Homework-4 [Case-studies]

The figure shows the bridge with hanging wires.

(i) Name the shape of the hanging wires?

(a) linear (b) Spiral (c) parabola (d) Ellipse

(ii) What will be the expression of the polynomial shown?

(a) $y=ax+b$ (b) $y=ax^2+bx+c$ (c) $y=ax^3+bx^2+cx+d$ (d) none

(iii) The polynomial representing sum of zeroes -3 and the product of zeroes 5 is

(a) x^2-3x-5 (b) x^2+3x-5 (c) x^2-3x+5 (d) x^2+3x+5

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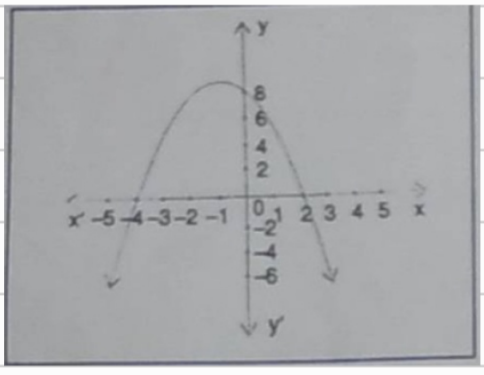


Due to cyclonic storm, electric poles bent out as shown. It followed a mathematical shape

(a) how many zeroes are there for the polynomial representing the shape?

(b) Find the zeroes of the polynomial represented by the electric pole.

(c) What is the expression of the polynomial representing the electric pole?

(d) Find the value of the polynomial at $x=-1$.

3)

The suspension bridge cables are in parabolic shape.

(i) if the suspension cable is represented by the polynomial $x^2-8x-20$, find its zeroes.

(ii) Find a quadratic polynomial with sum and product of whose zeroes are -4 and -12.

(iii) Find a quadratic polynomial whose one zero is -2

and product of whose zeroes is 8.

(iv) Find a quadratic polynomial whose zeroes are reciprocal of the zeroes of $6x^2-7x-3$.

(v) If the parabola representing a quadratic polynomial ax^2+bx+c touches x-axis, then

(a) it has only one real root

(b) its roots are real and equal

(c) it has no real roots

(d) its roots are of opposite signs.

4)

A highway underpassage is parabolic in shape

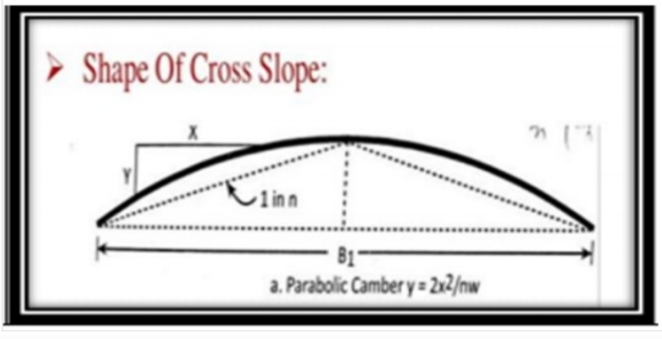
(i) If the highway overpass is represented by x^2-2x-8, Then its zeroes are

(a) 2, -4

(b) 4, -2

(c) -2, -2

(d) -4, -4



(ii) No. of zeroes of the polynomial representing highway overpass is equal to number of points where the graph of polynomial

(a) intersects the x-axis

(b) intersects the y-axis

(c) intersects y-axis or x-axis

(iii) Graph of quadratic polynomial is a

(a) straight line (b) circle

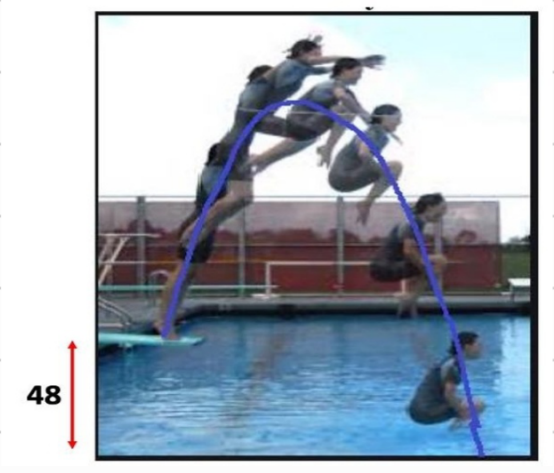
(c) parabola (d) ellipse

(iv) The representation of Highway Underpass

whose one zero is 6 and sum of the zeroes is 0 is
(a) x^2-6x+2 (b) x^2-36 (c) x^2-6 (d) x^2-3

(v) The number of real zeroes that polynomial $f(x) = (x-2)^2+4$ can have is
(a) 1 (b) 2 (c) 0 (d) 3

5)



The figure shows the path of a driver when she takes a jump from the diving board. Clearly, it is a parabola. Annie was standing on a diving board, 48 feet above the water level. She took a dive into the pool. Her height (in feet) above the water level at any time 't' in seconds is given by the polynomial $h(t)$ such that $h(t) = -16t^2+8t+k$

(i) What is the value of k?
(a) 0 (b) −48 (c) 48 (d) −16

(ii) At what time will she touch the water in the pool?
(a) 30 seconds (b) 2 seconds
(c) 1.5 seconds (d) 0.5 seconds

(iii) Rita's height above the water level (in feet) is given by another polynomial $p(t)$ with zeroes −1 and 2. Then $p(t)$ is given by
(a) t^2+t-2 (b) t^2+2t-1 (c) $24t^2-24t+28$
(d) $-24t^2+24t+48$

(iv) A polynomial $q(t)$ with sum of zeroes as 1 and the product as −6 is modelling Anni's height in feet above the water at any time

t (in seconds). Then q(t) is given by

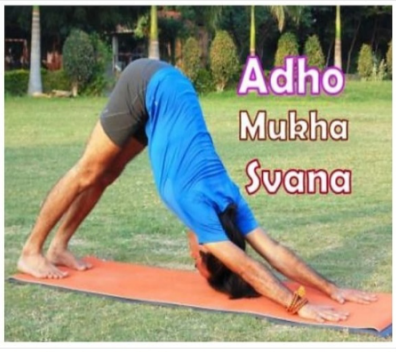
(a) t^2+t+t (b) t^2+t-6

(c) $-8t^2+8t+48$ (d) $8t^2-8t+48$

(v) The zeroes of the polynomial $r(t) = -12t^2+(k-3)t+48$ are negative of each other. Then k is

(a) 3 (b) 0 (c) −1.5 (d) −3

6)



Meditation poses can be related to representation of a quadratic polynomial

(i) The shape of the poses shown is

(a) spiral (b) Ellipse (c) linear (d) Parabola

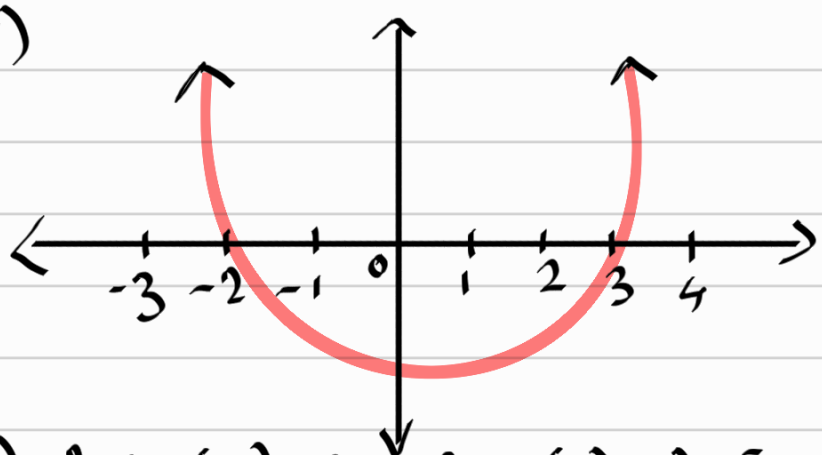
(ii) The graph of the parabola representing the polynomial $p(x) = ax^2+bx+c$ opens downwards, if

(a) $a \geq 0$ (b) $a = 0$ (c) $a < 0$ (d) $a > 0$

(iii) The no. of zeroes of the polynomial representing the graph is

(a) 0 (b) 1 (c) 3 (d) 2

(iv)



The zeroes of the polynomial representing the graph is

(a) −2, 3 (b) 2, −3 (c) −2, 6 (d) 2, 3

(v) The polynomial representing the graph is given by

(a) x^2-x-6 (b) x^2+x-6 (c) x^2-x+6 (d) x^2+x+6

7)

The figure shows various structures in shape of parabola. A parabola is a curve represented by a quadratic polynomial $p(x) = ax^2+bx+c$.

(i) In the standard form of quadratic polynomial ax^2+bx+c,

(a) a, b and c all are rational numbers

(b) a, b and c all are integers

(c) a, b and c all are real numbers

(d) a is a non-zero real number and b and c are real numbers

(ii) If α and $\frac{1}{\alpha}$ are zeroes of the quadratic polynomial $2x^2-x+8k$, then the value of k is

(a) 4 (b) $\frac{1}{4}$ (c) $-\frac{1}{4}$ (d) 2

(iii) The graph of the polynomial $p(x) = x^2+1$

(a) intersects x-axis at two distinct points

(b) touches x-axis at a point

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(iv) If the sum and product of the roots of a quadratic polynomial are $-\alpha$ and $-\frac{1}{\alpha}$, then the quadratic polynomial is

(a) $a\left(x^2+\alpha x-\frac{1}{\alpha}\right)$ (b) $a\left(x^2-\alpha x-\frac{1}{\alpha}\right)$

8) (c) $a\left(x^2+\alpha x+\frac{1}{\alpha}\right)$ (d) $a\left(x^2-\alpha x+\frac{1}{\alpha}\right)$

Mira is very health conscious and avoids fast food, cakes, icecream etc on her birthday. She decided to serve fruits to her friends. She had 60 bananas and 36 apples which are to be distributed equally among all.

(i) How many maximum guests Mira can invite?
(a) 6 (b) 96 (c) 12 (d) 180

(ii) How many apples will each guests get?
(a) 3 (b) 6 (c) 4 (d) 5

(iii) How many bananas will each guest get?
(a) 3 (b) 6 (c) 4 (d) 5

(iv) If Mira also decides to distribute 42 mangoes, how many maximum guests she can invite?
(a) 12 (b) 6 (c) 8 (d) 180

(v) How many total fruits will each guest get?
(a) 23 (b) 25 (c) 17 (d) 18

9)

Name of the city	Distance travelled (Km)	Amount paid (Rs.)
City A	10	75
	15	110
City B	8	91
	14	145

The auto charges in a city comprise of a fixed charge together with the charge for the distance covered.

(i) If the fixed charges of autorickshaw be ₹x and the running charges be ₹y km/hr, the pair of linear equations representing the travel in City A is

(a) $x+10y=75; x+5y=145$ (b) $x+10y=75; x+15y=110$

(c) $x+8y=91; x+14y=145$ (d) $x+8y=145; x+14y=91$

(ii) For travelling in City B is

(a) $x+10y=75; x+5y=145$ (b) $x+10y=75; x+15y=110$

(c) $x+8y=91; x+14y=145$ (d) $x+8y=145; x+14y=91$

(iii) The amount paid by a person travelling 100 km in City A is

(a) ₹310 (b) ₹510 (c) ₹705 (d) ₹710

(iv) The amount paid by a person travelling 60 km in City B is

(a) ₹370 (b) ₹578 (c) ₹559 (d) ₹610

(v) The amount paid by a person in travelling 50 km in City A and 30 km in City B is

(a) ₹355 (b) ₹289 (c) ₹644 (d) ₹746

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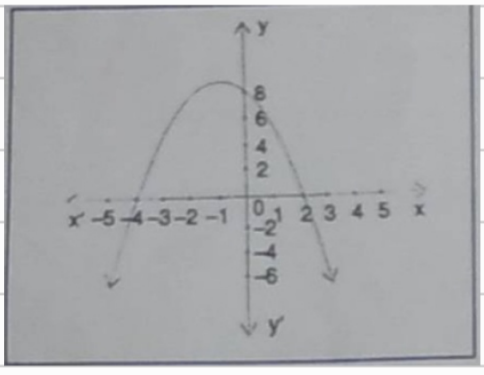

Due to cyclonic storm, electric poles bent out as shown. It followed a mathematical shape

(a) how many zeroes are there for the polynomial representing the shape? 2

(b) Find the zeroes of the polynomial represented by the electric pole. -4, 2

(c) What is the expression of the polynomial representing the electric pole? $p(x) = x^2+2x-8$

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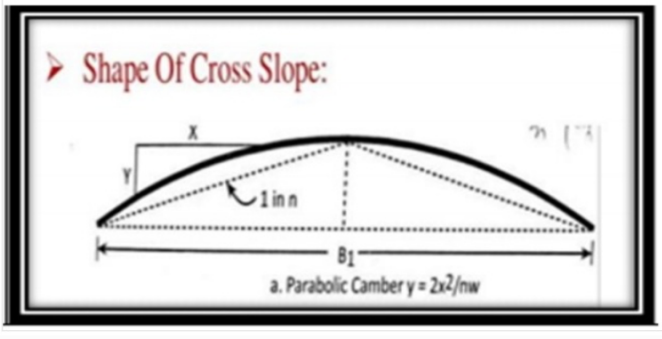

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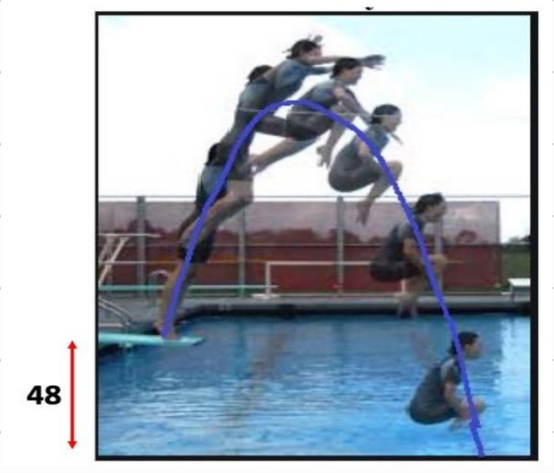

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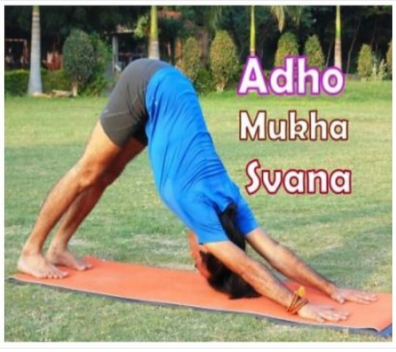

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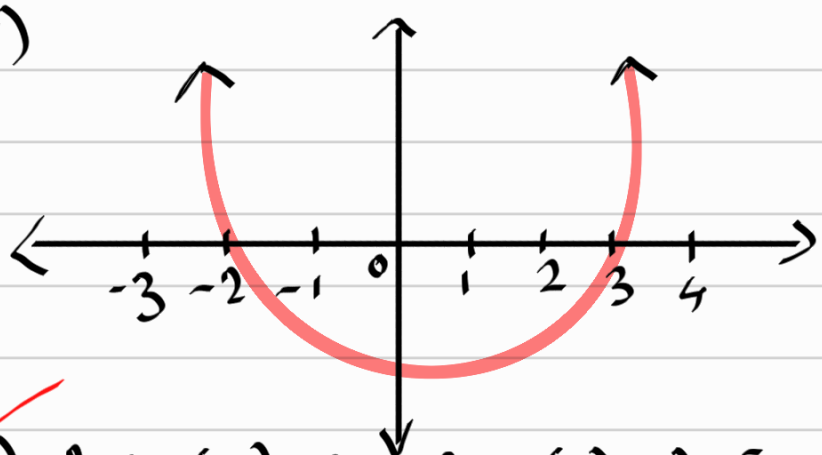

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(iv) The amount paid by a person travelling 60 km in City B is $x=19, y=9$

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LCM =