



# MATHS

## BOOKS - NCERT MATHS (ENGLISH)

### NUMBER SYSTEMS

#### Multiple Choice Questions

1. Every rational number is ?

A. a natural number

B. an integer

C. a real number

D. a whole number

**Answer: C**



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**2. Between two rational numbers**

A. there is no rational number

B. there is exactly one rational number

C. there are infinitely many rational number

D. there are only rational numbers and no irrational numbers

**Answer: C**



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**3. Decimal representation of a rational cannot be**

A. terminating

B. non-terminating

C. non-terminating repeating

D. non-terminating non- repeating

**Answer: D**



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**4.** The product of any two irrational numbers is

is

A. always an irrational number

B. always a rational number

C. always an integer

D. sometimes rational, sometimes  
irrational

**Answer: D**



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5. The decimal expansion of the number  $\sqrt{2}$  is

A. a finite decimal

B. 1.41421.... .

C. terminating after 6 digits

D. non-terminating repeating

**Answer: B**



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**6. Which of the following irrational ?**

A.  $\sqrt{\left(\frac{4}{9}\right)}$

B.  $\frac{\sqrt{12}}{\sqrt{3}}$

C.  $\sqrt{7}$

D.  $\sqrt{81}$

**Answer: C**



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7. Which of the following is irrational?

A. 0.14

B.  $0.14\overline{16}$

C.  $0.\overline{1416}$

D. 0.4014001400014.....

**Answer: D**



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**8.** A rational number between  $\sqrt{2}$  and  $\sqrt{3}$  is

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

B.  $\left( \frac{\sqrt{2} \cdot \sqrt{3}}{2} \right)$

C. 1.5



D. 1.6

**Answer: C**



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9. The value of  $1.999\dots$  in the form of  $\frac{p}{q}$ , where  $p$  and  $q$  are integers and  $q \neq 0$ , is

A.  $\frac{19}{10}$

B.  $\frac{1999}{1000}$

C. 2

D.  $\frac{1}{9}$

**Answer: B**



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**10.** The value of  $2\sqrt{3} + \sqrt{3}$  is

A.  $2\sqrt{6}$

B. 6

C.  $3\sqrt{3}$

D.  $4\sqrt{6}$

**Answer: C**



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11.  $\sqrt{10} \cdot \sqrt{15}$  is equal to

A.  $6\sqrt{5}$

B.  $5\sqrt{6}$

C.  $\sqrt{25}$

D.  $10\sqrt{5}$

**Answer: B**



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12. The number obtained on rationalising the

denominator of  $\frac{1}{\sqrt{7} - 2}$  is

A.  $\frac{\sqrt{7} + 2}{3}$

B.  $\frac{\sqrt{2} - 2}{3}$

C.  $\frac{\sqrt{7} + 2}{5}$

D.  $\frac{\sqrt{7} + 2}{45}$

**Answer: A**





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13.  $\frac{1}{\sqrt{9} - \sqrt{8}}$  is equal?

A.  $\frac{1}{2}(3 - 2\sqrt{2})$

B.  $\frac{1}{3 + 2\sqrt{2}}$

C.  $3 - 2\sqrt{2}$

D.  $3 + 2\sqrt{2}$

**Answer: D**



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14. After rationalizing the denominator of

$$\frac{7}{3\sqrt{3} - 2\sqrt{2}}, \text{ we get the denominator as}$$

A. 13

B. 19

C. 5

D. 35

**Answer: B**



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15. Find the value of

$$\frac{\sqrt{32} + \sqrt{48}}{\sqrt{8} + \sqrt{12}}$$

A.  $\sqrt{2}$

B. 2

C. 4

D. 8

**Answer: B**



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16. If  $\sqrt{2} = 1.4142$ , then  $\sqrt{\frac{\sqrt{2} - 1}{\sqrt{2} + 1}}$  is equal to

A. 2.4142.....

B. 5.8282.....

C. 0.4142.....

D. 0.1718.....

**Answer: C**



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17.  $\sqrt[4]{\sqrt[3]{2^2}}$  equal to

A.  $2^{-\frac{1}{6}}$

B.  $2^{-6}$

C.  $2^{\frac{1}{6}}$

D.  $2^6$

**Answer: C**



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18. The product  $\sqrt[3]{2} \cdot \sqrt[4]{2} \cdot \sqrt[12]{32}$  equal to

A.  $\sqrt{2}$

B. 2

C.  $\sqrt[12]{2}$

D.  $\sqrt[12]{32}$

**Answer: B**



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19. The value of  $\sqrt[4]{(81)^{-2}}$  is

A.  $\frac{1}{9}$

B.  $\frac{1}{3}$

C. 9

D.  $-\frac{1}{9}$

**Answer: A**



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20.  $(256)^{0.16} \times (256)^{0.09} = ?$

A. 4

B. 16

C. 64

D. -4

**Answer: A**



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21. which of the following is equal to x ?

A.  $x^{\frac{12}{7}} - x^{\frac{5}{7}}$

B.  $\sqrt[12]{(x^4)^{\frac{1}{3}}}$

C.  $\left((x)^3\right)^{\frac{1}{3}}$

D.  $x^{\frac{12}{7}} \times x^{\frac{7}{12}}$

**Answer: C**



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## Short Answer Type Questions

1. Let  $x$  and  $y$  be rational and irrational numbers, respectively. Is  $x+y$  necessarily an irrational number?

A. True

B. False

C. Can not be determined

D. None of these

**Answer: A**



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2. If  $x$  is a rational number and  $y$  is an irrational number, then both  $x + y$  and  $xy$  are necessarily rational both  $x + y$  and  $xy$

are necessarily irrational  $xy$  is necessarily irrational, but  $x + y$  can be either rational or irrational  $x + y$  is necessarily irrational, but  $xy$  can be either rational or irrational



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3. State whether the following statements is false ?

A.  $\frac{\sqrt{2}}{3}$  is a rational number.

B. There are infinitely many rational numbers between any two integers.

C. Number of rational numbers between 15 and 18 is infinite.

D. Rational numbers are numbers which can be written in the form  $\frac{p}{q}$ ,  $q \neq 0$ ,  $p$  and  $q$  both are integers.

**Answer: A**



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4. Check which of the following numbers is rational .

A.  $\sqrt{\frac{9}{27}}$

B.  $\sqrt{196}$

C.  $(1 + \sqrt{5}) + (4 + \sqrt{5})$

D. 1.010010001...

**Answer: B**



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5. Find which of the variables  $x, y, z$  and  $u$  represent irrational numbers : (i)  $x^2 = 5$  (ii)  $y^2 = 9$  (iii)  $z^2 = 0.04$  (iv)  $u^2 = \frac{400}{4}$

A.  $z$

B.  $y$

C.  $x$

D.  $u$

**Answer: C**



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6. find three rational numbers between (i)  $-1$  and  $-2$  (ii)  $0.1$  and  $0.11$  (iii)  $\frac{5}{7}$  and  $\frac{6}{7}$  (iv)  $\frac{1}{4}$  and  $\frac{1}{5}$

A.  $-1$  and  $-2$

B.  $0.1$  and  $0.11$

C.  $\frac{5}{7}$  and  $\frac{6}{7}$

D.  $\frac{1}{4}$  and  $\frac{1}{5}$

**Answer:**



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7. Inset a rational number and an irrational number between the following

(i) 2 and 3 , (ii) 0 and 0.1, (iii)  $\frac{1}{3}$  and  $\frac{1}{2}$

(iv)  $\frac{-2}{5}$  and  $\frac{1}{2}$  , (v) 0.15 and 0.16 , (iv)

$\sqrt{6}$  and  $\sqrt{3}$

(vii) 2.357 and 3.121 , (vii) .0001 and .001

(ix) 3.623623 and 0.484848 , (x) 3.375289 and

6.375738



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8. Represent the following numbers on the number line  $7$ ,  $7.2$ ,  $-\frac{3}{2}$  and  $-\frac{12}{5}$



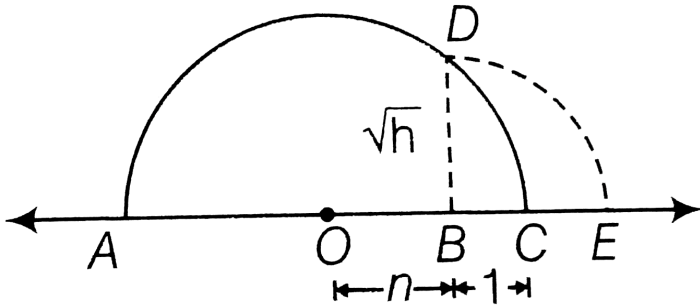
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9. Locate  $\sqrt{10}$  and  $\sqrt{17}$  on number line.



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10. Represent geometrically the following numbers on the number line



A.  $\sqrt{4.5}$

B.  $\sqrt{5.6}$

C.  $\sqrt{8.1}$

D.  $\sqrt{2.3}$

**Answer:**



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11. Express the following in the form  $\frac{P}{q}$  where  $p$  and  $q$  are integers and  $q \neq 0$ . (i) 0.2 , (ii) 0.888.... , (iii)  $5.\bar{2}$  (iv)  $0.\overline{001}$  , ( v) 0.2555.... ,(vi)  $0.1\bar{34}$  (vii) 0.00323232..... ,(viii) 0.404040...



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12. Show that  $0.142857142857..... = \frac{1}{7}$ .



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13. Simplify the following (i)

$$\sqrt{45} - 3\sqrt{20} + 4\sqrt{5} \quad \text{(ii)} \quad \frac{\sqrt{24}}{8} + \frac{\sqrt{54}}{9} \quad \text{(iii)}$$

$$\sqrt[4]{12} \times \sqrt[7]{6} \quad \text{(iv)} \quad 4\sqrt{28} \div 3\sqrt{7} \div \sqrt[3]{7} \quad \text{(v)}$$

$$3\sqrt{3} + 2\sqrt{27} + \frac{7}{\sqrt{3}} \quad \text{(vi)} \quad (\sqrt{3} - \sqrt{2})^2 \quad \text{(vii)}$$

$$\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32} + \sqrt{225} \quad \text{(viii)}$$

$$\frac{3}{\sqrt{8}} + \frac{1}{\sqrt{2}} \quad \text{(ix)} \quad \frac{2\sqrt{3}}{3} - \frac{\sqrt{3}}{6}$$



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14. Rationalise the denominator of the

following (i)  $\frac{2}{3\sqrt{3}}$ , (ii)  $\frac{\sqrt{40}}{\sqrt{3}}$ , (iii)  $\frac{3 + \sqrt{2}}{4\sqrt{2}}$



$$(iv) \frac{16}{\sqrt{41} - 5}, (v) \frac{2 + \sqrt{3}}{2 - \sqrt{3}}, (vi) \frac{\sqrt{6}}{\sqrt{2} + \sqrt{3}} \quad (vii)$$

$$\frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}, (viii) \frac{3\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}}, (ix) \frac{4\sqrt{3} + 5\sqrt{2}}{\sqrt{48} + \sqrt{18}}$$



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**15.** find the values of a and b in each of the following (i)  $(5+2\sqrt{3})/(7+4\sqrt{3}) = a-6\sqrt{3}$

(ii)  $(3-\sqrt{5})/(3+2\sqrt{5}) = a\sqrt{5} - (19/11)$  (iii)

$(\sqrt{2}+\sqrt{3})/(3\sqrt{2}-2\sqrt{3}) = 2-b\sqrt{6}$  (iv)

$(7+\sqrt{5})/(7-\sqrt{5}) - (7-\sqrt{5})/(7+\sqrt{5}) = a +$

$(7/11)b\sqrt{5}$

$$\text{A. } \frac{5 + 2\sqrt{3}}{7 + 4\sqrt{3}} = a - 6\sqrt{3}$$

$$\text{B. } \frac{3 - \sqrt{5}}{3 + 2\sqrt{5}} = a\sqrt{5} - \frac{19}{11}$$

$$\text{C. } \frac{\sqrt{2} + \sqrt{3}}{3\sqrt{2} - 2\sqrt{3}} = 2 - b\sqrt{6}$$

$$\text{D. } \frac{7 + \sqrt{5}}{7 - \sqrt{5}} - \frac{7 - \sqrt{5}}{7 + \sqrt{5}} = a + \frac{7}{11}\sqrt{5}b$$

**Answer:**



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**16.** if  $a = 2 + \sqrt{3}$ , then find the value of

$$\left(a - \frac{1}{a}\right).$$

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17. Rationalise the denominator in each of the following and hence evaluate by taking

$$\sqrt{2} = 1.414, \sqrt{3} = 1.732 \text{ and } \sqrt{5} = 2.236$$

upto three places of decimal.

$$(i) \frac{4}{\sqrt{3}}, (ii) \frac{6}{\sqrt{6}}, (iii) \frac{\sqrt{10} - \sqrt{5}}{2}$$

$$(iv) \frac{\sqrt{2}}{2 + \sqrt{2}}, (v) \frac{1}{\sqrt{3} + \sqrt{2}}$$



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## 18. simplify

$$(i) (1^3 + 2^3 + 3^3)^{\frac{1}{2}} \quad (ii) \left(\frac{3}{5}\right)^4 \left(\frac{8}{5}\right)^{-12} \left(\frac{32}{5}\right)^6,$$

$$(iii) \left(\frac{1}{27}\right)^{-\frac{2}{3}}$$

$$(vi) \left[ \left( (625)^{-\frac{1}{2}} \right)^{-\frac{1}{4}} \right]^2, (v) \frac{9^{\frac{1}{3}} \times 27^{-\frac{1}{2}}}{3^{\frac{1}{6}} \times 3^{-\frac{2}{3}}} (vi)$$

$$64^{-\frac{1}{3}} \left[ 64^{\frac{1}{3}} - 64^{\frac{2}{3}} \right]$$

$$\frac{8^{\frac{1}{3}} \times 16^{\frac{1}{3}}}{32^{-\frac{1}{3}}}$$



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Long Answer Type Questions

1. Express  $0.6 + 0.\bar{7} + 0.4\bar{7}$  in the form  $\frac{p}{q}$  where  $p$  and  $q$  are integers and  $q \neq 0$ .



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2.

Simplify

$$\frac{7\sqrt{3}}{\sqrt{10} + \sqrt{3}} - \frac{2\sqrt{5}}{\sqrt{6} + \sqrt{5}} - \frac{3\sqrt{2}}{\sqrt{15} + 3\sqrt{2}}$$



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3. if  $\sqrt{2} = 1.414$  and  $\sqrt{3} = 1.732$  then find the value of

$$\frac{4}{3\sqrt{3} - 2\sqrt{2}} + \frac{3}{3\sqrt{3} + 2\sqrt{2}}$$



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4. If  $a = \frac{3 + \sqrt{5}}{2}$  then find the value of  $a^2 + \frac{1}{a^2}$



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5. If  $x = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$  and  $y = \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$  then

find the value of  $x^2 + y^2$  ?



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6. Simplify:  $(256)^{-\left(4^{\left(\frac{-3}{2}\right)}\right)}$



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7.

Simplify:

$$\frac{4}{(216)^{-\frac{2}{3}}} + \frac{1}{(256)^{-\frac{3}{4}}} + \frac{2}{(243)^{-\frac{1}{5}}}$$



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