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Practice Set 1.1 8th Std Maths Answers Chapter 1 Rational and Irrational Numbers

Question 1.
Show the following numbers on a number line. Draw a separate number line for each example.

i. 32,52,−32

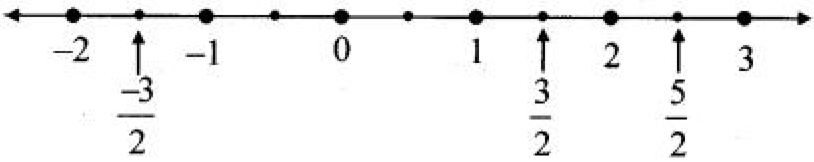
ii. 75,-25,-45

iii. -58,118

iv. 1310,-1710

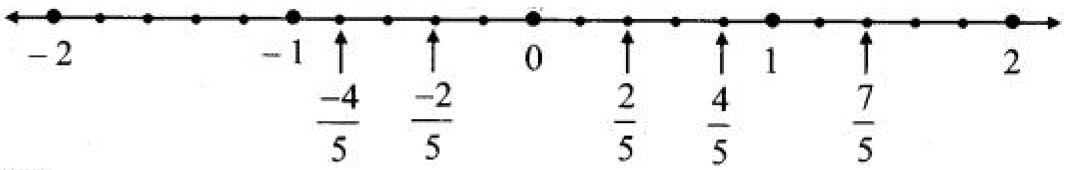
Solution:

i. 32,52,−32



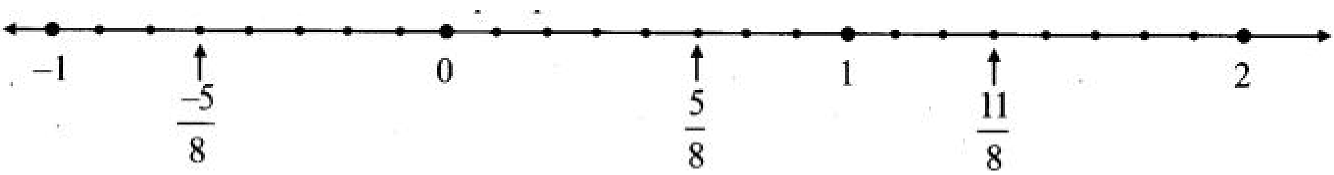
Here, the denominator of each fraction is 2.
∴ Each unit will be divided into 2 equal parts.

ii. 75,-25,-45



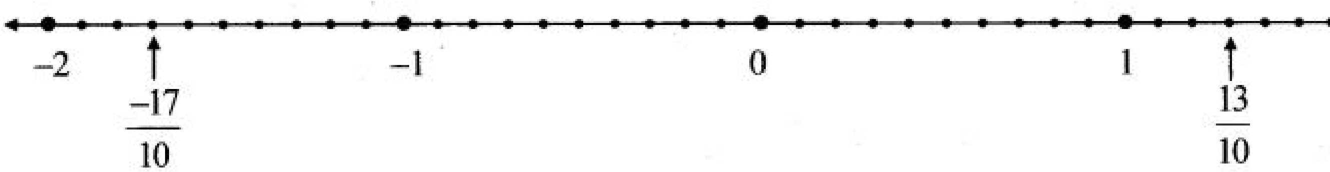
Here, the denominator of each fraction is 5.
∴ Each unit will be divided into 5 equal parts.

iii. -58,118



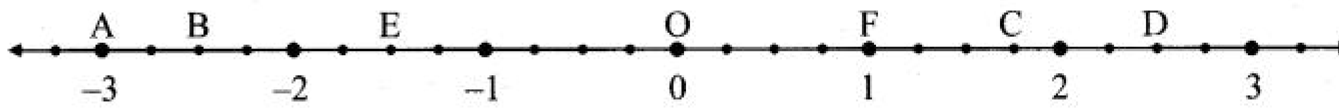
Here, the denominator of each fraction is 8.
∴ Each unit will be divided into 8 equal parts.

iv. 1310,-1710



Here, the denominator of each fraction is 10.
∴ Each unit will be divided into 10 equal parts.

Question 2.
Observe the number line and answer the questions.



i. Which number is indicated by point B?

ii. Which point indicates the number $1\frac{3}{4}$?

iii. State whether the statement, 'the point D denotes the number $\frac{5}{2}$ is true or false.

Solution:
Here, each emit is divided into 4 equal parts.
i. Point B is marked on the 10th equal part on the left side of O.
∴ The number indicated by point B is $-\frac{10}{4}$.

ii.
$$1\frac{3}{4} = \frac{1\times4+3}{4}$$
$$= \frac{4+3}{4}$$
$$= \frac{7}{4}$$

Point C is marked on the 7th equal part on the right side of O.

∴ The number $1\frac{3}{4}$ is indicated by point C.

iii. True
Point D is marked on the 10th equal part on the right side of O.

∴ D denotes the number $\frac{10}{4}=\frac{5\times2}{2\times2}=\frac{5}{2}$

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Practice Set 1.2 8th Std Maths Answers Chapter 1 Rational and Irrational Numbers

Question 1.
Compare the following numbers.
i. 7, -2
ii. 0, -95
iii. 87, 0

iv. $-54,14$

v. $4029,14129$

vi. $-1720,-1320$

vii. $1512,716$

viii. $-258,-94$

ix. $1215,35$

x. $-711,-34$

Solution:
i. 7, -2
If a and b are positive numbers such that a < b, then -a > -b.
Since, 2 < 7 ∴ -2 > -7

ii. 0, -95
On a number line, -95 is to the left of zero.
∴ 0 > -95

iii. 87, 0
On a number line, zero is to the left of 87 .
∴ 87 > 0

iv. $-54,14$
We know that, a negative number is always less than a positive number.
∴ $-54<14$

v. $4029,14129$
Here, the denominators of the given numbers are the same.
Since, 40 < 141
∴ $4029<14129$

vi. $-1720,-1320$
Here, the denominators of the given numbers are the same.
Since, 17 < 13

∴ -17 < -13

∴ −1720<−1320

vii. 1512,716

Here, the denominators of the given numbers are not the same.
LCM of 12 and 16 = 48

$$\frac{15}{12} = \frac{15 \times 4}{12 \times 4} = \frac{60}{48},$$

$$\frac{7}{16} = \frac{7 \times 3}{16 \times 3} = \frac{21}{48}$$

Since, 60 > 21

$$\therefore \quad \frac{60}{48} > \frac{21}{48}$$

$$\therefore \quad \mathbf{\frac{15}{12} > \frac{7}{16}}$$

Alternate method:
15 × 16 = 240
12 × 7 = 84
Since, 240 > 84
∴ 15 × 16 > 12 × 7

$$\therefore \quad \mathbf{\frac{15}{12} > \frac{7}{16}} \qquad \ldots\left[\text{If } a \times d > b \times c, \text{ then } \frac{a}{b} > \frac{c}{d}\right]$$

viii. −258,−94

Here, the denominators of the given numbers are not the same.
LCM of 8 and 4 = 8

$$-\frac{9}{4} = -\frac{9 \times 2}{4 \times 2} = -\frac{18}{8}$$

Since, 25 > 18

$$\therefore \quad \frac{25}{8} > \frac{18}{8}$$

$$\therefore \quad -\frac{25}{8} < -\frac{18}{8}$$

$$\therefore \quad \mathbf{-\frac{25}{8} < -\frac{9}{4}}$$

ix. 1215,35

Here, the denominators of the given numbers are not the same.

LCM of 15 and 5 = 15

$$\frac{3}{5} = \frac{3 \times 3}{5 \times 3} = \frac{9}{15}$$

Since, $12 > 9$

$$\therefore \quad \frac{12}{15} > \frac{9}{15}$$

$$\therefore \quad \mathbf{\frac{12}{15} > \frac{3}{5}}$$

x. −711,−34

Here, the denominators of the given numbers are not the same.
LCM of 11 and 4 = 44

$$-\frac{7}{11} = -\frac{7 \times 4}{11 \times 4} = -\frac{28}{44},$$

$$-\frac{3}{4} = -\frac{3 \times 11}{4 \times 11} = -\frac{33}{44}$$

Since, $28 < 33$

$$\therefore \quad \frac{28}{44} < \frac{33}{44}$$

$$\therefore \quad -\frac{28}{44} > -\frac{33}{44}$$

$$\therefore \quad \mathbf{-\frac{7}{11} > -\frac{3}{4}}$$

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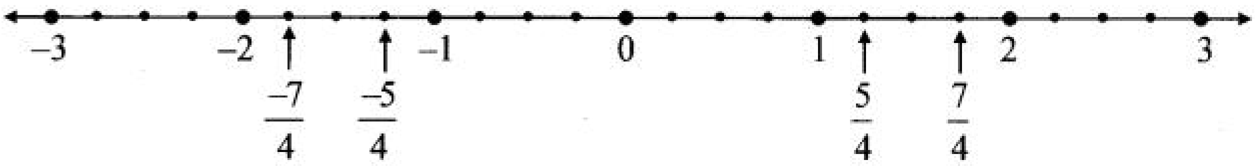
Maharashtra Board Class 8 Maths Solutions Chapter 1 Rational and Irrational Numbers Practice Set 1.2 Questions and Activities

Question 1.
Verify the following comparisons using a number line. (Textbook pg. no, .3)
i. 2 < 3 but – 2 > – 3

ii. 54<74 but -54<-74

Solution:



We know that, on a number line the number to the left is smaller than the other.
∴ 2 < 3 and -3 < -2
i.e. 2 < 3 and -2 > -3

$\frac{5}{4} < \frac{7}{4}$ and $\frac{-7}{4} < \frac{-5}{4}$

i.e. $\frac{5}{4} < \frac{7}{4}$ and $\frac{-5}{4} > \frac{-7}{4}$

Practice Set 1.3 8th Std Maths Answers Chapter 1 Rational and Irrational Numbers

Question 1.
Write the following rational numbers in decimal form.
i. 937
ii. 1842
iii. 914
iv. −1035
v. −1113

Solution:
i. 937

$$
\begin{array}{r@{}l}
 & \underline{\;0.243\;} \\
37 & \big)\,9.000 \\
 & \underline{-0} \\
 & 90 \\
 & \underline{-74} \\
 & 160 \\
 & \underline{-148} \\
 & 120 \\
 & \underline{-\;111} \\
 & 9
\end{array}
$$

$\therefore \quad \frac{9}{37} = \mathbf{0.\overline{243}}$

ii. 1842

$$\frac{18}{42} = \frac{3 \times 6}{7 \times 6} = \frac{3}{7}$$

$$\begin{array}{r} 0.428571 \\ 7\overline{)3.000000} \\ -0 \\ \hline 30 \\ -28 \\ \hline 20 \\ -14 \\ \hline 60 \\ -56 \\ \hline 40 \\ -35 \\ \hline 50 \\ -49 \\ \hline 10 \\ -7 \\ \hline 3 \end{array}$$

$$\frac{18}{42} = \frac{3}{7} = \mathbf{0.\overline{428571}}$$

iii. 914

$$14\overline{)9.0000000}\quad \text{quotient } 0.6428571$$

$$\begin{array}{r} 9.0000000 \\ -\ 0 \\ \hline 90 \\ -\ 84 \\ \hline 60 \\ -\ 56 \\ \hline 40 \\ -\ 28 \\ \hline 120 \\ -\ 112 \\ \hline 80 \\ -\ 70 \\ \hline 100 \\ -\ 98 \\ \hline 20 \\ -\ 14 \\ \hline 6 \end{array}$$

$$\therefore \quad \frac{9}{14} = \mathbf{0.6\overline{428571}}$$

iv. −1035

$$5\overline{)103.0}\quad \text{quotient } 20.6$$

$$\begin{array}{r} 103.0 \\ -\ 10 \\ \hline 03 \\ -\ 0 \\ \hline 30 \\ -\ 30 \\ \hline 0 \end{array}$$

$$\therefore \quad \frac{103}{5} = 20.6$$

$$\therefore \quad -\frac{103}{5} = \mathbf{-20.6}$$

V. −1113

$$\begin{array}{r} 0.846153 \\ 13\overline{)11.000000} \\ -\underline{0} \\ 110 \\ -\underline{104} \\ 60 \\ -\underline{52} \\ 80 \\ -\underline{78} \\ 20 \\ -\underline{13} \\ 70 \\ -\underline{65} \\ 50 \\ -\underline{39} \\ 11 \end{array}$$

$$\therefore \quad \frac{11}{13} = 0.\overline{846153}$$

$$\therefore \quad -\frac{11}{13} = -\mathbf{0.\overline{846153}}$$

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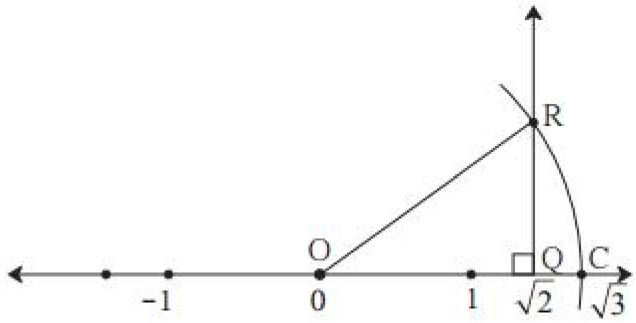
Practice Set 1.4 8th Std Maths Answers Chapter 1 Rational and Irrational Numbers

Question 1.
The number √2 is shown on a number line. Steps are given to show √3 on the number line using √2. Fill in the boxes properly and complete the activity.



The point Q on the number line shows the number ……….
A line perpendicular to the number line is drawn through the point Q. Point R is at unit distance from Q on the line.
Right angled ΔOQR is obtained by drawing seg OR.
l(OQ) = √2, l(QR) = 1
∴By Pythagoras theorem,
$[l(OR)]^2 = [l(OQ)]^2 + [l(QR)]^2$

$$= \boxed{}^2 + \boxed{}^2 = \boxed{} + \boxed{}$$

$$= \boxed{} \qquad \therefore l(OR) = \boxed{}$$

Draw an arc with centre O and radius OR. Mark the point of intersection of the line and the arc as C. The point C shows the number √3
Solution:
The point Q on the number line shows the number √2
A line perpendicular to the number line is drawn through the point Q. Point R is at unit distance from Q on the line.
Right angled ΔOQR is obtained by drawing seg OR.
l(OQ) = √2, l(QR) = 1
∴By Pythagoras theorem,
$[l(OR)]^2 = [l(OQ)]^2 + [l(QR)]^2$

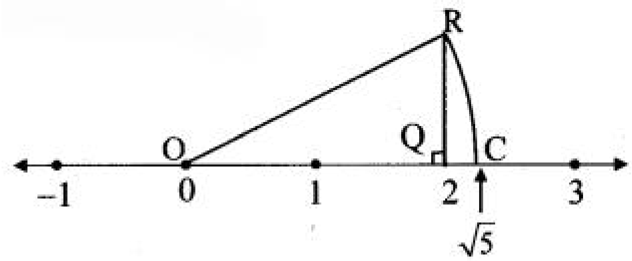
$$= \boxed{\sqrt{2}}^2 + \boxed{1}^2$$

$$= \boxed{2} + \boxed{1} = \boxed{3}$$

$$\therefore \quad l(OR) = \boxed{\sqrt{3}}$$

.. .[Taking square root of both sides]
Draw an arc with centre O and radius OR. Mark the point of intersection of the line and the arc as C. The point C shows the number √3.

Question 2.
Show the number √5 on the number line.
Solution:
Draw a number line and take a point Q at 2
such that l(OQ) = 2 units.
Draw a line QR perpendicular to the number line through the point Q such that l(QR) = 1 unit.
Draw seg OR.
ΔOQR formed is a right angled triangle.
By Pythagoras theorem,
$[l(OR)]^2 = [l(OQ)]^2 + [l(QR)]^2$
$= 2^2 + 1^2$
$= 4 + 1$
$= 5$
∴l(OR) = √5 units
...[Taking square root of both sides]
Draw an arc with centre O and radius OR. Mark the point of intersection of the number line and arc as C. The point C shows the number √5.



Question 3.
Show the number √7 on the number line.
Solution:
Draw a number line and take a point Q at 2 such that l(OQ) = 2 units.
Draw a line QR perpendicular to the number line through the point Q such that l(QR) = 1 unit.
Draw seg OR.
ΔOQR formed is a right angled triangle.
By Pythagoras theorem,
$[l(OR)]^2 = [l(OQ)]^2 + [l(QR)]^2$
$= 2^2 + 1^2$
$= 4 + 1$
$= 5$
∴ l(OR) = √5 units
... [Taking square root of both sides]
Draw an arc with centre O and radius OR.
Mark the point of intersection of the number line and arc as C. The point C shows the number √5.
Similarly, draw a line CD perpendicular to the number line through the point C such that l(CD) = 1 unit.
By Pythagoras theorem,
l(OD) = √6 units
The point E shows the number √6 .

Similarly, draw a line EP perpendicular to the number line through the point E such that l(EP) = 1 unit.

By Pythagoras theorem,

l(OP) = √7 units

The point F shows the number √7.