MATHS

NCERT - NCERT MATHEMATICS(BENGALI ENGLISH)

REAL NUMBERS

Example

1. Represent $\frac{5}{3}$ and $-\frac{5}{3}$ on the number line.

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2. Are the following statements True? Give reasons for your answers with an example.

Every rational number is an integer.

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3. Are the following statements True? Give reasons for your answers with an example.

Every integer is a rational number

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4. Are the following statements True? Give reasons for your answers with an example.

Zero is a rational number

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5. Find two rational numbers between 3 and 4 by mean method.

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6. Express $\frac{7}{16}, \frac{10}{7}$ and $\frac{2}{3}$ in decimal from.

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7. Express 3.28 in the form of $\frac{p}{q}$ (where p and q are intgers, $q \neq 0$).

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8. Express $1.\overline{62}$ in $\frac{p}{q}$ form where $q \neq 0, p, q$ are integers.

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9. Locate $\sqrt{2}$ on number line

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10. Locate $\sqrt{3}$ on number line

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11. Find any two irrational numbers between $\frac{1}{5}$ and $\frac{2}{7}$.

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12. Find an irrational number between 3 and 4.

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13. Examine, whether the following numbers are rational or irrational :

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

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14. Examine, whether the following numbers are rational or irrational :

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

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15. Examine, whether the following numbers are rational or irrational :

$\frac{10}{10\sqrt{5}}$

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16. Examine, whether the following numbers are rational or irrational :

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

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17. Visualise the representation of $3.5\bar{8}$ on the number line through successive magnification upto 4 decimal places.

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18. Check whether (i) $5\sqrt{2}$ (ii) $\frac{5}{\sqrt{2}}$ (iii) $21+\sqrt{3}$ (iv) $\pi+3$ are irrational numbers or not?

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19. Subtract $5\sqrt{3}+7\sqrt{5}$ from $3\sqrt{5}-7\sqrt{3}$

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20. Multiply $6\sqrt{3}$ with $13\sqrt{3}$

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21. Simplify the following expressions :

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

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22. Simplify the following expressions :

$(2+\sqrt{3})(2-\sqrt{3})$

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23. Simplify the following expressions :

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

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24. Simplify the following expressions :

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

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25. Find the square root of $5+2\sqrt{6}$

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26. Rationalise the denominator of $\frac{1}{4+\sqrt{5}}$

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27. If $x = 7 + 4\sqrt{3}$ then find the value of $x + \frac{1}{x}$

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28. Simiplify $\frac{1}{7+4\sqrt{3}}+\frac{1}{2+\sqrt{5}}$

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29. Simplify

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

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30. Simplify

$\left(5^{\frac{1}{7}}\right)^{4}$

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31. Simplify

$$\frac{3^{\frac{1}{5}}}{3^{\frac{1}{3}}}$$

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32. Simplify

$$7^{\frac{1}{17}}.11^{\frac{1}{17}}$$

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Do This

1. Represent $\frac{-3}{4}$ on the number line.

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2. Right $0, 7, 10, -4$ in $\frac{p}{q}$ form.

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3. Guess my number : Your friend chooses an integer between 0 and 100. You have to find out that number by asking questions, but your friend can answer only in 'yes' or 'no'. What strategy would you use?

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4. Find any five rational numbers between 2 and 3 using mean method.

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5. Find any 10 rational numbers between $-\frac{3}{11}$ and $\frac{8}{11}$.

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6. Express (i) $\frac{1}{17}$ (ii) $\frac{1}{19}$ in decimal form.

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7. Find rationalising factors of the denominators of $\frac{1}{2\sqrt{3}}$

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8. Find rationalising factors of the denominators of $\frac{3}{\sqrt{5}}$

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9. Find rationalising factors of the denominators of $\frac{1}{\sqrt{8}}$

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10. Simplify :

$(16)^{\frac{1}{2}}$

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11. Simplify :

$(128)^{\frac{1}{7}}$

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12. Simplify :

$(343)^{\frac{1}{5}}$

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13. Write the following surds in exponential form

$\sqrt{2}$

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14. Write the following surds in exponential form

$\sqrt[3]{9}$

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15. Write the following surds in exponential form

$\sqrt[5]{20}$

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16. Write the following surds in exponential form

$\sqrt[17]{19}$

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17. Write the surds in radical form:

$5^{\frac{1}{7}}$

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18. Write the surds in radical form:

$17^{\frac{1}{6}}$

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19. Write the surds in radical form:

$5^{\frac{2}{3}}$

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20. Write the surds in radical form:

$142^{\frac{1}{2}}$

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Try These

1. Find the decimal values of the following:

$\frac{1}{2}$

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2. Find the decimal values of the following:

$$\frac{1}{2^2}$$

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3. Find the decimal values of the following:

$$\frac{1}{5}$$

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4. Find the decimal values of the following:

$$\frac{1}{5 \times 2}$$

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5. Find the decimal values of the following:

$$\frac{3}{10}$$

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6. Find the decimal values of the following:

$$\frac{27}{25}$$

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7. Find the decimal values of the following:

$\frac{1}{3}$

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8. Find the decimal values of the following:

$\frac{7}{6}$

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9. Find the decimal values of the following:

$$\frac{5}{12}$$

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10. Find the decimal values of the following:

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

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11. Find the value of $\sqrt{3}$ upto six decimals.

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12. Locate $\sqrt{5}$ and $-\sqrt{5}$ on number line.

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Think Discuss And Write

1. Kurthi said $\sqrt{2}$ can be written $\frac{\sqrt{2}}{1}$ which is in $\frac{p}{q}$ form. So $\sqrt{2}$ is a rational number. Do you agree with her argument?

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Exercise 1 1

1. (a) Write any three rational numbers


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2. (b) Explain rational number in your own words.


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3. Give one example each to the following statements.

i. A number which is rational but not an integer

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4. Give one example each to the following statements.

ii. A whole number which is not a natural number

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5. Give one example each to the following statements.

iii. An integer which is not a whole number

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6. Give one example each to the following statements.

iv. A number which is natural number, whole number, integer and rational number.

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7. Give one example each to the following statements.

v. A number which is an integer but not a natural number.

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8. Find five rational numbers between 1 and 2.

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9. Insert three rational numbers between $\frac{3}{5}$ and $\frac{2}{3}$

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10. Represent $\frac{8}{5}$ and $\frac{-8}{5}$ on the number line

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11. Express the following rational numbers in decimal form.

$$\frac{242}{1000}$$

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12. Express the following rational numbers in decimal form.

$$\frac{354}{500}$$

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13. Express the following rational numbers in decimal form.

$\frac{2}{5}$

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14. Express the following rational numbers in decimal form.

$\frac{115}{4}$

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15. Express the following rational numbers in decimal form.

$$\frac{2}{3}$$

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16. Express the following rational numbers in decimal form.

$$-\frac{25}{36}$$

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17. Express the following rational numbers in decimal form.

$\frac{22}{7}$

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18. Express the following rational numbers in decimal form.

$\frac{11}{9}$

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19. Express each of the following decimals in $\frac{p}{q}$ form where $q \neq 0$ and p, q are integers

0.36

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20. Express each of the following decimals in $\frac{p}{q}$ form where $q \neq 0$ and p, q are integers

15.4

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21. Express each of the following decimals in $\frac{p}{q}$ form where $q \neq 0$ and p, q are integers

10.25

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22. Express each of the following decimals in $\frac{p}{q}$ form where $q \neq 0$ and p, q are integers

3.25

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23. Express each of the following decimal numbers in $\frac{p}{q}$ form

$0.\bar{5}$

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24. Express each of the following decimal numbers in $\frac{p}{q}$ form

$3.\bar{8}$

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25. Express each of the following decimal numbers in $\frac{p}{q}$ form

$0.\overline{36}$

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26. Express each of the following decimal numbers in $\frac{p}{q}$ form

$3.127\bar{7}$

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27. Without actually dividing find which of the following are terminating decimals.

$$\frac{3}{25}$$

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28. Without actually dividing find which of the following are terminating decimals.

$$\frac{11}{18}$$

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29. Without actually dividing find which of the following are terminating decimals.

$$\frac{13}{20}$$

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30. Without actually dividing find which of the following are terminating decimals.

$$\frac{41}{42}$$

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Exercise 1 2

1. Classify the following numbers as rational or irrational.

$\sqrt{27}$

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2. Classify the following numbers as rational or irrational.

$\sqrt{441}$

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3. Classify the following numbers as rational or irrational.

$30.2323342345\ldots$

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4. Classify the following numbers as rational or irrational.

$7.484848\ldots$

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5. Classify the following numbers as rational or irrational.

11.21132435465

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6. Classify the following numbers as rational or irrational.

$0.3030030003\ldots$

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7. Give four examples for rational and irrational numbers?

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8. Find an irrational number between $\frac{5}{7}$ and $\frac{7}{9}$. How many more there may be?

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9. Find two irrational numbers between 0.7 and 0.77

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10. Find the value of $\sqrt{5}$ upto 3 decimal places.

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11. Find the value of $\sqrt{7}$ up to six decimal places by long division method.

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12. Locate $\sqrt{10}$ on the number line.

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13. Find atleast two irrational numbers between 2 and 3.

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

(i) Every irrational number is a real number.

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

(ii) Every rational number is a real number.

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

(iii) Every real number need not be a rational number

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

(iv) n is not irrational if n is a perfect square.

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

(v) $\sqrt{n}$ is irrational if n is not a perfect square.

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

(vi) All real numbers are irrational.

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Exercise 1 3

1. Visualise 2.874 on the number line, using successive magnification.

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2. Visualise $5.\overline{28}$ on the number line, upto 3 decimal places.

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Exercise 1 4

1. Simplify the following expressions.

$$(5+\sqrt{7})(2+\sqrt{5})$$

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2. Simplify the following expressions.

$$(5+\sqrt{5})(5-\sqrt{3})$$

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3. Simplify the following expressions.

$$(\sqrt{3}+\sqrt{7})^2$$

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4. Simplify the following expressions.

$$(\sqrt{11}+\sqrt{7})(\sqrt{11}+\sqrt{7})$$

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5. Classify the following numbers as rational or irrational.

$5 - \sqrt{3}$

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6. Classify the following numbers as rational or irrational.

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

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7. Classify the following numbers as rational or irrational.

$(\sqrt{2}-2)^2$

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8. Classify the following numbers as rational or irrational.

$$\frac{2\sqrt{7}}{7\sqrt{7}}$$

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9. Classify the following numbers as rational or irrational.

2π

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10. Classify the following numbers as rational or irrational.

$$\frac{1}{\sqrt{3}}$$

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11. Classify the following numbers as rational or irrational.

$(2+\sqrt{2})(2-\sqrt{2})$

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12. In the following equations, find whether variables x, y, z etc. represent rational or irrational numbers

$x^2 = 7$

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13. In the following equations, find whether variables x, y, z etc. represent rational or irrational numbers

$y^2 = 16$

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14. In the following equations, find whether variables x, y, z etc. represent rational or irrational numbers

$z^2 = 0.02$

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15. In the following equations, find whether variables x, y, z etc. represent rational or irrational numbers

$u^2 = \frac{17}{4}$

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16. In the following equations, find whether variables x, y, z etc. represent rational or

irrational numbers

$w^2 = 27$

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17. In the following equations, find whether variables x, y, z etc. represent rational or irrational numbers

$t^4 = 256$

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18. Every surd is an irrational, but every irrational need not be a surd. Justify your answer.

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19. Rationalise the denominators of the following:

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

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20. Rationalise the denominators of the following:

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

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21. Rationalise the denominators of the following:

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

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22. Rationalise the denominators of the following:

$$\frac{\sqrt{6}}{\sqrt{3}-\sqrt{2}}$$

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23. Simplify each of the following by rationalising the denominator:

$$\frac{6-4\sqrt{2}}{6+4\sqrt{2}}$$

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24. Simplify each of the following by rationalising the denominator:

$$\frac{\sqrt{7}-\sqrt{5}}{\sqrt{7}+\sqrt{5}}$$

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25. Simplify each of the following by rationalising the denominator:

$$\frac{1}{3\sqrt{2}-2\sqrt{3}}$$

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26. Simplify each of the following by rationalising the denominator:

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

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27. Find the value of $\frac{\sqrt{10}-\sqrt{5}}{2\sqrt{2}}$ upto three decimal places. (take $\sqrt{2}=1.414$ and $\sqrt{5}=2.236$)

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28. Find:

$64^{\frac{1}{6}}$

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29. Find:

$32^{\frac{1}{5}}$

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30. Find:

$625^{\frac{1}{4}}$

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31. Find:

$16^{\frac{3}{2}}$

Watch Video Solution

32. Find:

$243^{\frac{2}{5}}$

Watch Video Solution

33. Find:

$(46656)^{\frac{-1}{6}}$

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34. Simplify : $\sqrt[4]{81} - 8\sqrt[3]{343} + 15\sqrt[5]{32} + \sqrt{225}$

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35. If 'a' and 'b' are rational numbers, find the value of a and b in each of the following

equations.

$$\frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} = a + b\sqrt{6}$$

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36. If 'a' and 'b' are rational numbers, find the value of a and b in each of the following equations.

$$\frac{\sqrt{5}+\sqrt{3}}{2\sqrt{5}-3\sqrt{3}} = a - b\sqrt{15}$$

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37. Find the square root of $11 + 2\sqrt{30}$

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