MATHS

BOOKS - CAMBRIDGE MATHS (KANNADA ENGLISH)

NUMBER SYSTEMS

Exercise 1 1

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

$q \neq 0$?

A.

B.

C.

D.

Answer:

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2. Find six rational numbers between 3 and 4.

A.

B.

C.

D.

Answer: $\Rightarrow \dfrac{22}{7}, \dfrac{23}{7}, \dfrac{24}{7}, \dfrac{25}{7}, \dfrac{26}{7}$ **and** $\dfrac{27}{7}$

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

A.

B.

C.

D.

Answer: $\dfrac{19}{30}, \dfrac{2}{3}, \dfrac{7}{10}, \dfrac{11}{15}$ **and** $\dfrac{23}{30}$

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

(i) Every natural number is a whole number.

(ii) Every integer is a whole number.

(iii) Every rational number is a whole number.

A.

B.

C.

D.

Answer: (i) true (ii) false (iii) false

1. State whether the following statements are true or false. Justify your answers.

(i) Every irrational number is a real number.

(ii) Every point on the number line is of the form where m is a natural number.

(iii) Every real number is an irrational number.

A.

B.

C.

D.

Answer: (i) true (ii) wrong (iii) wrong.

2. Are the square roots of all positive integers irrational ? If not give an example of the square root of a number that is a rational number

A.

B.

C.

D.

Answer: The above statement is wrong

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

A.

B.

C.

D.

Answer: N/A

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Exercise 1 3

1. Write the following in decimal form and say

what kind of decimal expansion each has:

(i) $\dfrac{36}{100}$

(ii) $\dfrac{1}{11}$

(iii) $4\dfrac{1}{8}$

(iv) $\dfrac{3}{13}$

(v) $\dfrac{2}{11}$

(vi) $\dfrac{329}{400}$

A.

B.

C.

D.

Answer: (i) 0.36

(ii) $0.\overline{09}$

(iii) 4.125

(iv) $0.\overline{230769}$

(v) $0.\overline{18}$

(vi) 0.8225

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

A.

B.

C.

D.

Answer: (i) $0.\overline{285714}$

(ii) $0.\overline{428571}$

(iii) $0.\overline{571428}$

(iv) $0.\overline{714285}$

(v) $0.\overline{857142}$

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3. Express the following in the form $\dfrac{p}{q}$ where p

and q are integers and $q \neq 0$.

(i) $0.\overline{6}$ $(ii)\,0.4\overline{7}$ $(iii)\,0.\overline{001}$

A.

B.

C.

D.

Answer: (i) $x = \dfrac{2}{3}$

(ii) $x = \dfrac{43}{90}$

(iii) $x = \dfrac{1}{999}$

4. Express 0.9999.... In the form $\dfrac{p}{q}$ are you surprised by your answer ? With your teacher and classmates discuss why the answer makes sense

A.

B.

C.

D.

Answer: $0.9999 = 1$

5. what can the maximum number of digits be in the repeating block of digits in the decimal expansion of $\dfrac{1}{17}$?

A.

B.

C.

D.

Answer:

6. Look at several example of rational numbers in the form $\dfrac{p}{q}$ 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?

A.

B.

C.

D.

Answer:

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

A.

B.

C.

D.

Answer:

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

A.

B.

C.

D.

Answer: $\therefore$ The three irrational numbers between $\dfrac{5}{7}$ and $\dfrac{9}{11}$ are.

I. $0.76076007600076\ldots\ldots\ldots\ldots$.

ii. $0.781781178111781111\ldots\ldots\ldots\ldots$

iii. $0.790790079000790000\ldots\ldots\ldots\ldots$

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9. Classify the following numbers as rational or irrational:

(i) $\sqrt{23}$

(ii) $\sqrt{225}$

(iii) 0.3796

(iv) 7.478478

(v) $1.101001000100001\ldots$

    A.

    B.

    C.

D.

Answer: (i) irrational number.

(ii) rational number

(iii) rational number

(iv) rational number.

(v) irrational number.

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Exercise 1 4

1. Visualise 3.765 on the number line using successive magnification

A.

B.

C.

D.

Answer:

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2. Visualise $4.\overline{26}$ on the number line upto 4 decimal places

A.

B.

C.

D.

Answer:

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1. Classify the following numbers as rational or irrational:

(i) $2 - \sqrt{5}$

(ii) $\left(3 + \sqrt{23}\right) - \sqrt{23}$

(iii) $\dfrac{2\sqrt{7}}{7\sqrt{7}}$

(iv) $\dfrac{1}{\sqrt{2}}$

(v) 2π

A.

B.

C.

D.

Answer: (i) irrational number

(ii) rational number.

(iii) rational number.

(iv) irrational number.

(v) irrational number.

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2. Simplify each of the following expressions:

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

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

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

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

A.

B.

C.

D.

Answer: (i) $6 + 3\sqrt{2} + 2\sqrt{3} + \sqrt{6}$

(ii) 6

(iii) $7 + 2\sqrt{10}$

(iv) 3

3. Real π is defined as the ratio of the circumference (say c) of a circle to its diameter (say d) i.e $\pi = \dfrac{c}{d}$ this seems to contradict the fact that π is irrational how will you resolve this contradication ?

A.

B.

C.

D.

Answer: This has a non-terminating terminal expansion .

4. Rationalise the denominators of the following :

(i) $\dfrac{1}{\sqrt{7}}$

(ii) $\dfrac{1}{\sqrt{7} - \sqrt{6}}$

(iii) $\dfrac{1}{\sqrt{5} + \sqrt{2}}$

(iv) $\dfrac{1}{\sqrt{7} - 2}$

A.

B.

C.

D.

Answer: $\dfrac{\sqrt{7}}{7}$

(ii) $\sqrt{7} + \sqrt{6}$

(iii) $\dfrac{\sqrt{5} - \sqrt{2}}{3}$

(iv) $\dfrac{\sqrt{7} + 2}{3}$

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1. Find:

(i) $64^{\frac{1}{2}}$

(ii) $32^{\frac{1}{5}}$

(iii) $(125)^{\frac{1}{3}}$

    A.

    B.

    C.

    D.

Answer: (i) 8

(ii) 2

(iii) 5

2. Find:

(i) $9^{\frac{3}{2}}$

(ii) $(32)^{\frac{2}{5}}$

(iii) $16^{\frac{3}{4}}$

(iv) $(125)^{-\frac{1}{3}}$

A.

B.

C.

D.

Answer: **(i) 27**

(ii) 4

(iii) 8

(iv) $\dfrac{1}{5}$

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3. Simplify :

(i) $2^{\frac{2}{3}} \times 2^{\frac{1}{5}}$

(ii) $\left(\dfrac{1}{3^3}\right)^7$

(iii) $\dfrac{11^{\frac{1}{2}}}{11^{\frac{1}{4}}}$

(iv) $7^{\frac{1}{2}} \cdot 8^{\frac{1}{2}}$

A.

B.

C.

D.

Answer: (i) $2^{\frac{13}{15}}$

(ii) 3^{-21}

(iii) $11^{\frac{1}{4}}$

(iv) $56^{\frac{1}{2}}$

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