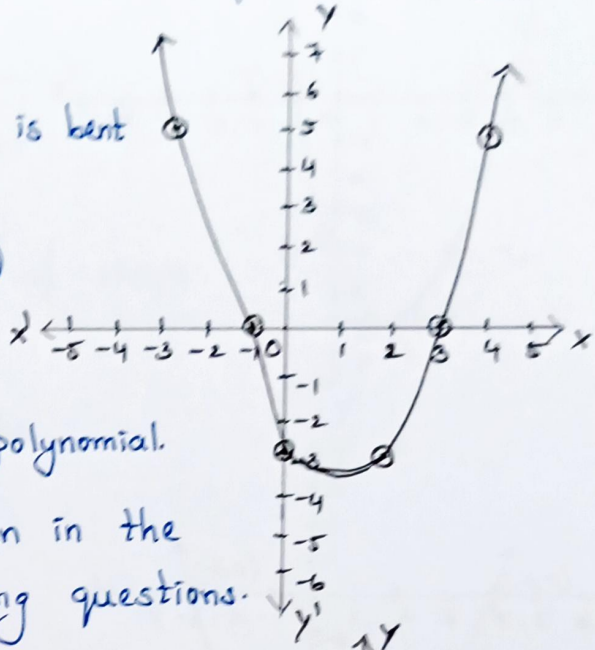
2. Polynomials

4 Marks:

1) Due to heavy storm an electric wire got bent as shown in the figure. It followed a mathematical shape. Answer the following questions below.



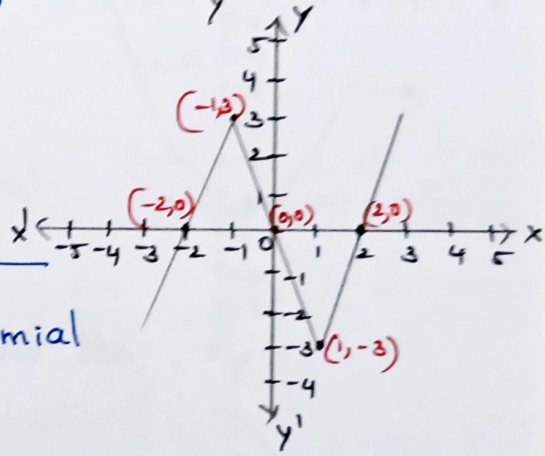
a) Name the shape in which the wire is bent

b) How many zeroes are there for the polynomial (shape of the wire)

c) The zeroes of the polynomial are _____

d) Sum of the zeroes of the polynomial.

2) Observe the graph $y = x^3 - 4x$ given in the figure and answer the following questions.



a) Name the graph

b) How many zeroes are there for the polynomial?

c) The zeroes of the polynomial are _____

d) Sum of the zeroes of the polynomial $y = x^3 - 4x$

3) Find the zeroes of the quadratic polynomial $x^2 + 7x + 10$, and verify the relationship between the zeroes and the coefficients.

4) Find the quadratic polynomial whose sum and product of zeroes are $\frac{1}{4}$, -1 respectively.

5) Find the zeroes of the $6x^2 - 3 - 7x$ quadratic polynomials and verify the relationship between the zeroes and the coefficients

6) Observe the graph and answer the following questions below:

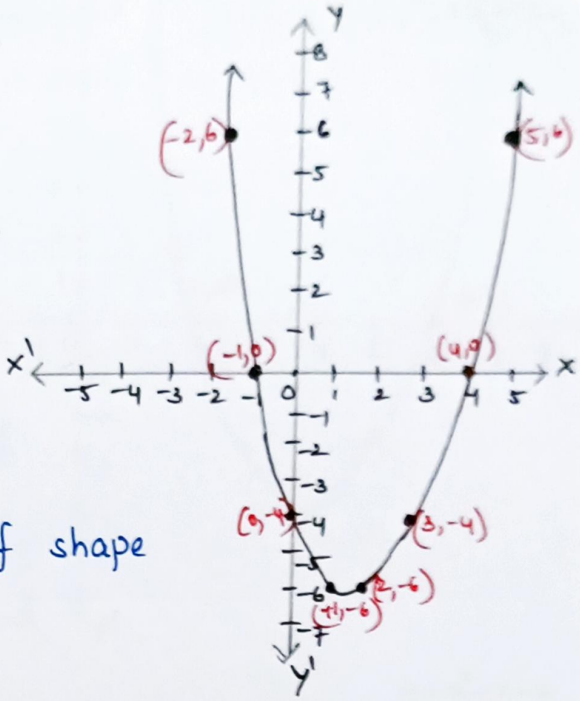
a) Name the shape of the graph

b) How many zeroes are there for the polynomial

c) zeroes of the polynomial are —

d) Sum of the zeroes and product of the zeroes of the polynomial.

e) Write the points of intersection of shape and x-axis.



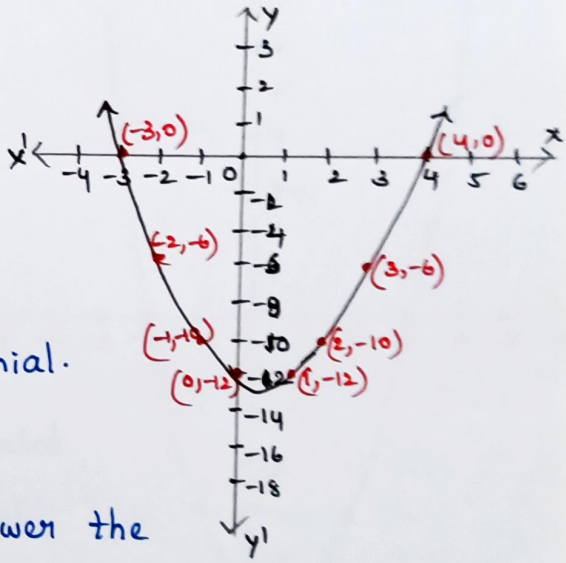
7) Observe the graph and answer the following questions.

a) Name the shape of the graph

b) How many zeroes are there for the polynomial?

c) zeroes of the polynomial are —

d) Sum of the zeroes of the polynomial.



8) Observe the following graph and answer the following questions:

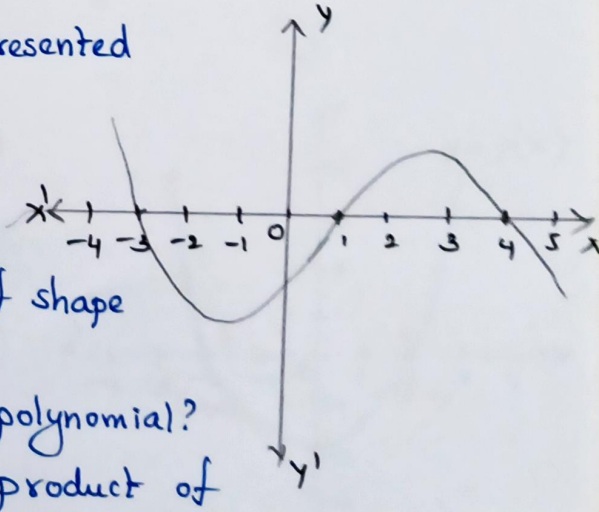
i) Name the type of polynomial represented by the shape of graph

ii) How many zeroes are there for that polynomial?

iii) Write the points of intersection of shape and x-axis.

iv) What are the zeroes of given polynomial?

v) Find the sum of zeroes and product of zeroes of polynomial



9) Due to heavy storm an electric wire got bent as shown in the figure. It followed a mathematical shape. Answer the following questions below.

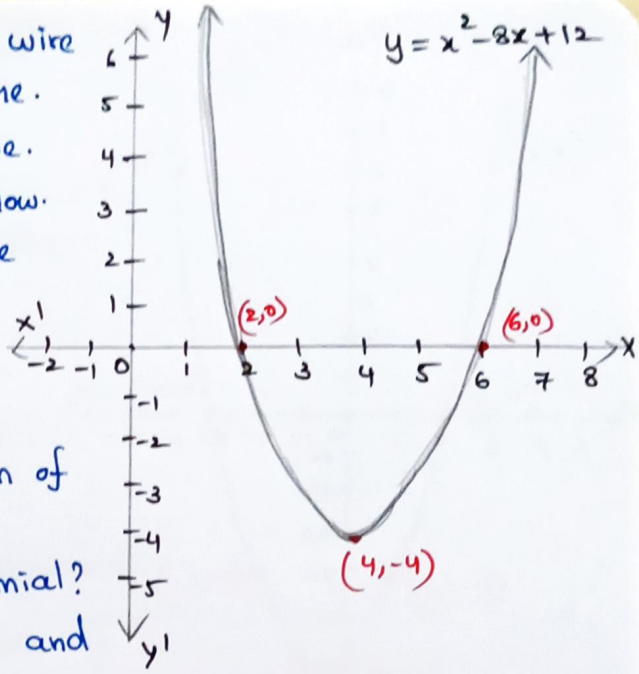
i) Name the shape in which the wire is bent?

ii) How many zeroes are there for the polynomial?

iii) Write the points of intersection of graph and x-axis?

iv) What are the zeroes of polynomial?

v) Find the sum of the zeroes and product of the zeroes.



10) Observe the graph and answer the following questions.

a) Name the shape of the graph

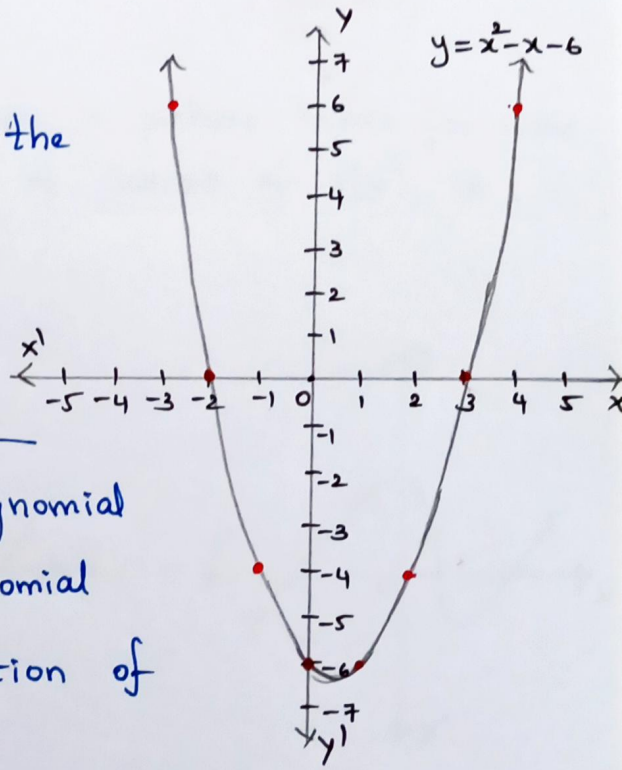
b) How many zeroes are there for the polynomial

c) zeroes of the polynomial are ——

d) Product of the zeroes of polynomial

e) Sum of the zeroes of polynomial

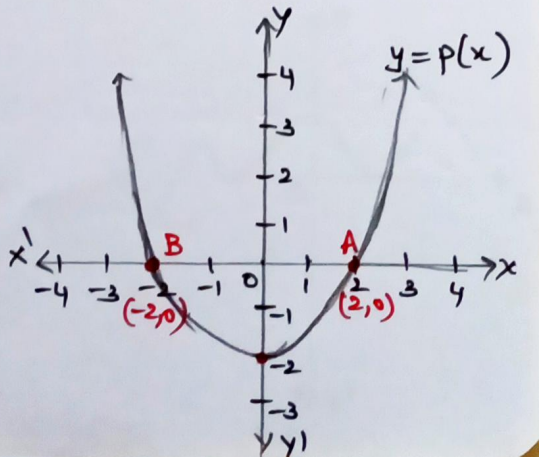
f) Write the points of intersection of graph and x-axis?



11) The graph of the polynomial p(x) is given. Graph intersects x-axis at A(2,0) and B(-2,0). Find

i) zeroes of the polynomial y = p(x)

ii) Polynomial p(x)



12) Observer the graph and answer the following question below:

a) Name the shape of the graph

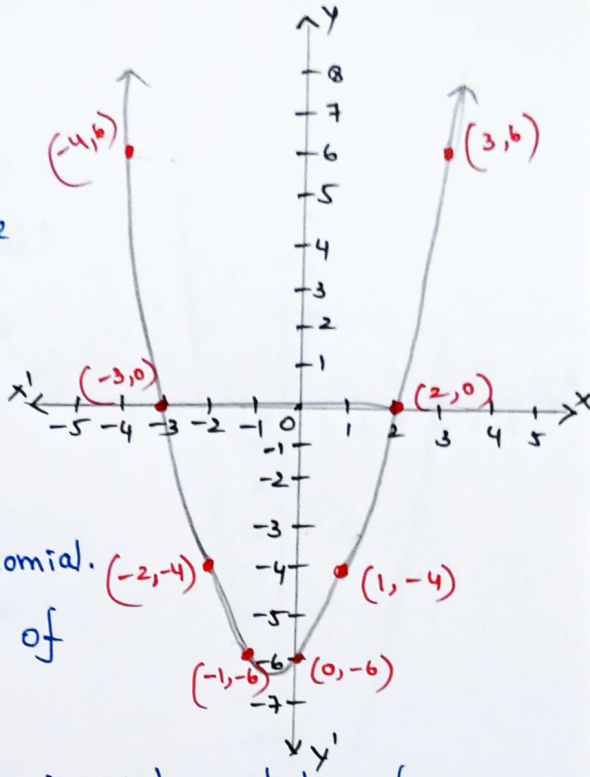
b) How many zeroes are there for the polynomial

c) Zeroes of the polynomial are

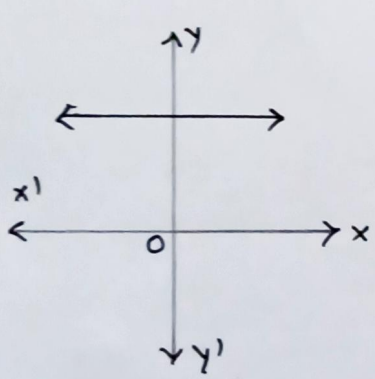
d) Product of the zeroes of the polynomial

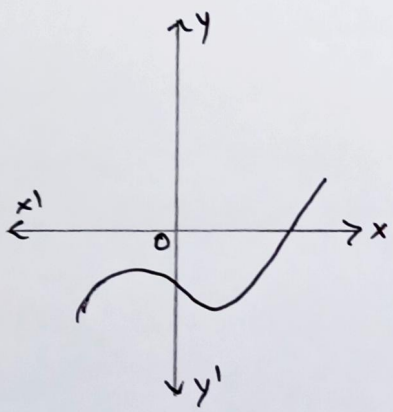
e) Sum of the zeroes of the polynomial.

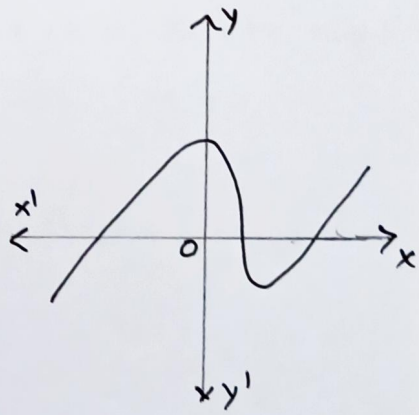
f) Write the points of intersection of graph and x-axis.

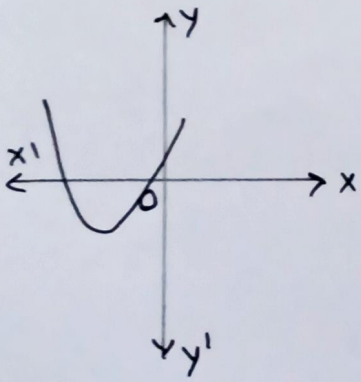


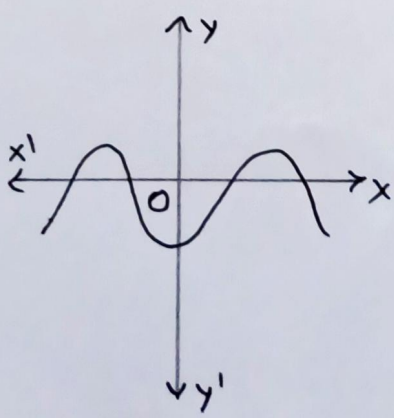
13) The graphs of $y = p(x)$ are given in picture below, for some polynomials $p(x)$. Find numbers of zeroes of $p(x)$, in each case.

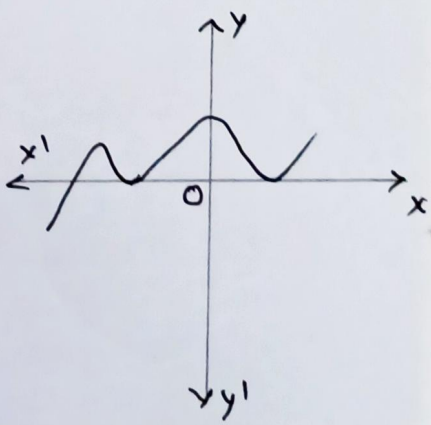












14) Observe the graph and answer the questions

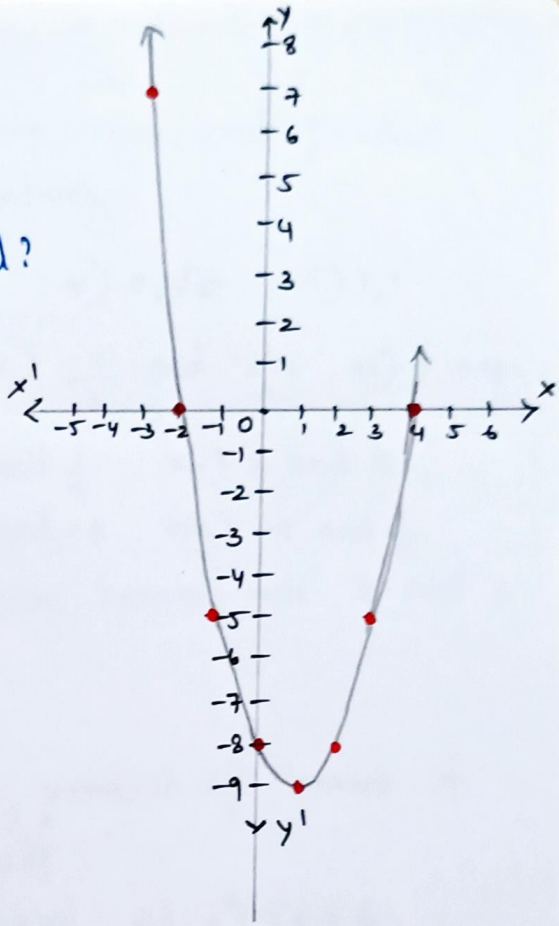
a) What is the shape of the graph?

b) What are the zeroes of polynomial?

c) What is the sum of the zeroes of the polynomial?

d) What is product of the zeroes of polynomial

e) Write the point of intersection of graph and x-axis



2 Marks :

1) i) Find a quadratic polynomial whose sum and product of the zeroes are 3 and 2 respectively.

ii) -3 and 2 iii) $\frac{1}{4}, -1$ iv) $\sqrt{2}, \frac{1}{3}$ v) $0, \sqrt{5}$ vi) $1, 1$

vii) $1, \frac{5}{3}$ viii) $-\sqrt{3}, \sqrt{3}$ ix) $0, -6$ x) $\frac{-5}{3}$ and $\frac{-2}{3}$ xi) $0, -4$

xii) $\frac{-1}{4}$ and $\frac{1}{4}$ xiii) $4, 1$ xiv) $\frac{2}{3}$ and $\frac{1}{9}$ xv) 2 and 5

xvi) 7 and 10 xvii) -7 and 10 xviii) 0 and -3 xix) -1 and $\frac{1}{3}$

2) i) Find a quadratic polynomial whose zeroes are 2 and 5

ii) -7 and 5

3) i) Find the sum of the zeroes and product of zeroes of the quadratic polynomial $2x^2+4x+5$

ii) x^2-4x+4 iii) $3x^2-4$ iv) $3x^2-2x+5$ v) x^2-5x+6

vi) $\sqrt{3}x^2+9x+6\sqrt{3}$ vii) $(x-2)(x+3)$ viii) $x^2-\sqrt{2}x-3$

4) i) Find the zeroes of the polynomial $p(x) = x^2+7x+10$

ii) $p(x) = x^2-15$ iii) $p(x) = 3x^2-x-4$ iv) $p(x) = x^2-5$

v) x^2-x-6 vi) x^2-x-2 vii) x^2-3 viii) $9x^2-1$

1 Mark:

I

1) Assertion: Sum of the zeroes of a quadratic polynomial $2x^2+3x-4$ is $\frac{-3}{2}$

Reason: Sum of the zeroes of a quadratic polynomial ax^2+bx+c is $\frac{c}{a}$

2) Assertion: Sum of zeroes of quadratic polynomial x^2-3 is -3

Reason: Sum of zeroes of quadratic polynomial ax^2+bx+c is $\frac{c}{a}$

3) Assertion: Product of the zeroes of a quadratic polynomial $x^2+7x+10$ is 10

Reason: Product of the zeroes of a quadratic polynomial ax^2+bx+c is $\frac{c}{a}$

4) Statement - 1 : $(x-1)$ is a factor of x^2+1

Statement - 2: $x-a$ is a factor of $p(x)$ if $p(a)=0$

5) Assertion: The polynomial $p(x)=5x-\frac{1}{2}$ is a linear polynomial

Reason: The general form of linear polynomial is $ax+b$

6) Assertion: product of the zeroes of a quadratic polynomial x^2+4x+6 is 6

Reason: Sum of the zeroes of a quadratic polynomial ax^2+bx+c is $\frac{-b}{a}$

7) Assertion: If α and β are zeroes of the polynomial x^2-x-4, then $\alpha+\beta=-4$

Reason: For a quadratic polynomial $p(x)=ax^2+bx+c$, sum of the zeroes $= \frac{-x \text{ coefficient}}{x^2 \text{ coefficient}}$.

8) Assertion: If one root of the quadratic polynomial $f(x)=(k-1)x^2-10x+3$, $k\neq 1$ is reciprocal of the other, then $k=4$

Reason: The product of roots of the quadratic polynomial ax^2+bx+c, $a\neq 0$ is $\frac{a}{c}$.

9) If α, β and γ are the zeroes of $p(x) = x^3 + 3x^2 - x - 2$, then match the following:

i) $\alpha+\beta+\gamma$	a) 2
ii) $\alpha\beta+\beta\gamma+\gamma\alpha$	b) -3
iii) $\alpha\beta\gamma$	c) -1

A) i-a, ii-x, iii-b B) i-b, ii-c, iii-a C) i-b, ii-a, iii-c

D) i-a, ii-b, iii-c

10) Assertion: Degree of a zero polynomial is not defined

Reason: Degree of a non-zero constant polynomial is '0'

11) Assertion: The graph of a linear polynomial intersects the x-axis at a point.

Reason: For polynomial $p(x)$ of degree 'n' the graph of $y = p(x)$ intersect x-axis atmost points.

12) Assertion: The sum of the zeroes of a polynomial $p(x) = 2x^3 - 5x^2 - 14x + 8$ is $\frac{-5}{2}$

Reason: Sum of the zero of a polynomial $p(x) = ax^3 + bx^2 + cx + d$ is $\frac{-b}{a}$

13) Assertion: If α, β, γ are the zeroes of the polynomial $p(x) = ax^3 + 3x^2 + cx + d$ then $\alpha+\beta+\gamma = \frac{c}{a}$

Reason: product of the zeroes of the quadratic polynomial is $\frac{c}{a}$

14) Assertion: The polynomial $f(x) = x^2 - 2x + 2$ has two real zeroes

Reason: A quadratic polynomial can have atmost two real zeroes.

15) Assertion: $ax^2 + bx + c$ is a quadratic polynomial if $a \neq 0$

Reason: Quadratic polynomial has degree '2'.

16) Assertion: If α, β and γ are the zeroes of the polynomial $6x^3+3x^2-5x+1$, then $\alpha^{-1}+\beta^{-1}+\gamma^{-1}=5$

Reason: α, β, γ are the zeroes of the cubic polynomial ax^3+bx^2+cx+d, then $\alpha+\beta+\gamma=\frac{-b}{a}$

17) Statement A: If α, β are the zeroes of the quadratic polynomial ax^2+bx+c then $\alpha+\beta=\frac{-b}{a}$, $\alpha\beta=\frac{c}{a}$

Statement B: In the polynomials, if $p(x)=g(x)\cdot q(x)+r(x)$ then it is a division algorithm

18) Statement A: There exists atleast one zero value to every polynomial.

Statement B: If the maximum number of possible zeroes of a polynomial is 3 then it is a cubic polynomial

19) Statement A: A cubic polynomial have atmost three zeroes

statement B: The degree of a quadratic polynomial is not two.

20) Statement A: The zero of $ax+b$ is $\frac{-b}{a}$

Statement B: The graph of $y=ax^2+bx+c$ is a straight line

21) Statement A: The product of zeroes of x^2-5x+6 is 5

Statement B: A quadratic polynomial can have only one real zero.

II 1) The degree of bi-quadratic polynomial is ____

2) The graph of the polynomial $p(x) = 3x+1$ meets the x-axis at the point ____

3) If α and β are the zeroes of the polynomial $x^2 - x - 2$. Match the following

p) $\alpha+\beta$	i) 1	A) p-i, q-ii, r-iii
q) $\alpha\beta$	ii) $\frac{-1}{2}$	B) p-i, q-iii, r-ii
r) $\frac{1}{\alpha}+\frac{1}{\beta}$	iii) -2	C) p-iii, q-i, r-ii
		D) p-iii, q-ii, r-i

4) Product of zeroes of $2x^2+6x+m$ is -1 then $m =$ ____

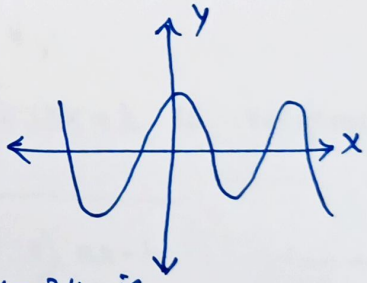
5) The number of polynomials having zeroes as -2 and 5 is ____ A) 1 B) 2 C) 3 D) more than 3 [ ]

6) If the graph of a polynomial does not intersect the x-axis at any point, then that polynomial has ____

7) i) The zeroes of x^2-5 are $\sqrt{5}$ and $-\sqrt{5}$ [True / False]

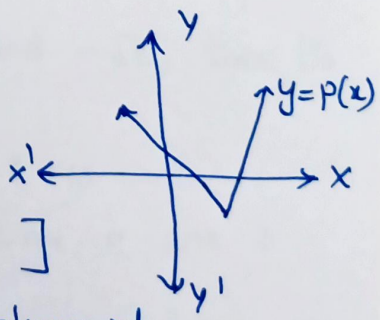
ii) zeroes of t^2-15 are ____.

8) The graph of a polynomial is shown in figure, then the number of its zeroes is ____



9) No. of zeroes of the polynomial $2x^2+2x-24$ is ____

10) From the graph, number of zeroes does the polynomial $p(x)$ have ____



11) Zero of the polynomial $2x^2+x-6$ is ____

A) -2 B) $\frac{3}{2}$ C) A & B D) All the above [ ]

12) If $\sqrt{5}$ and $-\sqrt{5}$ are two zeroes of the polynomial $x^3+3x^2-5x-15$ then its third zero is [ ]

A) 3 B) -3 C) 5 D) -5

13) If the sum of the zeroes of the polynomial $f(x) = 2x^3 - 3kx^2 + 4x - 5$ is 6, then the value of k is ——

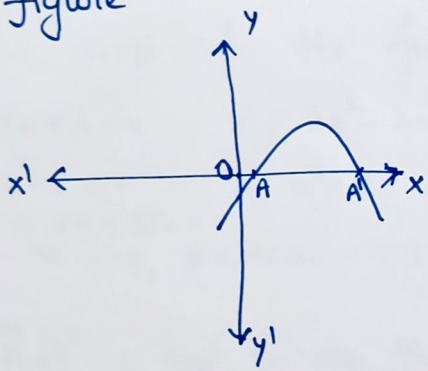
14) If the product of zeroes of the polynomial $f(x) = ax^3 - 6x^2 + 11x - 6$ is 4, then $a =$ ——

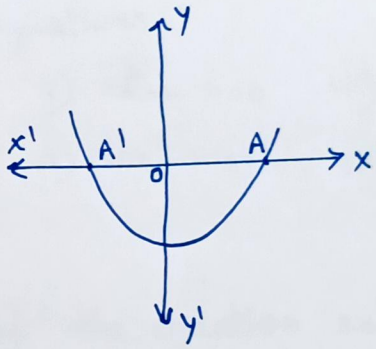
15) If one of the zeroes of the quadratic polynomial $(k-1)x^2 + kx + 1$ is -3, then the value of k is [ ]

A) $\frac{4}{3}$ B) $\frac{-4}{3}$ C) $\frac{2}{3}$ D) $\frac{-2}{3}$

16) Sum of the zeroes of the polynomial $p(x) = ax^3 + bx^2 + cx + d$ is ——

17) Find the no. of zeroes of the given quadratic polynomials in the figure





18) If one root of the polynomial $f(x) = 5x^2 + 13x + k$ is reciprocal of the other, then the value of k is ——

19) Zero of the polynomial i) $3x + 5$ is —— ii) $ax - b$ is —— iii) $ax + b$ is ——

20) zeroes of the polynomial $x^2 + x - 6$ are ——

21) If two zeroes of $x^3 + x^2 - 5x - 5$ are $\sqrt{5}$ and $-\sqrt{5}$, then its third zero is ——

22) The product of the zeroes of $x^3 + 4x^2 + x - 6$ is ——

23) If two zeroes of the polynomial $x^3 + x^2 - 9x - 9$ are 3 and -3, then its third zero is ——

24) zeroes of the polynomial $x^2 - 5x + 6$ is ——

25) The value of $p(x) = x^2 + 1$ at $x = -1$ is ——

26) Degree of a polynomial $x(x+1)(x-1)$ is ——