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10TH MATHS PRACTICE QUESTIONS FOR QUARTERLY EXAM PART 1

10th Standard
Maths

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1) Find A x B, A x A and B x A
A = {2, -2, 3} and B = {1,-4}

Answer : Given A = {2, – 2, 3}, B = {1, – 4}.
A x B = {2,-2,3) x {1 ,-4}
= {(2, 1), (2, - 4), (- 2, 1), (- 2, - 4), (3, 1), (3, - 4)}
A x A = {2,-2,3} x {2,-2,3}
= {(2,2), (2, - 2), (2,3), (-2,2), (- 2, - 2), (- 2,3),(3,2),(3, - 2), (3, 3)}
B x A = {1, -4} x {2, -2, 3}
= {(1,2),(1, -2),(1, 3)}, (- 4, 2), (- 4, - 2), (- 4, 3)}

2) A Relation R is given by the set {(x,y) / y = x + 3, x {0, 1, 2, 3, 4, 5}}. Determine its domain and range.

Answer : Given Set = {(x,y) / y = x + 3, x {0, 1, 2, 3, 4, 5}}
When x = 0, y = 0 + 3 = 3
When x = 1, y = 1 + 3 = 4
When x = 2,y = 2 + 3 = 5
When x = 3, y = 3 + 3 = 6
When x = 4, y = 4 + 3 = 7
When x = 5, y = 5 + 3 = 8
Relation R = {(0, 3), (1,4), (2,5), (3,6), (4,7), (5,8)}
Domain of R = {0, 1, 2, 3, 4, 5}
Range of R = {3, 4, 5, 6, 7, 8}

3) Let f(x) = 2x + 5. If x ≠ 0 then find $\frac{2\ 5 \Rightarrow 3 \quad 2 \Rightarrow 3}{}$.

Answer : f(x) = 2x + 5, x ≠ 0.
$\frac{2\ 5 \Rightarrow 3 \quad 2 \Rightarrow 3}{}$ s $\frac{\Rightarrow 2\ 5 \Rightarrow 35\ e \quad \Rightarrow 2 \Rightarrow 35\ e}{}$
s $\frac{= 5]\ 5\ e \quad o}{}$ s $\frac{= 5\ o \quad o}{}$
s $\frac{=}{}$ s $=$

4) Let f be a function f : N ⟶ N be defined by f(x) = 3x + 2, x N
(i) Find the images of 1, 2, 3
(ii) Find the pre-images of 29, 53
(iii) Identify the type of function

Answer : The function f:N ⟶ N is defined by f(x) = 3x + 2
(i) If x = 1, f(1) = 3(1) + 2 = 5
If x = 2, f(2) = 3(2) + 2 = 8
If x = 3, f(3) = 3(3) + 2 = 11
The images of 1, 2, 3 are 5, 8, 11 respectively.
(ii) If x is the pre-image of 29, then f(x) = 29, Hence 3x + 2 = 29
3x = 27 ⇒ x = 9
Similarly, if x is the pre-image of 53, then f(x) = 53. Hence 3x + 2 = 53
3x = 51 ⇒ x = 17
Thus the pre-images of 29 and 53 are 9 and 17 respectively.
(iii) Since different elements of N have different images in the co-domain, the function f is one-one function.
The co-domain of f is N.
But the range of f = {5, 8, 11, 14, 17,....} is a proper subset of N.
Therefore f is not an onto function. That is, f is an into function.
Thus f is one-one and into function.

5) Find k if f o f(k) = 5 where f(k) = 2k - 1.

Answer : f o f(k) = f(f(k))
= 2(2k - 1) -1 = 4k - 3
Thus, f o f(k) = 4k - 3
But, it is given that f o f(k) = 5
Therefore 4k - 3 = 5 ⇒ k = 2

6) ' a ' and ' b ' are two positive integers such that a^b x b^a = 800. Find ' a ' and ' b'

Answer : The number 800 can be factorized as
800 = 2 x 2 x 2 x 2 x 2 x 5 x 5 = 2^5 x 5^2
Hence a^b x b^a = 2^5 x 5^2
This implies that a = 2 and b = 5 or a = 5 and b = 2

7) The general term of a sequence is defined as

a_n = 2 5 [3q *l*
=5 <q *l*

Find the eleventh and eighteenth terms.

Answer : To find a_{11}, Since 11 is odd, we put n = 11 in a_n = n (n + 3)
Thus, the eleventh term a_{11} = 11(11 + 3) = 154
To find a_{18}, Since 18 is even, we put n = 18 in a_n = n^2 +1
Thus the eighteenth term a_{18} = 18^2 + 1 = 325

8) Find the number of terms in the A.P. 3, 6, 9, 12,..., 111.

Answer : First term a = 3; common difference d = 6 - 3 = 3 ; last term l = 111
We know that, n =)—— [5 <
n =) <<< [/ [[5 <= 37
Thus the A.P. contain 37 terms

9) Find x so that x + 6, x + 12 and x + 15 consecutive terms of a Geometric Progression.

Answer : If the given numbers are consecutive terms of a G.P. then

= s ⊥ [< =

8 86 $\frac{5 \Leftarrow}{5\ i}$ s $\frac{5 \lessdot e}{5 \Leftarrow}$

$(x+ 12)^2 = (x + 6)(x + 15)$

$x^2 + 24x + 144 = x^2 + 6x + 15x + 90$

$x^2 + 24x + 144 - x^2 - 6x - 15x - 90 = 0$

$24x - 21x + 144 - 90 = 0$

$3x + 54 = 0$

$3x = -54$

s $\frac{e]}{[}$ s ⋖n

10) If 1+ 2 + 3 +...+ n = 666 then find n.

Answer : Since, 1 + 2 + 3 +...+ n = $\frac{2\ 5 \lessdot 3}{=}$, we have $\frac{2\ 5 \lessdot 3}{=}$ = 666

$n^2 + n - 1332 = 0$ gives $(n + 37)(n - 36) = 0$

So, n = -37 or n = 36

But n -37 (Since n is a natural number); Hence n = 36

11) Simplify

$\frac{2\ 5 \lessdot 3}{=}$ 5 $\frac{2< \ \ 3}{=}$

Answer : $\frac{2\ 5 \lessdot 3}{=}$ 5 $\frac{2< \ \ 3}{=}$ s $\frac{2\ 5 \lessdot 35\ \ 2\ 2< \ \ 3}{2\ \ \ \equiv 3}$ s $\frac{=}{=}$

12) Find the square root of the following

$4x^2 + 20x + 25$

Answer : $|2x + 5|$

13) Find the LCM of the given expressions.

$p^2 - 3p + 2,\ p^2 - 4$

Answer : $p^2 - 3p + 2$,

$p^2 - 3p + 2 = (p - 1)(p - 2)$

$p^2 - 4 = (p + 2)(p - 2)$

L.C.M = $(p - 2)(p + 2)(p - 1)$

14) Reduce each of the following rational expressions to its lowest form.

$\frac{=\ [\ \ \ ];}{=[\ \ \equiv\ \ \bar{5}\ i\ ]}$

Answer : $\frac{=\ [\ \ \ ];}{=[\ \ \equiv\ \ \bar{5}\ i\ ]}$ s $\frac{2\ \ \ n3}{=2\ =\ \ \Leftarrow 5\ [\equiv 3}$

$= \frac{(p-8)(p+5)}{2p(p-4)(p-8)}$

s $\frac{o\ 5\ e}{=2\ \ \ ]\ 3}$

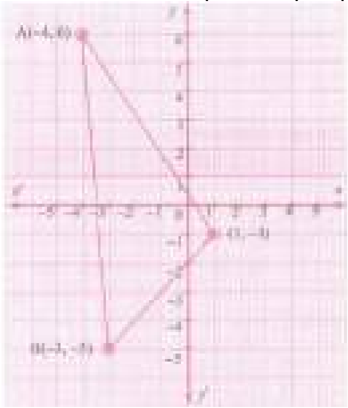
15) Find the square root of the following expressions

$\frac{\lessdot]\ \ n \Leftarrow \lessdot}{n< \ \Leftarrow]\ \ \lessdot}$

Answer : $\frac{\lessdot]\ \ n \Leftarrow \lessdot}{n< \ \Leftarrow]\ \ \lessdot}$ s $\frac{]}{[}$ $\frac{]\ i\ n}{i\ =\ m}$

16) Find the area of the triangle formed by the points (1, –1), (–4, 6) and (–3, –5)

Answer : (1,–1), (–4, 6) and (–3, –5)



A(-4, 6), B(-3, -5), C(1, -1)

Area of triangle ABC s ≤ 2 < =5 = [5 [<3 2 = <5 [=5 < [3

s ≤ <2 = [35 =2 [<35 [2 < =3 8

s ≤] 2 e 5 <3 [2 < i 35 <2i 5 e3

s ≤] 2] 3 [2 n35 < 2<<3

s ≤ <i 5 =<5 <<

s ≤2] n3 s =] 8 8

17) Determine whether the sets of points are collinear? 2 ≤6[3, (- 5, 6) and (-8, 8)

Answer : Given points are 2 ≤6[3, (- 5, 6) and (-8, 8)

Let us use area of triangle formula

Area of triangle = ≤ <2 = [35 =2 [<35 [2 < =3

s ≤ ≤2i n3 e2n [3 n2[i 3

s ≤ ≤2 =3 e2e3 n2 [3

s ≤ < =e 5 =] s ≤2; 3 s ;

Since, the area of triangle is zero, the given points are collinear.

18) Find the slope of a line joining the given points (- 6, 1) and (-3, 2)

Answer : (- 6, 1) and (-3, 2)

The slpoe = < / = < s = < / [5 i s < / [

19) If the three points (3, - 1) , (a, 3) and (1, - 3) are collinear, find the value of a.

Answer : Given points (3, - 1), (a, 3) and (1, - 3)

Let the points be A (3, - 1), B (a, 3) and C (1,- 3)

Slope of AB = < = / < = s < [/ [s] / [

Slope of BC = < = / < = s [5 [/ < s i / <

Since, the points A, B and C are collinear.

Slope of AB = Slope of BC

] / [s i / <

-2 (a - 1) = 3(3 - a)

-2a + 2 = 9 - 3a

3a - 2a = 9 - 2

a = 7

20) The line through the points (-2, a) and (9, 3) has slope - ≤. Find the value of a.

Answer : Given points (- 2, a) and (9, 3) and Slope = - ≤/═.

Slope of the line = - ≤/═

<═ s ≤/═

<═ ⌊ s ≤/═ o

⌊ s ≤/≪

2(a - 3) = 11

2a = 11 + 6

a = ⊲m/═

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21) Let A = {x N| 1 < x < 4}, B = {x W| 0 ≤ x < 2) and C = {x N| x < 3} Then verify that
(i) A x (B U C) = (A x B) U (A x C)
(ii) A x (B ∩ C) = (A x B) ∩ (A x C)

Answer : A = {x N| 1 < x < 4} = {2,3), B = {x W| 0 ≤ x < 2) = (0,1), C = {x N| x < 3} = (1,2)

(i) A x (B U C) = (A x B) U (A x C)

B U C = (0,1) U (1,2) = {0,1,2}

A x (B U C) = {2,3) x {0,1,2} = {(2,0),(2,1)(2,2)(3,0)(3,1),(3,2) ..(1)

A x B = {2,3} x {0,1} = {(2,0),(2,1),(3,0),(3,1)}

A x C = {2,3} x {1,2} = {(2,1),(2,2),(3,1)(3,2)}

(A x B) U (A x C) = {(2,0),(2,1),(3,0),(3,1)} U {(2,1),(2,2),(3,1),(3,2)}

= {(2,0),(2,1),(2,2),(3,0),(3,1),(3,2)} ...(2)

From (1) and (2), A x (B U C) = (A x B) U (A x C) is verified.

(ii) A x (B ∩ C) = (A x B) ∩ (A x C)

(B ∩ C) = {0,1} ∩ {1,2} = {1}

A x (B ∩ C) = {2,3} x {1} = {(2,1),(3,1)} .... (3)

A x B = {2,3} x {0,1} = {(2,0),(2,1),(3,0),(3,1)}

A x C = {2,3} x {1,2} = {(2,1),(2,2),(3,1),(3,2)

(A x B) ∩ (A x C) = {(2,0),(2,1),(3,0),(3,1)} ∩ {(2,1),(2,2),(3,1),(3,2)}

= {(2,1),(3,1)} .... (4)

From (3) and (4), A x (B ∩ C) = (A x B) ∩ (A x C) is verified.

22) Let A = {x W| x < 2}, B = {x N| 1 < x ≤ 4} and C = (3,5). Verify that
A x (B U C) = (A x B) U (A x C)

Answer : Given A = {x W| x < 2} A = {0,1}

B = {x N| 1 < x ≤ 4} B = {2,3,4}

C = {3,5}

A x (B U C) = (A x B) U (A x C)

N *P* = {2,3,4,5}

A x (B U C) = {0,1} x {2,3,4,5}

= {{0,2},(0,3),(0,4),(0,5),(1,2),(1,3),(1,4),(1,5)} ...(1)

A x B = {0,1} x {2,3,4}

= {(0,2),(0,3),(0,4),(1,2),(1,3),(1,4)}

A x C = {0,1} x {3,5}

= {{0,3},(0,5),(1,3),(1,5)}

2C *N3* *2C* *P3* = {(0,2),(0,3),(0,4),(0,5),(1,2),(1,3),(1,4),(1,5)} ...(2)

From (1) x (2),it is clear that

C *2N* *P3* s *2C* *N3* *2C* *P3*

Hence verified

23) Let A = {1,2,3,4} and B = { 2, 5, 8, 11,14} be two sets. Let f: A ⟶ B be a function given by f(x) = 3x − 1. Represent this function
(i) by arrow diagram

(ii) in a table form
(iii) as a set of ordered pairs
(iv) in a graphical form

Answer : A = {1, 2, 3, 4} ; B = {2, 5, 8,11,14}; f(x) = 3x − 1
f(1) = 3(1) –1 = 3 – 1 = 2; f(2) = 3(2) –1 = 6 –1 = 5
f(3) = 3(3) –1 = 9 –1 = 8; f(4) = 4(3) –1 = 12 –1 = 11

(i) Arrow diagram

Let us represent the function f :A ⟶ B by an arrow diagram

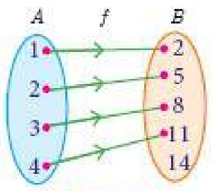

Fig. 1.19

(ii) Table form

The given function f can be represented in a tabular form as given below

x	1	2	3	4
f(x)	2	5	8	11

(iii) Set of ordered pairs

The function f can be represented as a set of ordered pairs as
f = {(1,2),(2,5),(3,8),(4,11)}

(iv) Graphical form

In the adjacent xy -plane the points
(1,2), (2,5), (3,8), (4,11) are plotted (Fig.1.20).

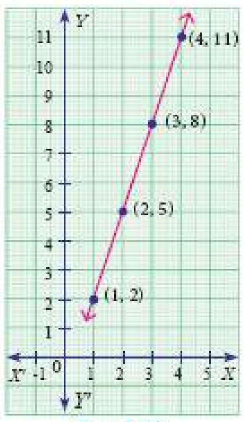

Fig. 1.20

24) If the function f: R⟶ R defined by

= 5 m6 r =
2 3s = =6 = r [
[=6 [

(i) f(4)
(ii) f(-2)
(iii) f(4) + 2f(1)
(iv) $\frac{2<3 \; [\; 2] \; 3}{2 \; [3}$

Answer : The function f is defined by three values in intervals I, II, III as shown by the side.
For a given value of x = a, find out the interval at which the point a is located, there after find
f(a) using the particular value defined in that interval.
(i) First, we see that, x = 4 lie in the third interval.
Therefore, f(x) = 3x - 2; f(4) = 3(4) = 10
(ii) x = -2 lies in the second interval
Therefore, $f(x) = x^2 - 2$; $f(-2) = (-2)^2 - 2 = 2$
(iii) From (i), f(4) =10.
To find f(1) first we see that x = 1 lies in the second interval.
Therefore, $f(x) = x^2-2 \Rightarrow f(1) = 1^2 - 2 = -1$
So, f(4) + 2f(1) = 10 + 2(-1) = 8
(iv) We know that f(1) = -1 and f(4) = 10
For finding f(-3), we see that x = −3, lies in the first interval.
Therefore, f(x) = 2x + 7; thus, f(-3) = 2(-3) + 7 = 1
Hence, $\frac{2<3 \;[\; 2]\, 3}{2 \;[3}$ s $\frac{= [2<; 3}{<}$ = - 31

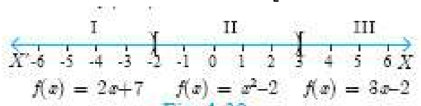

Fig. 1.39

25) If $f(x) = x^2$, g(x) = 3x and h(x) = x - 2, Prove that (f o g) o h = f o (g o h).

Answer : $f(x) = x^2$, g(x) = 3x, h(x) = x - 2
f o g = f [g(x)] = f (3x)
$= (3x)^2 - 9x^2$
(f o g) o h = (f o g) [h (x)] = (f o g) [x - 2]
$= 9\,(x - 2)^2$
g o h = g [h (x)] = g[x - 2] = 3 (x - 2)
f o (g o h) = f [g (h(x))]
$= f\,[3(x - 2)] = [3(x - 2))]^2 = 9\,(x - 2)^2$
(f o g) o h = f o(g o h)
Hence proved.

26) The sum of three consecutive terms that are in A.P. is 27 and their product is 288. Find the three terms.

Answer : Let the three consecutive terms be a - d, a, a + d
Given their sum is 27
(a - d) + a + (a + d) = 27
a - d + a + a + d = 27
3a = 27
s $\frac{=m}{[}$ s o
Product = 288
(a - d) a (a + d) = 288
$a(a^2 - d^2) = 288$
$9(9^2 - d^2) = 288$
n< = s $\frac{=mn}{o}$
$81 - d^2 = 32$
$d^2 = 81 - 32 = 49$
d x d = 7 x 7
d =   7
(i) a = 9, d = 7, The three terms are,
= 9 -7, 9, 9 + 7
= 2,9, 16
(ii) a = 9, d = -7, Thethree terms are
9-(-7), 9, 9-7   16,9,2
The required three consecutive terms of the A.P are 2,9,16.

27) The product of three consecutive terms of a Geometric Progression is 343 and their sum is $\frac{o<}{[}$. Find the three terms.

Answer : Since the product of 3 consecutive terms is given.
we can take them as –, a, ar
Product of the terms = 343
– x a x ar = 343
$a^3 = 73$ gives a = 7
Sum of the terms = $\frac{o<}{[}$
Hence)$\frac{<}{-}$5 <5 [s $\frac{o<}{[}$ m) $\frac{<5 \;\; 5 \;\; =}{}$ [s $\frac{o<}{[}$
$3 + 3r + 3r^2 = 13r$ gives $3r^2 - 10r + 3 = 0$
(3r - 1)(r - 3) = 0 gives r = 3 or r = $\frac{<}{[}$
if a = 7, r = 3 then the three terms are $\frac{m}{[}$, 7, 21
If a = 7, r = $\frac{<}{[}$ then the three terms are 21, 7, $\frac{m}{[}$.

28) In a G.P. the 9^{th} term is 32805 and 6^{th} term is 1215. Find the 12^{th} term

Answer : 9^{th} term - $ar^{9-1} = 32805 = ar^8 = 32805$ ...(1)
6^{th} term = $ar^{6-1} = 1215 = ar^5 = 1215$ ...(2)
$\frac{2<3}{2=3}$ $\frac{n}{e}$ s $\frac{[=n;e}{<=<e}$
$r^3 = 27$
$r^3 = 3^3$
r = 3
Put r = 3 in (2)
$ar^5 = 1215$
$a(3)^5 = 1215$
s $\frac{<=<e}{[^e}$
a = 5
= 5(3)11 = 5 x 1,53,147
12th term of the G.P. = 7,65,735

29) Find the sum to n terms of the series
0.4 + 0.44 + 0.444 +..to n terms

Answer : 0.4 + 0.44 + 0.444 +......... to n terms
Let S_n = 0.4 + 0.44 + 0.444 + ... to n terms.
= 4 (0.1 + 0.11 + 0.111 + to n terms)
(multiply and divide by 9)
= ⌋/o (0.9 + 0.99 + 0.999 + ... to n terms)

s ⌋/o o/⩽ 5 oo/⩽; 5 ooo/⩽;; 5

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30) Find the sum to n terms of the series
3 + 33 + 333 + ...to n terms

Answer : 3 + 33 + 333 + ... to n terms.
Let S_n = 3 + 33 + 333 + ...upto n terms
= 3(1 + 11 + 111 + ... to n terms)
= ⌊/o (9 + 99 + 999 + ... to n terms)
(multiply and divide by 9)
= </⌈ 3[(10 - 1) + (100 - 1) + (1000 - 1) + to n terms]
= </⌈ [(10 - 1) + (10^2 - 1) + (10^3 - 1) +... + n upto n terms]
= </⌈ {[10 + 10^2 + 10^3 +...upto n terms] - n}
10 + 10^2 +... is a G.P. with a = 10, r = 10.

s s 2 ⊲3 / <

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s ⩽/=m 2⩽ ⊲3 ⌈

3 + 33 + 333 + ... to n terms s ⩽/=m 2⩽ ⊲3 ⌈

31) Find the sum of the following series
$10^3 + 11^3 + 12^3 + ... + 20^3$

Answer : ∢ 5 ⫤ 5 ⌈⌈ 5 5 ⌈ s {2 5 ∢3 / =} =

s)∢ 5 ⫤ 5 ⌈⌈ 5 5 ⫤⌈[ )∢ 5 ⫤ 5 5 o⌈[

s {⫤ 2⫤ 5 ∢3 / =} = {o 2o5 ∢3 / =} =

s ⫤ ⫤∢ / = = o ∢ / = = s 2⫤∢ 3⫤ 2] e3⫤

= 44100 - 2025 = 47075

$10^3 + 11^3 + 12^3 + \ldots + 20^3 = 42075$

32) Find the GCD of the following by division algorithm $2x^4 + 13x^3 + 27x^2 + 23x + 7$, $x^3 + 3x^2 + 3x + 1$, $x^2 + 2x + 1$

Answer : Let $f(x) = 2x^4 + 13x^3 + 27x^2 + 23x + 7$,
$g(x) = x^3 + 3x^2 + 3x + 1$,
$h(x) = x^2 + 2x + 1$
which is the least degree polynomial.
Now Dividing f (x) by h(x)

Quotient: $2x^2 + 9x + 7$
Divisor: $x^2 + 2x + 1$
$2x^4 + 13x^3 + 27x^2 + 23x + 7$
$2x^4 + 4x^3 + 2x^2$ (–)
$9x^3 + 25x^2 + 23x$
$9x^3 + 18x^2 + 9x$ (–)
$7x^2 + 14x + 7$
$7x^2 + 14x + 7$ (–)
0

Since the Remainder is zero, h (x) is the GCD of f (x) and h (x)
Now, dividing g (x) by h (x)

Quotient: $x + 1$
Divisor: $x^2 + 2x + 1$
$x^3 + 3x^2 + 3x + 1$
$x^3 + 2x^2 + x$ (–)
$x^2 + 2x + 1$
$x^2 + 2x + 1$ (–)
0

Remainder is zero,h (x) is the GCD of g (x) and h (x)
h (x) divides both f(x) and g (x) completely
GCD = $x^2 + 2x + 1$

33) Find the square root of $289x^4 - 612x^3 + 970x^2 - 684x + 361$

Answer :

$17x^2 - 18x + 19$

$17x^2$ | $289x^4 - 612x^3 + 970x^2 - 684x + 361$
$289x^4$
(–)

$34x^2 - 18x$ | $-612x^3 + 970x^2$
(+) (–)
$-612x^3 + 324x^2$

$34x^2 - 36x + 19$ | $646x^2 - 684x + 361$
(–) (–) (–)
$646x^2 - 684x + 361$
0

$|17x^2 - 18x + 19|$

34) Solve x + 2y - z = 5; x - y + z = -2; -5x - 4y + z = -11

Answer : Let, $x + 2y - z = 5$... (1)

$x - y + z = -2$....(2)

$-5x - 4y + z = -11$... (3)

Adding (1) and (2) we get,

$$\begin{array}{r} x + 2y - z = 5 \\ x - y + z = -2 \\ \hline 2x + y \quad = 3 \end{array} \ (+)$$

Subtracting (2) and (3),

$$\begin{array}{r} x - y + z = -2 \\ -5x - 4y + z = -11 \\ \hline 6x + 3y \quad = 9 \end{array} \ (-)$$

Dividing by 3 $\quad 2x + y = 3$

Subtracting (4) and (5),

$$\begin{array}{r} 2x + y = 3 \\ 2x + y = 3 \\ \hline 0 = 0 \end{array}$$

Here we arrive at an identity 0 = 0

Hence the system has an infinite number of solutions.

35) If x = ⁼5 [ ] / [= [and y = ⁼5 = n / = = =] find the value of x^2y^{-2}

Answer : x= ⁼5 [ ] / [= [, y= ⁼5 = n / = = =]

= = s) ⁼5 [ ] / [= [[ ]) ⁼5 [ ] / [= [[ ) = = =] / ⁼= n [

$$= \frac{(a+4)(a-1)}{3(a+1)(a-1)} \times \frac{(a+4)(a-1)}{3(a+1)(a-1)} \times \frac{2(a-2)(a+1)\,2(a-2)(a+1)}{(a+4)(a-2)(a+4)(a-2)}$$

= ⊥ / o

36) If $9x^4 + 12x^3 + 28x^2 + ax + b$ is a perfect square, find the values of a and b.

Answer :

$$\begin{array}{r|l} & 3x^2 + 2x + 4 \\ \hline 3x^2 & 9x^4 + 12x^3 + 28x^2 + ax + b \\ & 9x^4 \quad (-) \\ \hline 6x^2 + 2x & 12x^3 + 28x^2 \\ & 12x^3 + 4x^2 \quad (-) \\ \hline 6x^2 + 4x + 4 & 24x^2 + ax + b \\ & 24x^2 + 16x + 16 \quad (-) \\ \hline & 0 \end{array}$$

Because the given polynomial is a perfect square a - 16 = 0, b - 16 = 0

Therefore, a = 16, b = 16.

37) If the area of the triangle formed by the vertices A(-1, 2), B(k, -2) and C(7, 4) (taken in order) is 22 sq. units, find the value of k.

Answer : The vertices are A(1, 2), B(k, -2) and C(7, 4)

Area of triangle ABC is 22 sq.units

≤ { $(x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3)$ } = 22

≤ { (2 + 4k + 14) - (2k - 14 - 4) } = 22

2k + 34 = 44 gives 2k = 10 so k = 5.

38) Find the area of the quadrilateral formed by the points (8, 6), (5, 11), (-5, 12) and (-4, 3).

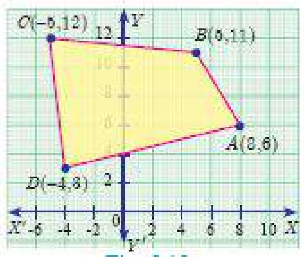
Answer : Before determining the area of quadrilateral, plot the vertices in a graph.
Let the vertices be A(8, 6), B(5, 11), C(-5, 12) and D(-4, 3).
Therefore, area of the quadrilateral ABCD

= ≤/= { ($x_1y_2 + x_2y_3 + x_3y_1$) - ($x_2y_1 + x_3y_2 + x_1y_3$) }

= ≤/= { (80 + 60 - 15 - 24) - (30 - 55 - 48 + 24)}

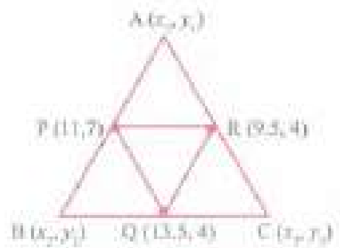
= ≤/= {109 + 49 }

= ≤/= { 158 } = 79 sq.units



39) Let P(11, 7), Q(13.5, 4) and R(9.5, 4) be the midpoints of the sides AB, BC and AC respectively of Δ ABC. Find the coordinates of the vertices A, B and C. Hence find the area of Δ ABC and compare this with area of ΔPQR.

Answer :



Given B Q, R are the mid points of the sides of a triangle.
Let the vertices of triangle ABC be A (x_1 , y_1),
B (x_2, y_2) and C (x_3, y_3)
P is the mid point of AB

{ 5/= 6 5/= s 2<<6m3

Comparing the co-ordinates, we get
$x_1 + x_2 = 22$ and ......(1)
$y_2 + y_3 = 8$ .....(2)
Q is the mid point of BC

{ 5/= [6 5/= [s 2<[8e6] 3

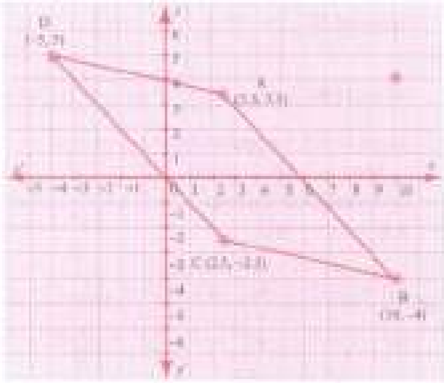
$x_2 + x_3 = 27$ ......(3)
$y_2 + y_3 = 8$ ......(4)
R is the mid point of AC

{ 5/= [6 5/= [s 2o8e6] 3

$x_1 + x_3 = 19$ ......(5)
$y_1 + y_3 = 8$ ......(6)
Solving (1), (3) and (5), we get
$x_1 = 7$, $x_2 = 15$ and $x_3 = 12$.
Solving (2), (4) and (6)
we get $y_1 = 7, y_2 = 7, y_3 = 1$
The vertices are A (7, 7),8 (15, 7) and C(12, 1)
Area of ABC s ≤/= <2 = [35 =2 [<35 [2 < =3
s ≤/= m2m <35 <e2< m35 <=2m m3
s ≤/=] = o; s ≤/=2] n3 s =]
= 24 sq. units [Area cannot be negative]
Area of PQR
s ≤/= <<2]] 35 <[8e2] m35 o8e2m] 3
s ≤/= ;] ; 8e 5 =n8e s ≤/= s i
Area = 6 sq.units [... area cannot be negative]
Area of ABC = 4 (Area of PQR).

40) Show that the given points form a parallelogram : A(2.5, 3.5) , B(10, - 4), C(2.5, -2.5) and D(-5, 5)

Answer :



Given points A(2.5,3.5), B (10, - 4), C (2.5, - 2.5) and D(-5, 5)

slope of a line = $\frac{y_2 - y_1}{x_2 - x_1}$

Slope of AB = $\frac{-4-3.5}{10-2.5} = \frac{-7.5}{7.5} = -1$

Slope of BC = $\frac{-2.5+4}{2.5-10} = \frac{1.5}{-7.5} = -\frac{1}{5}$

Slope of CD = $\frac{5+2.5}{-5-2.5} = \frac{7.5}{-7.5} = -1$

Slope of AD = $\frac{5-3.5}{-5-2.5} = \frac{1.5}{-7.5} = -\frac{1}{5}$

Slope of AB = Slope of CD = - 1

Slope of BC = Slope of AD = $-\frac{1}{5}$

AB is parallel to CD and BC is parallel to AD.

Hence, the given points form a parallelogram.