MATHS

BOOKS - SWAN PUBLICATION

NUMBER SYSTEMS

Exercise 1 1

1. Is zero a ratonal number ? Can you write it in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$?

2. Find six rotational numbers between 3 and 4.

3. Find five rational numbers between $\frac{3}{5}$ and $\frac{4}{5}$.

4. State whether the following statements are true or false. Give reasons for your answers:-

Every natural number is a whole number.

5. State whether the following statements are true. or false. Give reasons for your answers.

Every rational number is a whole number.

6. State whether the following statements are true or false. Give reasons for your answers:-

Every natural number is a whole number.

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Exercise 1 2

1. Are the following statement true and false ? Justify your answer. Every irrational number is a real number.

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2. Are the following statement true and false ? Justify your answer. Every point on the number line is of the form $\sqrt{m}$, where m is a natural number.

3. Are the following statement true and false ? Justify your answer. Every real number is a irrational number.

4. Are the square root of all positive integers irrational ? If no, give an example of the square root of a number that is a rational numebr.

5. Show how $\sqrt{5}$ can be represented on the number line.

1. Write the following in decimal form and say what kind of decimal expansion each has :
$\dfrac{36}{100}$.

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2. Write the following in decimal form and say what kind of decimal expansion each has : $\dfrac{1}{11}$

3. Write the following in decimal form and say what kind of decimal expansion each has : $4\dfrac{1}{8}$

4. Write the following in decimal form and say what kind of decimal expansion each has : $\dfrac{3}{13}$.

5. Write the following in decimal form and say what kind of decimal expansion each has : $\dfrac{2}{11}$

6. Write the following in decimal form and say what kind of decimal expansion each has : $\dfrac{329}{400}$

7. You know that $\frac{1}{7} = 0.\overline{142857}$. Can you predict what the decimal expansions of $\frac{2}{7}x\frac{3}{7}, \frac{4}{7}, \frac{5}{7}, \frac{6}{7}$ are without actually doing the long division? If so how?

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8. Express the following in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$:- $0.\overline{6}$

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9. Express the following in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$:- $0.4\bar{7}$

10. Express the following in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$:- $0.\overline{001}$

11. Express 0.99999....... in the form $\dfrac{P}{q}$. Are you surprised by your answer ? Discuss why the answer makes sense with your teacher and classmates.

12. What is the maximum number of digits in the repeating block of digits in the quotient while computing $\dfrac{1}{17}$? Perform the division to check your answer.

13. Look at several examples of rational numbers in the form $\dfrac{P}{q}(q \neq 0)$, where p and q are integers with no common factors other than 1 and having terminating decimal representations (expansions). Can you guess what property q must satisfy ?

14. Write three numbers whose decimal expansions are non-terminating non-recurring.

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15. Find three different irrational numbers between the rational numbers $\dfrac{5}{7}$ and $\dfrac{9}{11}$.

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16. Classify the following number as rational or irrational : $\sqrt{23}$

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17. Classify the number as rational or irrational $\sqrt{225}$

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18. Classify the following number as rational or irrational : 0.3796

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19. Classify the following number as rational or irrational : 7.478478...

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20. Classify the following number as rational or irrational : 1.101001000100001...

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1. Visualise 3.765 on the number line, using successive magnification.

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1. Classify the following numbers as rational or irrational : $2 - \sqrt{5}$

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2. Classify the following numbers as rational or irrational : $\left(3 + \sqrt{23}\right) - \sqrt{23}$.

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3. Classify the following number as rational or irrational: $\dfrac{2\sqrt{7}}{7\sqrt{7}}$

4. Classify the following numbers as rational or irrational : $\dfrac{1}{\sqrt{2}}$.

5. Classify the following numbers as rational or irrational : 2π.

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6. Simplify each of the following expressions:

$$\left(3 + \sqrt{3}\right)\left(2 + \sqrt{2}\right)$$

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7. Simplify each of the following expressions:

$$\left(3 + \sqrt{3}\right)\left(3 - \sqrt{3}\right)$$

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8. Simplify each of the following expressions:

$$\left(\sqrt{5} + \sqrt{2}\right)^2$$

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9. Simplify each of the following expressions:

$$\left(\sqrt{5} - \sqrt{2}\right)\left(\sqrt{5} + \sqrt{2}\right)$$

10. Recall, π is defined as the ratio of the circumference (say c) of a circle to its diameter(say d). That is, $\pi = \dfrac{c}{d}$. This seems to contradict the fact that π is irrational. How will you resolve this contradiction?

11. Represent $\sqrt{9.3}$ on the number line.

12. Rationalise the denominators of the

$$\frac{1}{\sqrt{7}}$$

13. Rationalise the denominators of the

$$\frac{1}{\sqrt{7} - \sqrt{6}}$$

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14. Rationalise the denominators of the

$$\frac{1}{\sqrt{5} + \sqrt{2}}$$

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15. Rationalise the denominator of the following: $\dfrac{1}{\sqrt{7} - 2}$

Exercise 16

1. Find : $64^{\frac{1}{2}}$.

2. Find : $32^{\frac{1}{5}}$.

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3. Find : $125^{\frac{1}{3}}$.

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4. Find : $9^{\frac{3}{2}}$.

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5. Find : $32^{\frac{2}{5}}$.

6. Find : $16^{\frac{3}{4}}$.

7. Find : $125^{-\frac{1}{3}}$

8. Simplify : $2^{\frac{2}{3}} \cdot 2^{\frac{1}{5}}$

9. Find $\left(\dfrac{1}{3^3} \right)^7$

10. Find $\dfrac{11^{\frac{1}{2}}}{11^{\frac{1}{4}}}$

11. Simplify : $7^{\frac{1}{2}} \cdot 8^{\frac{1}{2}}$

Objective Type Questions

1. State whether the statement are true (T) or false (F):

Any number which can be written in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$ is called rational number.

2. Every Whole number is Natural number?

3. State whether the statement are true (T) or false (F):

Every rational number is an integer.

4. State whether the statement are true (T) or false (F):

There are infinitely many rational numbers between any two given rational numbers .

5. State whether the statement are true (T) or false (F):

Zero is a rational number.

6. State whether the statement are true (T) or false (F):

A number s is called irrational if it canot be written in the form $\dfrac{p}{q}$, where p and q are integers and $q \neq 0$.

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7. State whether the statement are true (T) or false (F):

A number is irrational if and only if its decimal

representation is non terminating and non repeating.

8. State whether the statement are true (T) or false (F):

Every natural number is a whole number.

9. State whether the statement are true (T) or false (F):

A number where decimal expansion is terminating or non-terminating recurring is rational

10. State whether the statement are true (T) or false (F):

The decimal representation of $\dfrac{10}{3}$ is terminating recurring.

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11. Fill in the Blanks

Every integer is a ………………

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12. Fill in the Blanks

Collection of all rational nubers and irrational

numbers together make up of ....

13. Fill in the Blanks

Every irrational number is a ....

14. Fill in the Blanks

A number whose decimal expansion is non-terminating non-recurring is ....

15. Fill in the Blanks

The sum of difference of a rational number and an irrational number is ....

16. Fill in the Blanks

If $a > 0$ be a real number and p and q be

rational number then

$$\frac{a^p}{a^q} = \ldots\ldots\ldots$$

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17. Fill in the Blanks

If $a > 0$ be a real number and p and q be

rational number then

$$(a^p)^q = \ldots\ldots\ldots$$

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18. Check whether $7\sqrt{5}$ are irrational numbers or not.

19. Check whether $\dfrac{7}{\sqrt{5}}$ are irrational numbers or not.

20. Check whether $\sqrt{2} + 21$ are irrational numbers or not.

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21. Check whether $\pi - 2$ are irrational numbers or not.

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22. Add $2\sqrt{2} + 5\sqrt{3}$ and $\sqrt{2} - 3\sqrt{3}$.

23. Multiple $6\sqrt{5}$ by$2\sqrt{5}$.

24. Divide $8\sqrt{15} by 2\sqrt{3}$.

25. Rationalise the denominator of $\dfrac{1}{\sqrt{2}}$.

26. On rationalising the denominator of $\dfrac{1}{2 + \sqrt{3}}$ we get :

27. Solve $17^2 . 17^{-5}$

28. Solve $\left(5^2\right)^{-7}$

29. Solve $\dfrac{23^{-10}}{23^7}$

30. Solve $(7)^{-3} \cdot (9)^{-3}$

31. Solve $2^{\frac{2}{3}}2^{\frac{1}{3}}$

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32. Simplify $\left(3^{\frac{1}{5}}\right)^{4}$

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33. Solve $\dfrac{7^{\frac{1}{5}}}{7^{\frac{1}{3}}}$

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34. Solve $13^{\frac{1}{5}} \cdot 17^{\frac{1}{5}}$