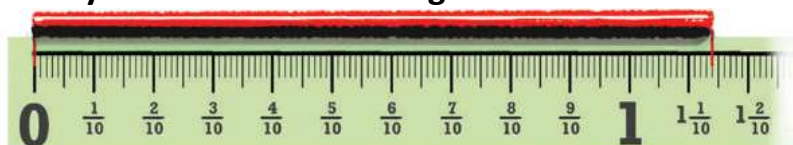
Q1: Observe the figure below. Notice the markings and the corresponding lengths written in the boxes when measured from 0. Fill the lengths in the empty boxes.



Ans:



The length of the wire in the first picture is given in three different ways. Can you see how they denote the same length?

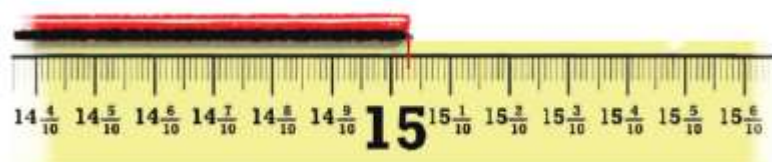
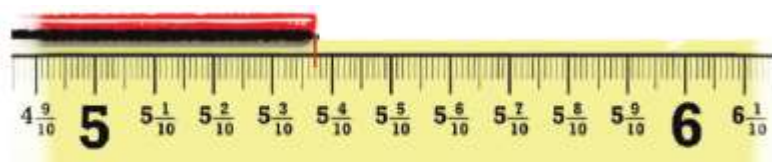


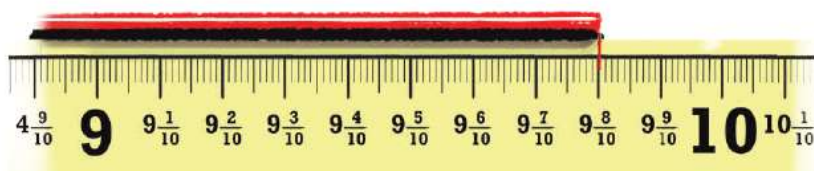
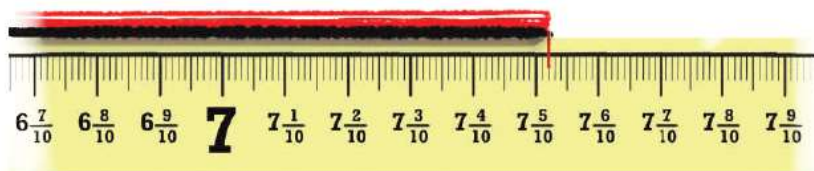
- $1 \frac{1}{10} \frac{4}{100}$ One and one-tenth and four-hundredths
- $1 \frac{14}{100}$ One and fourteen-hundredths
- $\frac{114}{100}$ One Hundred and Fourteen-hundredths

Ans:

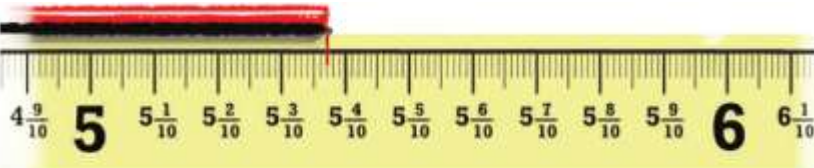
- "One and one-tenth and four-hundredths": $1 + \frac{1}{10} + \frac{4}{100} = 1.14$
- "One and fourteen-hundredths": $1 + \frac{14}{100} = 1.14$
- "One Hundred and Fourteen-hundredths": $\frac{114}{100} = 1.14$

Q2: For the lengths shown below write the measurements and read out the measures in words.





Ans: First Image:



$$5\frac{3}{100} = \frac{53}{100}$$

Five and three-tenths and seven-hundredths

Or $5\frac{37}{100}$

Five and thirty-seven-hundredths

Or $5\frac{37}{1000}$

Five hundred thirty-seven-hundredths

Second Image:



$$15\frac{3}{100}$$

Fifteen and three-hundredths

Or $15\frac{3}{100}$

One thousand five hundred three-hundredths

Third Image:



$$7\frac{52}{100}$$

Seven and five-tenths and two-hundredths

Or $7\frac{52}{100}$

Seven and fifty-two-hundredths

Or $7\frac{52}{100}$

Seven hundred fifty-two-hundredths

Fourth Image:



$$9\frac{8}{10}$$

Nine and eight-tenths

Or $9\frac{80}{100}$

Nine and eighty-hundredths

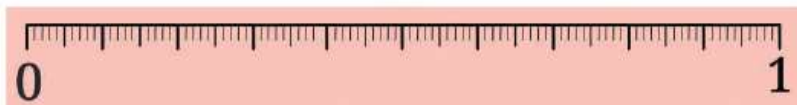
Or $9\frac{80}{100}$

Nine hundred eighty-hundredths

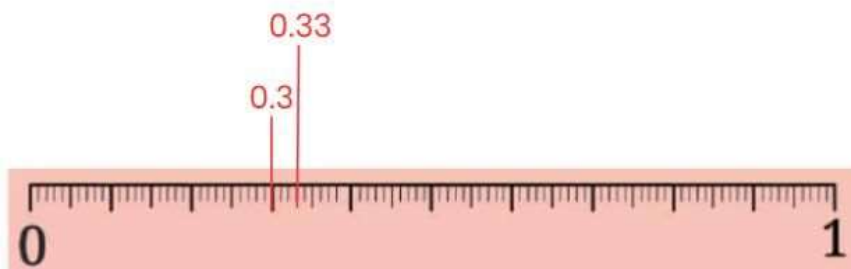
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Q1: In each group, identify the longest and the shortest lengths. Mark each length on the scale.

(a) $\frac{3}{10}$, $\frac{3}{100}$, $\frac{33}{100}$



Ans:



- **Convert to decimals:**

- $\frac{3}{10} = 0.3$

- $\frac{3}{100} = 0.03$

- $\frac{33}{100} = 0.33$

- **Order:** $0.03 < 0.3 < 0.33$

- **Result:**

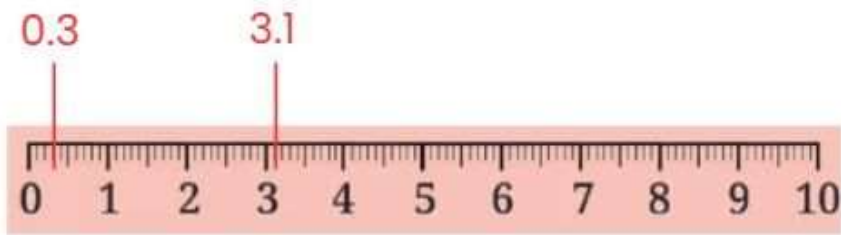
- **Shortest:** $\frac{3}{100}$ (0.03)

- **Longest:** $\frac{33}{100}$ (0.33)

(b) $3\frac{1}{10}$, $\frac{30}{10}$, $1\frac{3}{10}$



Ans:



- **Convert to decimals:**

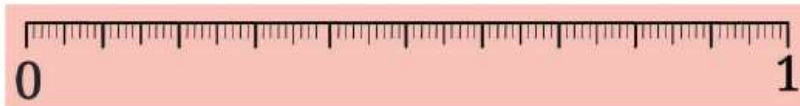
- $3\frac{1}{10} = 3.1$
- $\frac{30}{10} = 3$
- $\frac{3}{10} = 0.3$

- **Order:** $0.3 < 3 < 3.1$

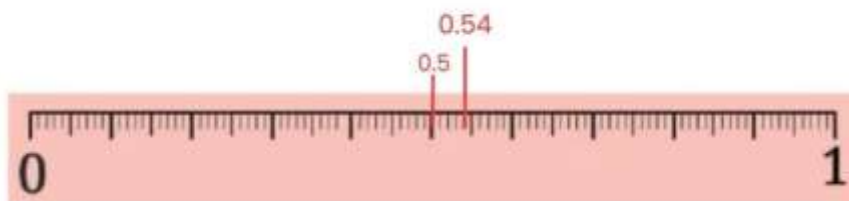
- **Result:**

- **Shortest:** $\frac{3}{10}$ (0.3)
- **Longest:** $3\frac{1}{10}$ (3.1)

(c) $\frac{45}{100}, \frac{54}{100}, \frac{5}{10}, \frac{4}{10}$



Ans:



- **Convert to decimals:**

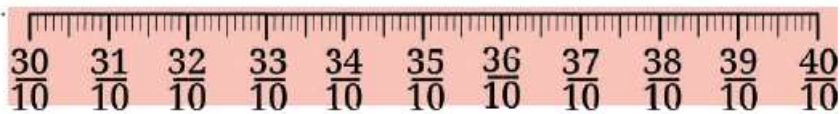
- $\frac{45}{100} = 0.45$
- $\frac{54}{100} = 0.54$
- $\frac{5}{10} = 0.5$
- $\frac{4}{10} = 0.4$

- **Order:** $0.4 < 0.45 < 0.5 < 0.54$

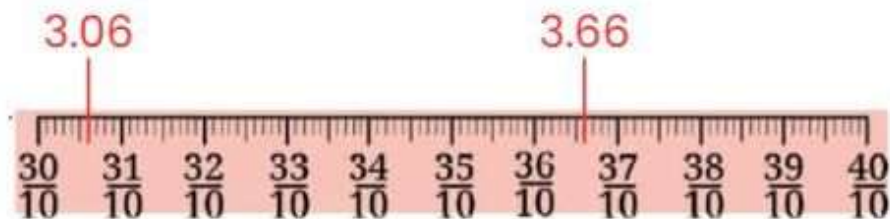
- **Result:**

- **Shortest:** $\frac{4}{10}$ (0.4)
- **Longest:** $\frac{54}{100}$ (0.54)

(d) $3\frac{6}{10}, 3\frac{6}{100}, 3\frac{6}{10}\frac{6}{100}$



Ans:



• Interpretation:

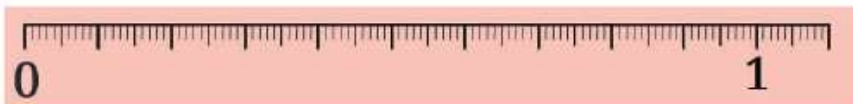
- $3\frac{6}{10} = 3.6$
- $3\frac{6}{100} = 3.06$
- $3\frac{6}{10}\frac{6}{100}$ is ambiguous. Assuming it means $3 + \frac{6}{10} + \frac{6}{100} = 3.66$.

• Order: $3.06 < 3.6 < 3.66$

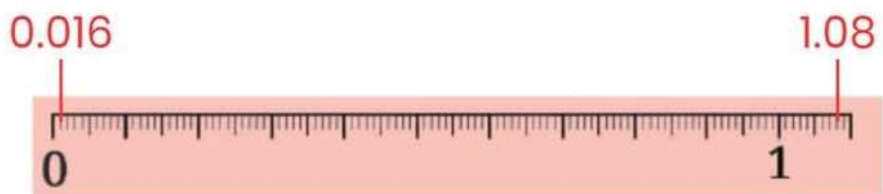
• Result:

- Shortest: $3\frac{6}{100}$ (3.06)
- Longest: $3\frac{6}{10}\frac{6}{100}$ (3.66)

(e) $\frac{8}{10}, \frac{2}{100}, \frac{9}{100}, 1\frac{8}{100}$



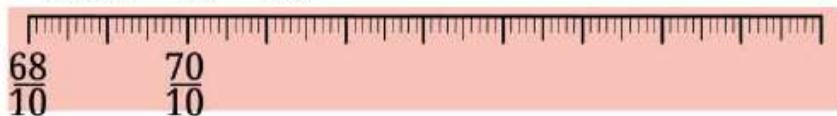
Ans:



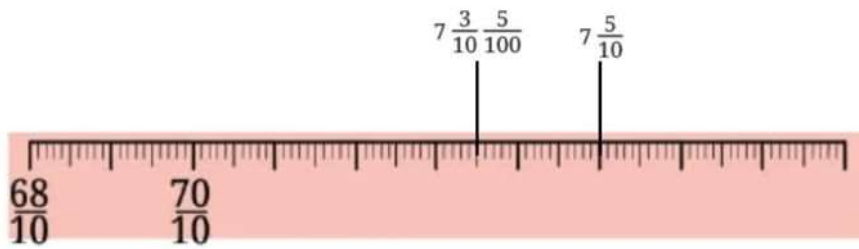
Longest: $1\frac{8}{100}$

Shortest: $\frac{8}{10}, \frac{2}{100}$

(f) $7\frac{3}{10}\frac{5}{100}, 7\frac{5}{10}, 7\frac{41}{100}$



Ans:



Longest: $7 \frac{5}{10}$

Shortest: $7 \frac{3}{10} \frac{5}{100}$

(g) $\frac{65}{10} \frac{15}{100}$, $5 \frac{87}{100}$, $5 \frac{7}{100}$



Ans:



Longest: $\frac{65}{10} \frac{15}{100}$

Shortest: $5 \frac{7}{100}$

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Q1: What will be the sum of $15 \frac{3}{10} \frac{4}{100}$ and $2 \frac{6}{10} \frac{8}{100}$?

Ans: We add the whole numbers, tenths, and hundredths separately.

Whole numbers: $15 + 2 = 17$

Tenths: $\frac{3}{10} + \frac{6}{10} = \frac{9}{10}$

Hundredths: $\frac{4}{100} + \frac{8}{100} = \frac{12}{100}$

Now, convert and combine:

$\frac{12}{100} = \frac{1}{10} + \frac{2}{100}$

Add $\frac{9}{10} + \frac{1}{10} = 1$

Now the total is:

- Whole numbers: $17 + 1 = 18$
- Tenths and hundredths left: $\frac{2}{100}$

Final Answer: $18 \frac{2}{100}$

Q2: Are both these methods different?

Ans: No, both Method 1 and Method 2 are not different in result. They are just two different ways of adding the same numbers.

- **Method 1** adds the whole numbers, tenths, and hundredths separately using brackets and regrouping.
- **Method 2** aligns the numbers in columns and adds them directly like we do in usual addition.

In both methods, the final answer is the same: $18\frac{2}{100}$

Q3: What is the difference: $25\frac{9}{10} - 6\frac{4}{10}\frac{7}{100}$?

Ans: We subtract the whole numbers, tenths, and hundredths step by step.

Whole numbers: $25 - 6 = 19$

Tenths: $9/10 - 4/10 = 5/10$

Hundredths: Since the first number has 0 hundredths, and we subtract $7/100$, we need to convert $1/10 = 10/100$

So, we take $9/10 = 8/10 + 1/10 = 8/10 + 10/100$

Now subtract:

$10/100 - 7/100 = 3/100$

So the total is:

Whole: 19

Tenths: $4/10$

Hundredths: $3/100$

Final Answer: $19\frac{4}{10}\frac{3}{100}$

$$\begin{array}{r}
 25\frac{9}{10} \\
 - 6\frac{4}{10} \\
 \hline
 \end{array}
 \longrightarrow
 \begin{array}{r}
 25\frac{8}{10}\frac{10}{100} \\
 - 6\frac{4}{10}\frac{7}{100} \\
 \hline
 \end{array}
 \longrightarrow
 \begin{array}{r}
 25\frac{8}{10}\frac{10}{100} \\
 - 6\frac{4}{10}\frac{7}{100} \\
 \hline
 = 19\frac{4}{10}\frac{3}{100}
 \end{array}$$

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Figure it Out

Q1: Find the sums and differences:

(a) $\frac{3}{10} + \frac{34}{100}$

$$\frac{3}{10} + \frac{34}{100} = \frac{3}{10} + \frac{34}{100}$$

$$= 3 + \frac{3}{10} + \frac{4}{100} = 3 + \frac{34}{100} = \frac{334}{100}$$

(b) $9\frac{57}{100} + 2\frac{13}{100}$

$$9\frac{57}{100} + 2\frac{13}{100}$$

$$= (9 + 2) + (\frac{5}{10} + \frac{1}{10}) + (\frac{7}{100} + \frac{3}{100})$$

$$\begin{aligned}
&= 11 + \frac{6}{10} + \frac{10}{100} \\
&= 11 + \frac{6}{10} + \frac{1}{10} = 11\frac{7}{10} \\
\text{(c)} \quad &15\frac{64}{100} + 14\frac{36}{100} \\
&15\frac{64}{100} + 14\frac{36}{100} \\
&= (15 + 14) + (\frac{6}{10} + \frac{3}{10}) + (\frac{4}{100} + \frac{6}{100}) \\
&= 29 + \frac{9}{10} + \frac{10}{100} \\
&= 29 + \frac{9}{10} + \frac{1}{10} = 29 + \frac{10}{10} \\
&= 29 + 1 = 30 \\
\text{(d)} \quad &\frac{77}{100} - \frac{44}{100} \\
&\frac{77}{100} - \frac{44}{100} \\
&= \frac{33}{100} \\
\text{(e)} \quad &\frac{86}{100} - \frac{53}{100} \\
&\frac{86}{100} - \frac{53}{100} = (8 - 5) + (\frac{6}{100} - \frac{3}{100}) = \frac{33}{100} \\
\text{(f)} \quad &\frac{1262}{100} - \frac{99}{100} \\
&\frac{1262}{100} \rightarrow \frac{125}{100} \rightarrow \frac{115}{100} - \frac{99}{100} - \frac{99}{100} - \frac{99}{100} \\
&= \frac{1163}{100} = 11\frac{63}{100}
\end{aligned}$$

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Q1: Can we not split a unit into 4 equal parts, 5 equal parts, 8 equal parts, or any other number of equal parts instead?

Ans: Yes, a unit can be split into any number of equal parts (e.g., 4, 5, 8) for measurement. For example, splitting into 4 parts gives quarters ($\frac{1}{4}$), and each quarter can be further divided into 4 for sixteenths ($\frac{1}{16}$).

Q2: Then why split a unit into 10 parts every time?

Ans: Splitting into 10 parts aligns with the Indian place value system, where each place value is 10 times the next (e.g., 10 ones = 1 ten).

This consistency extends to fractions (10 tenths = 1 unit, 10 hundredths = 1 tenth), making decimal notation and calculations simpler.

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Q1: Can we extend this further?

Ans: Yes, the place value system extends beyond thousandths. Splitting $\frac{1}{1000}$ into 10 parts gives $\frac{1}{10000}$ (ten-thousandths), and so on, allowing for increasingly precise measurements.

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Q1: We can ask similar questions about fractional parts:

- (a) How many thousandths make one unit?
- (b) How many thousandths make one tenth?
- (c) How many thousandths make one hundredth?
- (d) How many tenths make one ten?

(e) How many hundredths make one ten?

Ans: (a) 1000 thousandths make one unit ($1 = 1000/1000$).

(b) 100 thousandths make one tenth ($1/10 = 100/1000$).

(c) 10 thousandths make one hundredth ($1/100 = 10/1000$).

(d) 100 tenths make one ten ($10 = 100/10$).

(e) 1000 hundredths make one ten ($10 = 1000/100$).

Q2: Make a few more questions of this kind and answer them.

Ans:

(d) How many tenths make one hundred?

10001000 tenths ($0.1 \times 1000 = 1000.1 \times 1000 = 100$).

(b) How many units make one thousand?

10001000 units ($1 \times 1000 = 10001 \times 1000 = 1000$).

© How many tenths make one unit?

10 tenths ($0.1 \times 10 = 10.1 \times 10 = 1$).

(d) How many hundredths make one thousand?

100,000100,000 hundredths ($0.01 \times 100,000 = 10000.01 \times 100,000 = 1000$).

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Q1: How can we write 234 tenths in decimal form?

Ans: 234 tenths = $234/10 = 23 \frac{4}{10} = 23.4$.

Hundreds	Tens	Units	Tenths	Hundredths
			234	
	2	3	• 4	

Q2: Write these quantities in decimal form:

(a) 234 hundredths,

Ans: 234 hundredths means $234/100$.

So, the decimal form is 2.34

Hundreds	Tens	Ones	Decimal point	Tenths	Hundredths
					234
		2		3	4

(b) 105 tenths.

Ans: 105 tenths means $105/10$.

So, the decimal form is 10.5

Hundreds	Tens	Ones	Decimal point	Tenths	Hundredths
				105	
	1	0	.	5	

Q3: How many cm is 1 mm?

Ans: $1 \text{ mm} = 1/10 \text{ cm} = 0.1 \text{ cm}$.

Q4: How many cm is (a) 5 mm? (b) 12 mm?

Ans: (a) $5 \text{ mm} = 5/10 \text{ cm} = 0.5 \text{ cm}$.

(b) $12 \text{ mm} = 1 \text{ cm} + 2/10 \text{ cm} = 1.2 \text{ cm}$.

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Q1: Fill in the blanks below (mm \leftrightarrow cm):

12 mm = 1.2 cm	56 mm = 5.6 cm	70 mm = _____
_____ = 0.9 cm	134 mm = _____	_____ = 203.6 cm

Ans:

12 mm = 1.2 cm	56 mm = 5.6 cm	70 mm = 7.0 cm
9 mm = 0.9 cm	134 mm = 13.4 cm .	2036 mm = 203.6 cm

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Q1: Fill in the blanks below (cm \leftrightarrow m):

36 cm = _____	50 cm = _____	_____ = 0.89 m
4 cm = _____	325 cm = _____	_____ = 2.07 m

Ans:

36 cm = 0.36 m	50 cm = 0.50 m	89 cm = 0.89 m
4 cm = 0.04 m	325 cm = 3.25 m	207 cm = 2.07 m

Q2: How many mm does 1 meter have?

Ans: $1 \text{ m} = 100 \text{ cm} = 100 \times 10 \text{ mm} = 1000 \text{ mm}$.

Q3: Can we write $1 \text{ mm} = 1/1000 \text{ m}$?

Ans: Yes, $1 \text{ mm} = 1/1000 \text{ m}$, since $1 \text{ m} = 1000 \text{ mm}$.

Q: Fill in the blanks below (g \leftrightarrow kg)

465 g = _____	68 g = _____	1560 g = _____
704 g = _____	_____ = 0.56 kg	_____ = 2.5 kg

Ans:

465 g = 0.465 kg	68 g = 0.068 kg	1560 g = 1.560 kg
704 g = 0.704 kg	560 g = 0.56 kg	2500 g = 2.5 kg

Q: Fill in the blanks below (rupee \leftrightarrow paise)

10 p = _____	_____ p = ₹ 0.05	_____ p = ₹ 0.36
_____ = ₹ 0.50	99 p = _____	250 p = _____

Ans:

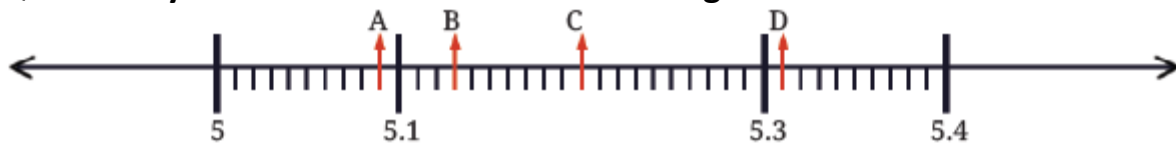
10 p = ₹0.1	5 p = ₹0.05	36 p = ₹0.36
50 p = ₹0.50	99 p = ₹0.99	250 p = ₹2.50

Q1: Name all the divisions between 1 and 1.1 on the number line.



Ans: The divisions between 1 and 1.1 are: 1.01, 1.02, 1.03, 1.04, 1.05, 1.06, 1.07, 1.08, 1.09

Q2: Identify and write the decimal numbers against the letters.



Ans: A = 5.09

B = 5.13

C = 5.20

D = 5.31

Q3: Sonu says that 0.2 can also be written as 0.20, 0.200; Zara thinks that putting zeros on the right side may alter the value of the decimal number. What do you think?

Ans: Sonu is correct. $0.2 = 0.20 = 0.200$, as trailing zeros after the decimal point do not change the value (they represent 0 hundredths, 0 thousandths, etc.). Zara is incorrect.

Decimal number	Units	Tenths	Hundredths	Thousandths
0.2	0	2		
0.20	0	2	0	
0.200	0	2	0	0
0.02	0	0	2	
0.002	0	0	0	2

We can see that 0.2, 0.20, and 0.200 are all equal as they represent the same quantity, i.e., 2 tenths. But 0.2, 0.02, and 0.002 are different.

Q4: Can you tell which of these is the smallest and which is the largest?

Ans: From the table above: $0.2 = 0.20 = 0.200$ (same), 0.02, 0.002.

Smallest: 0.002, Largest: 0.2.

Q5: Which of these are the same: 4.5, 4.05, 0.405, 4.050, 4.50, 4.005, 04.50?

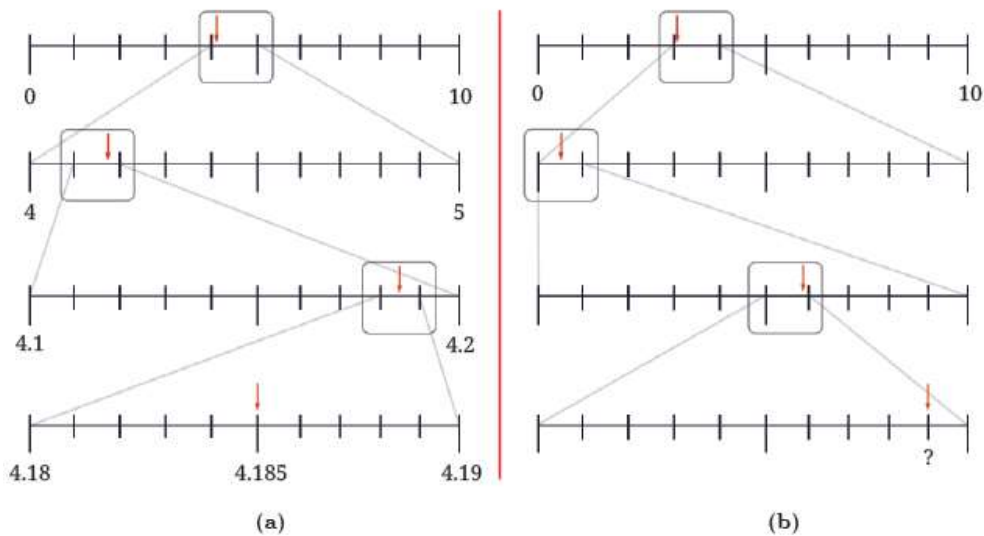
Ans: $4.5 = 4.50 = 04.50$ (trailing zeros).

Others (4.05, 0.405, 4.050, 4.005) are distinct.

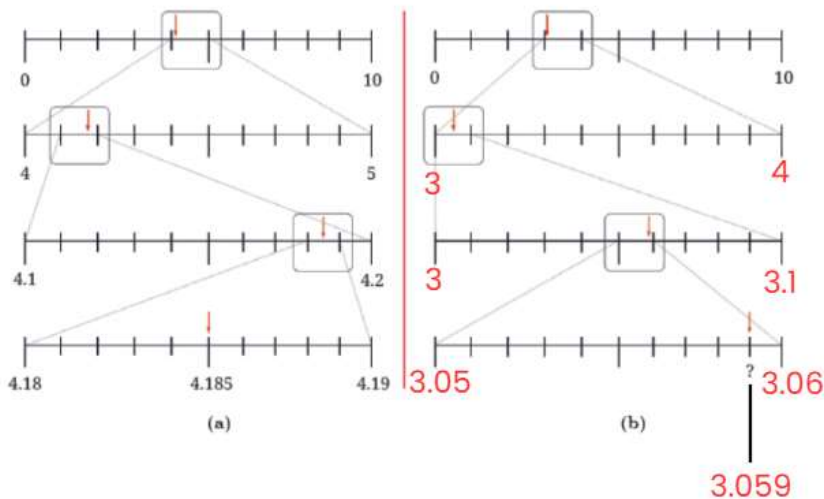
Same: 4.5, 4.50, 04.50.

Q6: (a) Observe the number lines in Figure (a) below. At each level, a particular segment of the number line is magnified to locate the number 4.185.

(b) Identify the decimal number in the last number line in Figure (b) denoted by ‘?’.



Ans:



Q7: Make such number lines for the decimal numbers: (a) 9.876 (b) 0.407.

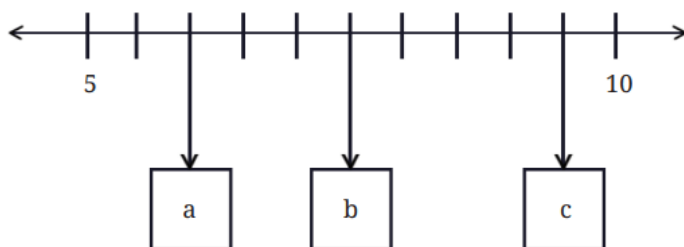
Ans: (a) 9.876:

Number line from 9 to 10, divide into 10 parts (tenths: 9.8, 9.9), then 9.8 to 9.9 into 10 parts (hundredths: 9.87, 9.88), then 9.87 to 9.88 into 10 parts (thousandths: 9.876). Draw a number line on your own.

(b) 0.407:

Number line from 0 to 1, divide into 10 parts (tenths: 0.4, 0.5), then 0.4 to 0.5 into 10 parts (hundredths: 0.40, 0.41), then 0.40 to 0.41 into 10 parts (thousandths: 0.407). Draw a number line on your own.

Q8: In the number line shown below, what decimal numbers do the boxes labelled 'a', 'b', and 'c' denote?

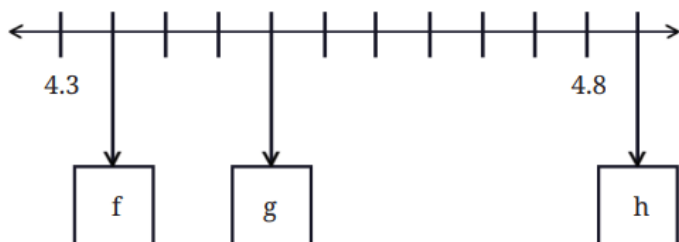
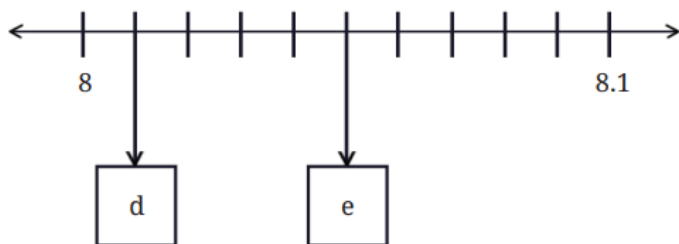


Ans: We are given that the number line from 5 to 10 is divided into 10 equal parts.

So, each small division $= \frac{10 - 5}{10} = \frac{5}{10} = 0.5$

- a = 6
- b = 7.5
- c = 9.5

Q1: Using similar reasoning find out the decimal numbers in the boxes below.



Ans: (Assuming similar scale, 5 to 10, 10 divisions):

- $d = 8.01$
- $e = 8.05$
- $f = 4.35$
- $g = 4.5$
- $h = 4.85$

Q2: Which is larger: 6.456 or 6.465?

Ans: Compare digits:

- Units: $6 = 6$.
- Tenths: $4 = 4$.
- Hundredths: $5 \neq 6$ (stop here, $6 > 5$).
6.465 is larger.

	Both numbers have 6 units.
	Both numbers have 6 units and 4 tenths.
	Both numbers have 6 units and 4 tenths, but the first number has only 5 hundredths, whereas the second number has 6 hundredths.

Q1: Why can we stop comparing at this point? Can we be sure that whatever digits are there after this will not affect our conclusion?

Ans: We stop when digits differ because subsequent digits represent smaller place values (thousandths, etc.), which cannot overturn the difference in a higher place value (hundredths in this case). Thus, $6.465 > 6.456$ regardless of further digits.

Q2: Which decimal number is greater?

(a) 1.23 or 1.32

(b) 3.81 or 13.800

(c) 1.009 or 1.090

Ans: (a) Using the decimal place value chart, we find that:

Tens	Ones	Decimal point	Tenths	Hundredths	Thousandths
	1	.	2	3	
	1	.	3	2	

Both numbers have 1 unit, but the first number has 2 tenths, whereas the second number has 3 tenths.

Therefore, $1.23 < 1.32$.

(b) Using the decimal place value chart, we find that:

Tens	Ones	Decimal point	Tenths	Hundredths	Thousandths
	3	.	8	1	0
1	3	.	8	0	0

Here, the first number has 3 units, whereas the second number has 1 ten and 3 units.

Therefore, $3.81 < 13.800$.

(c) Using the decimal place value chart, we find that:

Tens	Ones	Decimal point	Tenths	Hundredths	Thousandths
	1	.	0	0	9
	1	.	0	9	0

Both numbers have 1 unit and 0 tenths, but the first number has 0 hundredths, whereas the second number has 9 hundredths.

Therefore, $1.009 < 1.090$.

Q3: Consider the decimal numbers 0.9, 1.1, 1.01, and 1.11. Identify the decimal number that is closest to 1. Let us compare the decimal numbers. Arranging these in ascending order, we get $0.9 < 1 < 1.01 < 1.1 < 1.11$. Among the neighbours of 1, 1.01 is $1/100$ away from 1 whereas 0.9 is $10/100$ away from 1. Therefore, 1.01 is closest to 1.

Which of the above is closest to 1.09?

Ans: From 0.9, 1.1, 1.01, 1.11:

- $|1.09 - 0.9| = 0.19$
- $|1.09 - 1.1| = 0.01$
- $|1.09 - 1.01| = 0.08$
- $|1.09 - 1.11| = 0.02$

Closest: 1.1.

Q4: Which among these is closest to 4: 3.56, 3.65, 3.099?

Ans:

- $|4 - 3.56| = 0.44$
- $|4 - 3.65| = 0.35$
- $|4 - 3.099| = 0.901$

Closest: 3.65.

Q5: Which among these is closest to 1: 0.8, 0.69, 1.08?

Ans:

- $|1 - 0.8| = 0.2$
- $|1 - 0.69| = 0.31$
- $|1 - 1.08| = 0.08$

Closest: 1.08.

Q6: In each case below use the digits 4, 1, 8, 2, and 5 exactly once and try to make a decimal number as close as possible to 25.



Ans: We can make a decimal number closest to 25 using the digits 4, 1, 8, 2, and 5 with the given conditions as follows:

2 5 . 1 4 8

8 . 5 4 2

1 2 4 . 5 8

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Q1: Write the detailed place value computation for $84.691 - 77.345$, and its compact form.

Ans: Break the numbers into place values:

84.691

- Tens = 80
- Units = 4
- Tenths = 0.6
- Hundredths = 0.09
- Thousandths = 0.001

77.345

- Tens = 70
- Units = 7
- Tenths = 0.3
- Hundredths = 0.04
- Thousandths = 0.005

Now subtract each place value:

- Tens: $80 - 70 = 10$
- Units: $4 - 7 = -3$, borrow 1 from tens $\rightarrow 10 - 1 = 9$, units become $14 - 7 = 7$
- Tenths: $0.6 - 0.3 = 0.3$
- Hundredths: $0.09 - 0.04 = 0.05$
- Thousandths: $0.001 - 0.005 =$ Not possible \rightarrow borrow from hundredths:
 - $0.09 = 0.08 + 0.01$
 - $0.01 - 0.005 = 0.005$
 - So final hundredths = $0.08 - 0.04 = 0.04$
 - Thousandths = $0.005 - 0 = 0.005$

Now combine all: Difference = 7.346

Compact Form: $84.691 - 77.345 = 7.346$

Figure it Out

Q1: Find the sums:

(a) $5.3 + 2.6$

(b) $18 + 8.8$

(c) $2.15 + 5.26$

(d) $9.01 + 9.10$

(e) $29.19 + 9.91$

(f) $0.934 + 0.6$

(g) $0.75 + 0.03$

(h) $6.236 + 0.487$

Ans:

(a) $5.3 + 2.6 = 7.9$

(b) $18 + 8.8 = 26.8$

(c) $2.15 + 5.26 = 7.41$

(d) $9.01 + 9.10 = 18.11$

(e) $29.19 + 9.91 = 39.10$

(f) $0.934 + 0.6 = 1.534$

(g) $0.75 + 0.03 = 0.78$

(h) $6.236 + 0.487 = 6.723$

Q2: Find the differences:

(a) $5.6 - 2.3$

(b) $18 - 8.8$

(c) $10.4 - 4.5$

(d) $17 - 16.198$

(e) $17 - 0.05$

(f) $34.505 - 18.1$

(g) $9.9 - 9.09$

(h) $6.236 - 0.487$

Ans:

(a) $5.6 - 2.3 = 3.3$

(b) $18 - 8.8 = 9.2$

(c) $10.4 - 4.5 = 5.9$

(d) $17 - 16.198 = 0.802$

(e) $17 - 0.05 = 16.95$

(f) $34.505 - 18.1 = 16.405$

(g) $9.9 - 9.09 = 0.81$

(h) $6.236 - 0.487 = 5.749$

Q3: Continue this sequence and write the next 3 terms: 4.4, 4.8, 5.2, 5.6, 6.0.

Ans: Change: +0.4.

Next: 6.4, 6.8, 7.2.

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Q1: Similarly, identify the change and write the next 3 terms for each sequence given below. Try to do this computation mentally.

(a) 4.4, 4.45, 4.5, ...

(b) 25.75, 26.25, 26.75, ...

(c) 10.56, 10.67, 10.78, ...

(d) 13.5, 16, 18.5, ...

(e) 8.5, 9.4, 10.3, ...

(f) 5, 4.95, 4.90, ...

(g) 12.45, 11.95, 11.45, ...

(h) 36.5, 33, 29.5, ...

Ans:

(a) 4.4, 4.45, 4.5: +0.05.

Next: 4.55, 4.60, 4.65.

(b) 25.75, 26.25, 26.75: +0.50.

Next: 27.25, 27.75, 28.25.

(c) 10.56, 10.67, 10.78: +0.11.

Next: 10.89, 11.00, 11.11.

(d) 13.5, 16, 18.5: +2.5.

Next: 21.0, 23.5, 26.0.

(e) 8.5, 9.4, 10.3: +0.9.

Next: 11.2, 12.1, 13.0.

(f) 5, 4.95, 4.90: -0.05.

Next: 4.85, 4.80, 4.75.

(g) 12.45, 11.95, 11.45: -0.50.

Next: 10.95, 10.45, 9.95.

(h) 36.5, 33, 29.5: -3.5.

Next: 26.0, 22.5, 19.0.

Q2: Make your own sequences and challenge your classmates to extend the pattern.

Ans: Example: 2.3, 2.9, 3.6 (+0.6, +0.7, increasing by 0.1).

Next: 4.4, 5.3, 6.4.

Estimating Sums and Differences

Sonu has observed sums and differences of decimal numbers and says, "If we add two decimal numbers, then the sum will always be greater than the sum of their whole number parts. Also, the sum will always be less than 2 more than the sum of their whole number parts." Let us use an example to understand what his claim means:

If the two numbers to be added are 25.936 and 8.202, the claim is that their sum will be greater than $25 + 8$ (whole number parts) and will be less than $25 + 1 + 8 + 1$.

Q3: What do you think about this claim? Verify if this is true for these numbers. Will it work for any 2 decimal numbers?

Ans: Sonu's claim: Sum of decimals $>$ sum of whole parts, $<$ sum of whole parts + 2.
For $25.936 + 8.202 = 34.138$:

- Whole parts: $25 + 8 = 33 < 34.138$.
 - Whole parts + 2: $33 + 2 = 35 > 34.138$.
- True for this case. Generally true, as fractional parts add to less than 2 units.

Q4: What about for the sum of 25.93603259 and 8.202?

Ans: $25.93603259 + 8.202 = 34.13803259$.

- $25 + 8 = 33 < 34.13803259$.
 - $33 + 2 = 35 > 34.13803259$.
- Claim holds.

Q5: Similarly, come up with a way to narrow down the range of whole numbers within which the difference of two decimal numbers will lie.

Ans: Numbers:

25.936 and 8.202

Step 1: Whole number parts:

$$25 - 8 = 17$$

Step 2: Full decimal subtraction:

$$25.936 - 8.202 = 17.734$$

So the difference:

- Is **less than** $25 - 8 + 1 = 18$
- Is **more than** $25 - (8 + 1) = 16$

So we can say:

"The difference will always lie between $(\text{Whole1} - \text{Whole2} - 1)$ and $(\text{Whole1} - \text{Whole2} + 1)$ "

For example:

If Whole parts are 25 and 8

→ Range of difference = Between 16 and 18

→ Actual difference = 17.734 lies in the range.

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Q1: Where else can we see such 'non-decimals' with a decimal-like notation?

Ans: Examples:

- Time: 2.5 hours = 2 hours 30 minutes (not 2 hours 5 minutes).
- Money: ₹10.5 = 10 rupees 50 paise (not 10 rupees 5 paise).
- Sports: 5.5 overs = 5 overs 3 balls (1 over = 6 balls).

Q2: Convert the following fractions into decimals:

(a) $5/100$

(b) $16/1000$

(c) $12/10$

(d) 254/1000

Ans:

(a) $5/100 = 0.05$

(b) $16/1000 = 0.016$

(c) $12/10 = 1.2$

(d) $254/1000 = 0.254$

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Q: Convert the following decimals into a sum of tenths, hundredths, and thousandths:

(a) 0.34

(b) 1.02

(c) 0.8

(d) 0.362

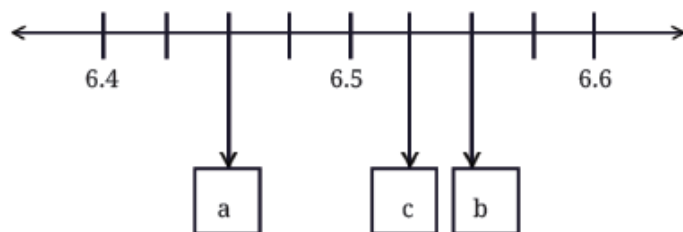
Ans: (a) $0.34 = \frac{34}{100} = \frac{30}{100} + \frac{4}{100} = \frac{3}{10} + \frac{4}{100}$

(b) $1.02 = \frac{102}{100} = \frac{100}{100} + \frac{2}{100}$

(c) $0.8 = \frac{8}{10}$

(d) $0.362 = \frac{362}{1000} = \frac{300}{1000} + \frac{60}{1000} + \frac{2}{1000}$
 $= \frac{3}{10} + \frac{6}{100} + \frac{2}{1000}$

Q: What decimal number does each letter represent in the number line below?



Ans: (Here divisions of 0.025):

- a: 6.45
- b: 6.55
- c: 6.525

Q: Arrange the following quantities in descending order:

(a) 11.01, 1.011, 1.101, 11.10, 1.01

(b) 2.567, 2.675, 2.768, 2.499, 2.698

(c) 4.678 g, 4.595 g, 4.600 g, 4.656 g, 4.666 g

(d) 33.13 m, 33.31 m, 33.133 m, 33.331 m, 33.313 m

Ans: (a) 11.01, 1.011, 1.101, 11.10, 1.01: 11.10, 11.01, 1.101, 1.011, 1.01.

(b) 2.567, 2.675, 2.768, 2.499, 2.698: 2.768, 2.698, 2.675, 2.567, 2.499.

(c) 4.678 g, 4.595 g, 4.600 g, 4.656 g, 4.666 g: 4.678, 4.666, 4.656, 4.600, 4.595.

(d) 33.13 m, 33.31 m, 33.133 m, 33.331 m, 33.313 m: 33.331, 33.313, 33.31, 33.133, 33.13.

Q: Using the digits 1, 4, 0, 8, and 6 make:

(a) the decimal number closest to 30

(b) the smallest possible decimal number between 100 and 1000.

Ans: (a) Closest to 30: 30.146 ($|30 - 30.146| = 0.146$).

(b) Smallest between 100 and 1000: 104.68.

Q: Will a decimal number with more digits be greater than a decimal number with fewer digits?

Ans: No, the number of digits doesn't determine size. Compare: 1.2 (fewer digits) > 0.9999 (more digits). Size depends on place value comparison.

Q: Mahi purchases 0.25 kg of beans, 0.3 kg of carrots, 0.5 kg of potatoes, 0.2 kg of capsicums, and 0.05 kg of ginger. Calculate the total weight of the items she bought.

Ans: $0.25 + 0.3 + 0.5 + 0.2 + 0.05 = 1.30$ kg.

Total: 1.30 kg.

Q: Pinto supplies 3.79 L, 4.2 L, and 4.25 L of milk to a milk dairy in the first three days. In 6 days, he supplies 25 litres of milk. Find the total quantity of milk supplied to the dairy in the last three days.

Ans: First 3 days: $3.79 + 4.2 + 4.25 = 12.24$ L.

Last 3 days: $25 - 12.24 = 12.76$ L.

Q: Tinku weighed 35.75 kg in January and 34.50 kg in February. Has he gained or lost weight? How much is the change?

Ans: $35.75 - 34.50 = 1.25$ kg.

Tinku lost 1.25 kg.

Q: Extend the pattern: 5.5, 6.4, 6.39, 7.29, 7.28, 6.18, 6.17 _____, _____.

Ans: Pattern alternates: +0.9, -0.01, +0.9, -0.01, etc.

Next: 7.07 (+0.9), 7.06 (-0.01), 7.96 (+0.9).

Q: How many millimeters make 1 kilometer?

Ans: $1 \text{ km} = 1000 \text{ m} = 1000 \times 1000 \text{ mm} = 1,000,000 \text{ mm}$.

Q: Indian Railways offers optional travel insurance for passengers who book e-tickets. It costs 45 paise per passenger. If 1 lakh people opt for insurance in a day, what is the total insurance fee paid?

Ans: 45 paise = ₹0.45.

1 lakh = 100,000.

Total: $100,000 \times 0.45 = ₹45,000$.

Q: Which is greater?

(a) $10/1000$ or $1/10$?

(b) One-hundredth or 90 thousandths?

(c) One-thousandth or 90 hundredths?

Ans: (a) As $10/1000 = 1/100$ and $1/10 = 10/100$, so $1/10 > 10/1000$

(b) As one-hundredth = $\frac{1}{100}$ and
 90 thousandths = $\frac{90}{1000} = \frac{9}{100}$, so $\frac{9}{100} > \frac{1}{100}$
 or 90 thousandths > One-hundredth.

(c) As one-thousandth = $\frac{1}{1000}$ and
 90 hundredths = $\frac{90}{100} = \frac{900}{1000}$, so $\frac{1}{1000} < \frac{900}{1000}$

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Q: Write the decimal forms of the quantities mentioned:

(a) 87 ones, 5 tenths and 60 hundredths = 88.10

(b) 12 tens and 12 tenths

(c) 10 tens, 10 ones, 10 tenths, and 10 hundredths

(d) 25 tens, 25 ones, 25 tenths, and 25 hundredths

Ans:

(a) 87 ones, 5 tenths, 60 hundredths = $87 + 0.5 + 0.60 = 88.1$.

(b) 12 tens, 12 tenths = $120 + 1.2 = 121.2$.

(c) 10 tens, 10 ones, 10 tenths, 10 hundredths = $100 + 10 + 1 + 0.1 = 111.1$.

(d) 25 tens, 25 ones, 25 tenths, 25 hundredths = $250 + 25 + 2.5 + 0.25 = 277.75$.

Q: Using each digit 0 – 9 not more than once, fill the boxes below so that the sum is closest to 10.5:

$$\begin{array}{r}
 \boxed{} \boxed{} . \boxed{} \boxed{} \boxed{} \boxed{} \\
 + \boxed{} \boxed{} . \boxed{} \boxed{} \boxed{} \boxed{}
 \end{array}$$

Ans:

$$\begin{array}{r}
 \boxed{9} \boxed{4} . \boxed{7} \boxed{6} \\
 + \boxed{1} \boxed{0} . \boxed{2} \boxed{5} \\
 \hline
 10 5 0 1
 \end{array}$$

Q: Write the following fractions in decimal form:

(a) $\frac{1}{2}$

(b) $\frac{3}{2}$

(c) $\frac{1}{4}$

(d) $\frac{3}{4}$

(e) $\frac{1}{5}$

(f) $\frac{4}{5}$

Ans: (a) $\frac{1}{2} \times \frac{5}{5} = \frac{5}{10} = 0.5$

(b) $\frac{3}{2} \times \frac{5}{5} = \frac{15}{10} = \frac{10}{10} + \frac{5}{10} = 1 + \frac{5}{10} = 1.5$

(c) $\frac{1}{4} \times \frac{25}{25} = \frac{25}{100} = \frac{20}{100} + \frac{5}{100} = \frac{2}{10} + \frac{5}{100} = 0.25$

(d) $\frac{3}{4} \times \frac{25}{25} = \frac{75}{100} = \frac{70}{100} + \frac{5}{100} = \frac{7}{10} + \frac{5}{100} = 0.75$

(e) $\frac{1}{5} \times \frac{2}{2} = \frac{2}{10} = 0.2$

(f) $\frac{4}{5} \times \frac{2}{2} = \frac{8}{10} = 0.8$

