Pakistan School
Kingdom of Bahrain

Assalamo – alikum and very good morning to you all

Exercise 2.3 page (45)

Objectives :at the end of today topic students will be able to :

(i)Explain the concept of radicals and radicands

(ii)Differentiate between radical form and exponential form of an expression.

(iii)Transform an expression given in radical form to an exponential form and vice versa.

Engaging starter : this symbol is $\sqrt{}$ stands for

(ii) $\sqrt[n]{a}$ is called ……. While the real number a stands for …

Exercise 2.3

Write each radical expression in exponential notation and each exponential expression in radical notation. Do not simplify.

(i) $= \sqrt[3]{-64} = (-64)^{\frac{1}{3}}$

(ii) $2^{\frac{3}{5}} = (2)^{3^{1/5}} = \sqrt[5]{2^3}$

(iii) $-7^{\frac{1}{3}} = \sqrt[3]{-7}$

Tell whether the following statements are true or false?

$(i) 5^{1/3} = \sqrt{5}$ (false)

$(ii) 2^{2/3} = \sqrt[3]{4}$ (true)

Q:3 Simplify the following radical expressions.

(i) $\sqrt[3]{-125}$

Solution :=$(-125)^{1/3}$

$=(-5^3)^{1/3}$ = -5 ans

(ii) = $\sqrt[4]{32}$

Solution : $32^{1/4}$

$=(2 \times \ 2 \times \ 2 \times \ 2 \times \ 2)^{1/4}$

$=(2^{4\times} \ \ 2)^{1/4}$

$= (2^4)^{1/4} \times 2^{1/4}$

$= 2 \text{ x } 2^{1/4}$

$= 2 \sqrt[4]{2}$

(iii) $\sqrt[5]{\frac{3}{32}}$

Solution : since $\sqrt[5]{\frac{3}{32}} = \left(\frac{3}{32}\right)^{1/5}$

$$\frac{(3)^{1/5}}{(32)^{1/5}} = \frac{\sqrt[5]{3}}{(2^5)^{1/5}}$$

$$= \frac{\sqrt[5]{3}}{2} \text{ ans}$$

Home work : Q 1 P(IV) Q 2 P(IV) and Q3 P (iv)

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Exercise 2.4 Page (46)

Objective: at the end of today topic students will be able to :

(i)Apply the laws of exponents to simplify expressions with real exponents.

Engaging starter : (I) a^m which one is base

(II) a^0 = ?

Q :1 Use laws of exponents to simplify:

$$(i)\ \frac{(243)^{-2/3}\ (32)^{-1/5}}{\sqrt{(196)^{-i}}}$$

Solution

$$:\frac{(3\times\ 3\times\ 3\times\ 3\times\ 3)^{-2/3}\ (2\times\ 2\times\ 2\times\ 2\times\ 2)^{-1/5}}{(14\times\ 14)^{-1/2}}$$

$$\frac{(3^3)^{-2/3}\ (3^2)^{-2/3}\ (2^5)^{-1/5}}{(14^2)^{-1/2}}$$

$$\frac{3^{-2}\ \ 3^{-4/3}\ \ 2^{-1}}{14^{-1}}$$

$$\frac{14}{3^2 \quad 3^{4/3} \quad 2}$$

$$\frac{7}{3^2 \quad 3^3 \quad 3^{1/3}}$$

ans

$$\frac{7}{3^3 \quad 3^{1/3}}$$

$$\frac{7}{27 \quad \sqrt[3]{3}}$$ ans

(ii)$(2 \quad x^5 \quad y^{-4}) \quad (-8 \quad x^{-3} \quad y^2)$

solution : $-16x^{5-3}y^{-4+2}$

$-16\,x^2y^{-2}$ ans .

(iii) $\left(\frac{x^{-2} \quad y^{-1} \quad z^{-4}}{x^{4} \quad y^{-3} \quad z^{0}}\right)^{-3}$

$$\left(\frac{y^{-1} \quad y^{3}}{x^{4} \quad x^{2} \quad z^{0} \quad z^{4}}\right)^{-3}$$

$$\left(\frac{y^{-1+3}}{x^{4+2} \quad z^{0+4}}\right)^{-3}$$

$$\left(\frac{y^{1}}{x^{6} \quad z^{4}}\right)^{-3} = \left(\frac{x^{6} \quad z^{4}}{y}\right)^{3}$$

$$\frac{x^{18} \quad z^{12}}{y^{3}}$$

$$\frac{(81)^n \quad 3^5 \quad - \quad (3)^{4n-1} \quad (243)}{9^{2n} \quad 3^3}$$

$$\frac{3^{4n} \quad 3^5 \quad - \quad 3^{4n} \quad 3^{-1} \quad 3^5}{(3^2)^{2n} \quad 3^3}$$

$$\frac{3^{4n} \quad 3^5 \quad - \quad 3^{4n} \quad 3^{-1+5}}{3^{4n} \quad 3^3}$$

$$\frac{3^{4n} \quad 3^5 \quad - \quad 3^{4n} \quad 3^4}{3^{4n} \quad 3^3}$$

$$\frac{3^{4n} \quad 3^3 \quad (3^2 \quad - \quad 3)}{3^{4n} \quad 3^3}$$

$$(3^2 \quad - \quad 3)$$

9-3 = 6 ans.

9-3 = 6 ans.

Home work : example 1 (i) (ii) page 46

Exercise 2.6 (9^{th} science page 52)

Engaging starter : If a =0 then a+ib reduces purely ……

Objectives : at the end of today topic students will be able to:

(i)To write each complex number in standard form

(ii)Carryout basic operation (i.e.. Addition ,subtraction , multiplication ,and division)on complex numbers.

Q:2 Express each complex number in the standard form a +bi ,where a and b are real numbers.

(i)(2 +3i) + (7 – 2i)

Solution : (2+3i) + (7 -2i)

2 +3i +7- 2i

2+7 +3i -2i

9 +i ans

(ii) 2 (5+4i) -3(7 +4i)

Solution : 2(5+4i) – 3(7+4i)

10 +8i – 21 -12i

10-21 +8i -12i

-11 -4i

-(11+4i) ans

(iv) $2i^2 + 6i^3 + 3i^{16} - 6i^{19} + 4i^{25}$

we know that $i^2 = -1$

$2(-i) + 6i.i^2 + 3\,(i^2)^8 - 6\,i.i^{18} + 4i.i^{24}$

$-2 + 6i\,(-1) + 3\,(-1)^8 - 6i\,(i^2)^9 + 4i\,(i^2)^{12}$

$-2 - 6i + 3\,(1) - 6\,i\,(-1)^9 + 4i\,(-1)^{12}$

$-2 - 6i + 3 - 6i\,(-1) + 4i\,(1)$

$-2 - 6i + 3 + 6i + 4i$

$-2 + 3 - 6i + 6i + 4i$

$1 + 4i$ ans

Q :3 Simplify and write your answer in the form of a + bi

(i) (-7+ 3i) (-3 +2i)

Solution : (-7 +3i) (-3 +2i)

-7 (-3 +2 i) + 3i (-3 +2i)

= 21 -14i -9i +6 i^2

= 21 -23i +6 (-1)

= 21 -23i -6

= 21-6 -23i

= 15 -23i ans

(ii) $(2 - \sqrt{-4}) (3- \sqrt{-4})$

Solution : $(2 - \sqrt{-1 \times 4}) (3 - \sqrt{-1 \times 4})$

we know that -1 $= i^2$ so

$(2 - \sqrt{4i^2}) (3 - \sqrt{4i^2})$

(2 – 2i) (3 – 2i)

= 2 (3- 2i) -2i (3-2i)

= 6 -4i -6i + 4 i^2

= 6 -10i + 4 (-1)

= 6 -10i -4

= 6-4 -10i

= 2 – 10i ans

(iv) $(2 - 3i)(\overline{3 - 2i})$

Solution : $(2-3i)(\overline{3 - 2i})$

$= (2-3i)(3+2i)$

$= 2(3+2i) - 3i(3+2i)$

$= 6 + 4i - 9i - 6i^2$

$= 6 - 5i - 6(-1)$

$= 6 - 5i + 6$

$= 6 + 6 - 5i$

$= 12 - 5i$ ans

Q :5 Calculate (i) (ii) z + (iii)z - (iv) z

(i) z = -i

= I

(ii) z + = -i+ i = 0

(iii) z - = -i –i = -2i

(iv) z = (-i) (i) = - = - (-1) = 1 ans

(iii) z =

Solution : x

= = =

= I so z = i

(i) = -I

(ii) z + = i + -i = 0

(iii) z - = i – (-i) = i +i = 2i

(iv) z = (i) (-i) = -

Welcome to class 9th science students

Objectives :

At the end of today topic students will be able to :

(i)Know Property of real numbers

(1) $\frac{17}{25}$

Solution:

$$
\begin{array}{r}
0.68 \\
25\overline{)170} \\
\underline{150} \\
200 \\
\underline{200} \\
0
\end{array}
$$

So, $\frac{17}{25}$ **= 0.68**

(2) $\frac{19}{4}$

Solution:

$$
\begin{array}{r}
4.75 \\
4\overline{)19} \\
\underline{16} \\
30 \\
\underline{28} \\
20 \\
\underline{20} \\
0
\end{array}
$$

(5) $\frac{5}{8}$

Solution:

$$
\begin{array}{r}
0.625 \\
8\overline{)\,50} \\
\underline{48} \\
20 \\
\underline{16} \\
40 \\
\underline{40} \\
0
\end{array}
$$

So, $\frac{5}{8} = 0.625$

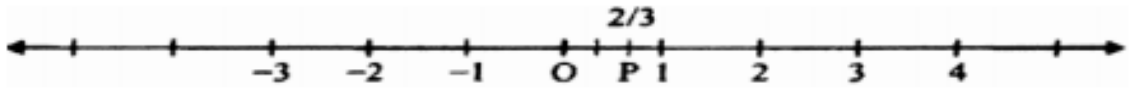
Objectives :

At the end of today topic students will be able to :

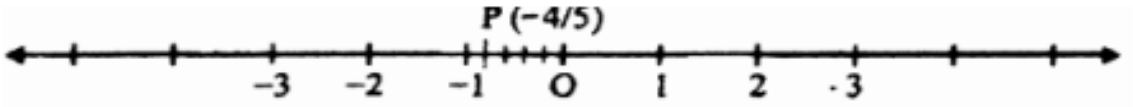
(i)Know Property of real numbers

Q4. Represent the following numbers on the number line.

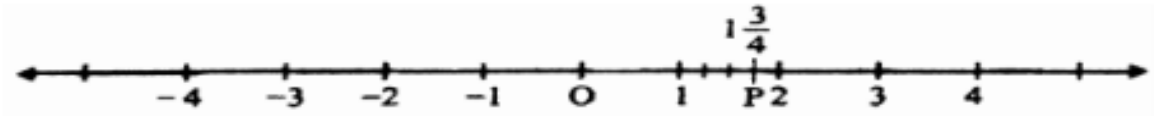
(1) $\frac{2}{3}$



(2) $-\frac{4}{5}$



(3) $1\frac{3}{4}$



Exercise 2.2

Q1. identify the property used in the following

i. $a+b=b+a$

ii. $a(bc)-(ab)c$

iii. $7\times 1=7$

iv. $x>y, x=y, x<y$

v. $ab=ba$

vi. $a+c=b+c \Rightarrow a=b$

vii. $5+(-5)=0$

viii. $7\times\frac{1}{7}=1$

ix. $a>b \Rightarrow ac>bc \quad (c>0)$

Solution:

i. Commutative property w.r t. addition

ii. Associative property w.r.t multiplication

iii. Multiplicative identity

iv. Trichotomy property

v. Commutative property w.r.t. multiplication

vi. Cancellation property

vii. Additive inverse

viii. Multiplicative inverse

ix. Multiplicative property

Q2. Fill in the following blanks by stating the properties of real numbers used.

$3x + 3(y-x)$

$= 3x + 3y - 3x,$ .....

$= 3x - 3x + 3y,$ .....

$= 0 + 3y,$ .....

$= 3y,$ .....

Solution:

$3x + 3(y-x)$

Step 1:

$= 3x + 3y - 3x$ Distributive property w.r.t. multiplication

Step 2:

$= 3x - 3x + 3y,$ Commutative property

Step 3:

$= 0 + 3y,$ Additive Inverse

Step 4:

$= 3y,$ Additive identity

Q3. Give the name of property used in the following.

1. $\sqrt{24}+0=\sqrt{24}$
2. $-\frac{2}{3}\left(5+\frac{7}{2}\right)=\left(-\frac{2}{3}\right)(5)+\left(-\frac{2}{3}\right)\left(\frac{7}{2}\right)$
3. $\pi+(-\pi)=0$
4. $\sqrt{3}.\sqrt{3}$ **is a real number**
5. $\left(-\frac{5}{8}\right)\left(-\frac{8}{5}\right)=1$

Solution:

1. Additive identity
2. Distributive property w.r.t. multiplication
3. Additive inverse
4. Closure property
5. Multiplication inverse

Home work : Properties of Real numbers (page 39 to page 42)