

CLASS - 10

MATHEMATICS

CH-2 : Polynomials

CBSE Board

Previous Year Questions-2

Shubham Tiwari

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

(CBSE Term I, 2022)

$$p(x) = (k-1)x^2$$

$$+ kx + 1$$

$$0 = (k-1)(-3)^2$$

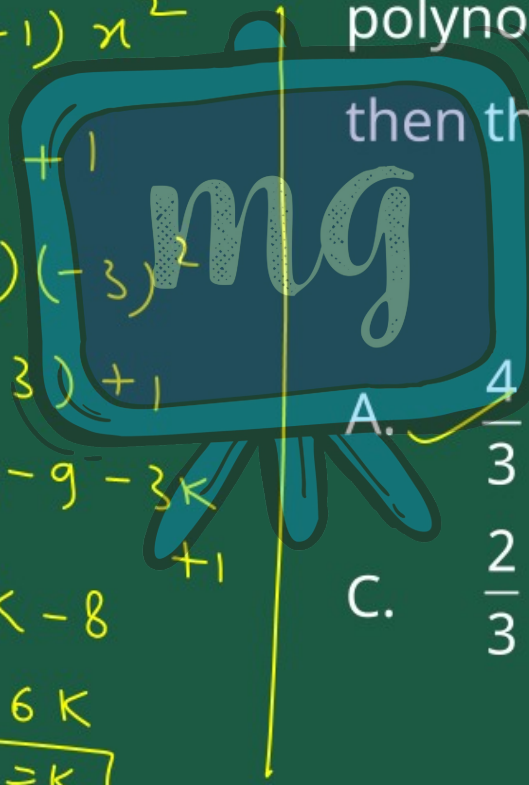
$$+ k(-3) + 1$$

$$0 = 9k - 9 - 3k$$

$$0 = 6k - 8$$

$$8 = 6k$$

$$\boxed{\frac{4}{3} = k}$$



A. $\frac{4}{3}$

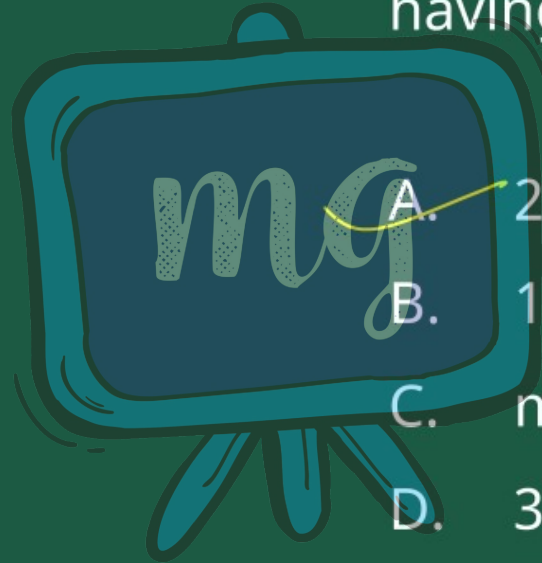
B. $-\frac{4}{3}$

C. $\frac{2}{3}$

D. $-\frac{2}{3}$

(K) $x^2 - (\alpha + \beta)x + \alpha\beta$ 2. The degree of polynomial having zeroes -3 and 4 only is -

(CBSE 2020)



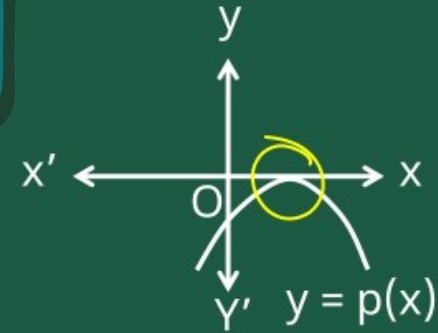
A. 2

B. 1

C. more than 3

D. 3

3. The graph of $y = p(x)$ is given, for a polynomial $p(x)$. The number of zeroes of $p(x)$ from the graph is –



(CBSE 2023)

- A. 3
- B. 1
- C. 2
- D. 0

4. If α and β are the zeroes of a polynomial $f(x) = px^2 - 2x + 3p$ and $\alpha + \beta = \alpha\beta$, then p is - (CBSE 2023)

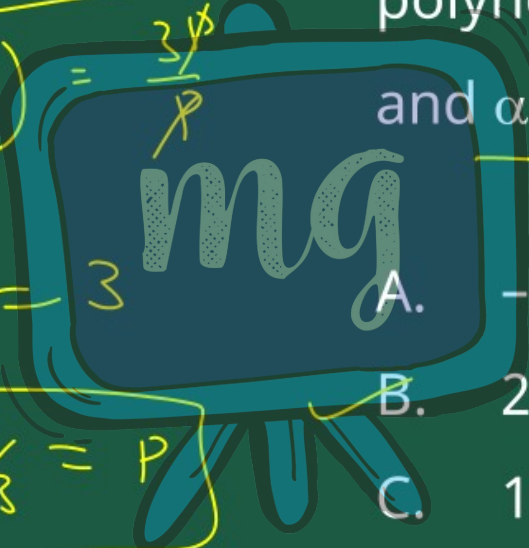
$\alpha + \beta = \alpha\beta$

$-\left(\frac{-2}{p}\right) = \frac{3p}{p}$

$\frac{2}{p} = 3$

$\frac{2}{3} = p$

A. $-\frac{2}{3}$
B. $\frac{2}{3}$
C. $\frac{1}{3}$
D. $-\frac{1}{3}$



$$\alpha \beta = 1$$

$$\frac{\gamma}{p} = 1$$

$$\gamma = p$$

5. If 2 and $\frac{1}{2}$ are the zeroes of $px^2 + 5x + r$, then -

(CBSE Term I, 2022)

A. $p = r = 2$

B. $p = r = -2$

C. $p = 2, r = -2$

D. $p = -2, r = 2$

$$2 + \frac{1}{2} = \frac{5}{2}$$

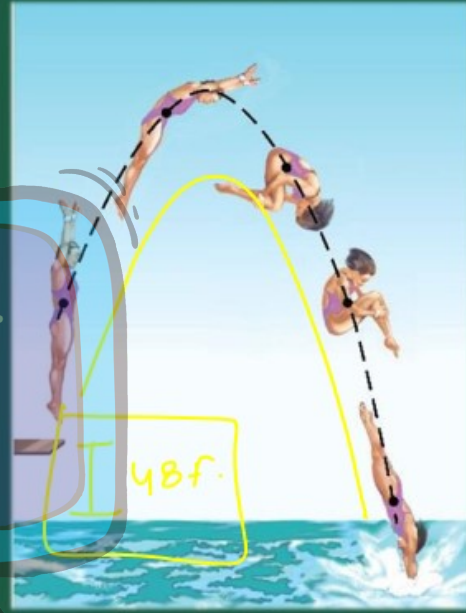
$$\alpha + \beta = -\frac{b}{a}$$

$$\frac{5}{2} = -\frac{5}{p}$$

$$\underline{p = -2}$$

6. **Case study** : The figure given alongside shows the path of a diver, 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 second) is given by the polynomial $h(t)$ such that $h(t) = -16t^2 + 8t + k$.

$$h(t) = -16t^2 + 8t + k$$
$$48 = -16(0) + 8(0) + k$$
$$48 = 0 + 0 + k$$

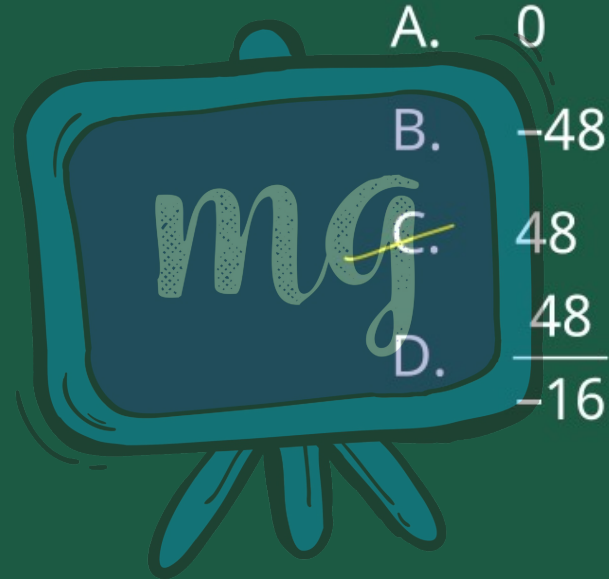


Based on above information attempt all subparts.

(CBSE Term I, 2022)

i. What is the value of k ?

3



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


$$h(t) = -16t^2 + 8t$$

+48

$$0 = -8 [2t^2 - t - 6]$$

$$2t^2 - t - 6 = 0$$

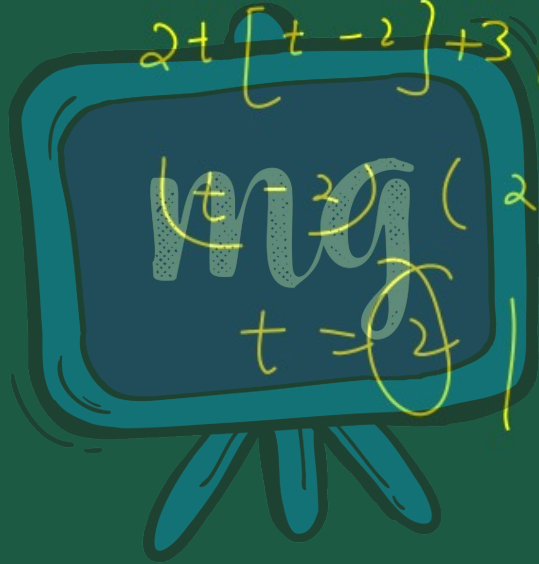
$$2t^2 - 4t + 3t - 6 = 0$$

$$2t[t - 2] + 3[t - 2] = 0$$

$$(t - 2)(2t + 3) = 0$$

$$t = 2 \quad | \quad t = -\frac{3}{2}$$

12
4 x 3



$$p(t) =$$

$$K [t^2 - (\alpha + \beta)t + \alpha\beta]$$

$$= K [t^2 - (-1+2)t + (-1)]$$

$$= K [t^2 - 1 \times t - 2]$$

$$= K [t^2 - t - 2]$$

$$= -24t^2 + 24t + 48$$

iii. Rita's height (in feet) above the water level 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. $24t^2 - 24t + 48$

D. $-24t^2 + 24t + 48$

$$q(t) =$$

$$\alpha + \beta = 1$$

$$\alpha\beta = -6$$

$$\begin{aligned} q(t) &= k \left[t^2 - (1)t + (-6) \right] \\ &= k \left[t^2 - t - 6 \right] \\ &= k \left[t^2 - t - 6 \right] \\ &= -8t^2 + 8t + 48 \end{aligned}$$

iv. A polynomial $q(t)$ with sum of zeroes as 1 and the product as -6 is modeling Anu's height in feet above the water at any time (in seconds). Then $q(t)$ is given by –

A. $t^2 + t + 6$

B. $t^2 + t - 6$

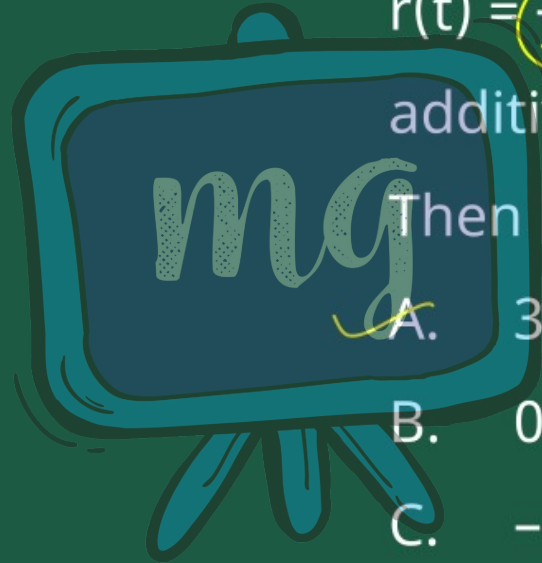
C. $-8t^2 + 8t + 48$

D. $8t^2 - 8t + 48$

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

Then k is -

- A. 3
- B. 0
- C. -1.5
- D. -3



$$a + b = 0$$

$$\alpha + \beta = -b/a$$

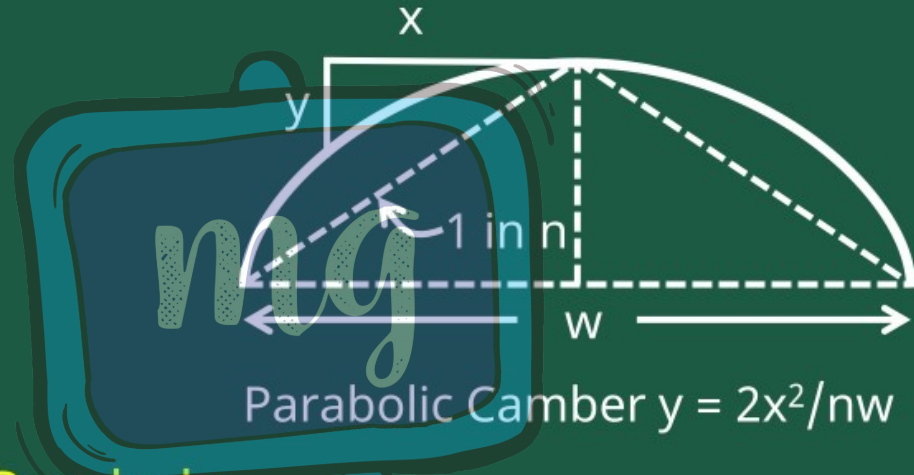
$$0 = -\frac{(k-3)}{-12}$$

$$0 = -(k-3)$$

7. **Case study** : Applications of
Parabolas–Highway Overpasses/
Underpasses A highway
underpasses is parabolic in shape.

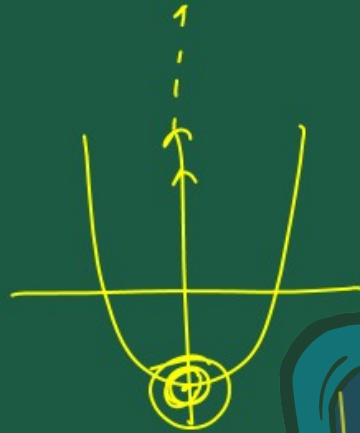


Shape of cross slope :

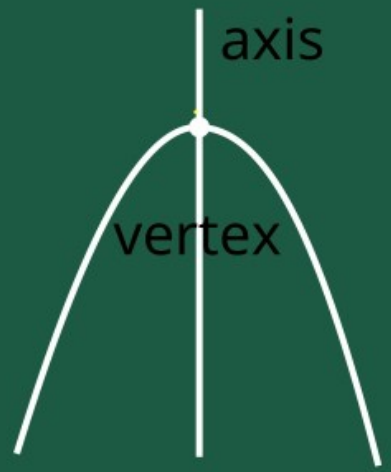
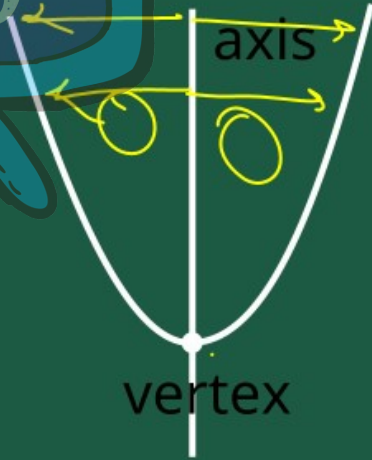


Parabola

A parabola is the graph that results from $p(x) = ax^2 + bx + c$. Parabolas are symmetric about a vertical line known as the Axis of symmetry.



The Axis of Symmetry runs through the maximum or minimum point of the parabola which is called the vertex.



Based on above information, attempt
all subparts.



(CBSE 2021)

$$\frac{x^2 - 2x - 8}{x^2 - (\alpha + \beta)x + \alpha\beta}$$

i. If the highway overpass is represented by $x^2 - 2x - 8$. Then

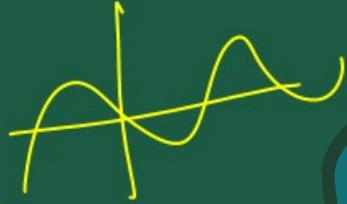
its zeroes are



- A. (2, -4)
- B. (4, -2)
- C. (-2, -2)
- D. (-4, -4)

$$\frac{x^2 - (\alpha + \beta)x + \alpha\beta}{x^2 - (\alpha + \beta)x + \alpha\beta}$$

$$\begin{aligned} & (4-2) \\ & x^2 - (2)x + 4x - 2 \\ & = -8 \end{aligned}$$

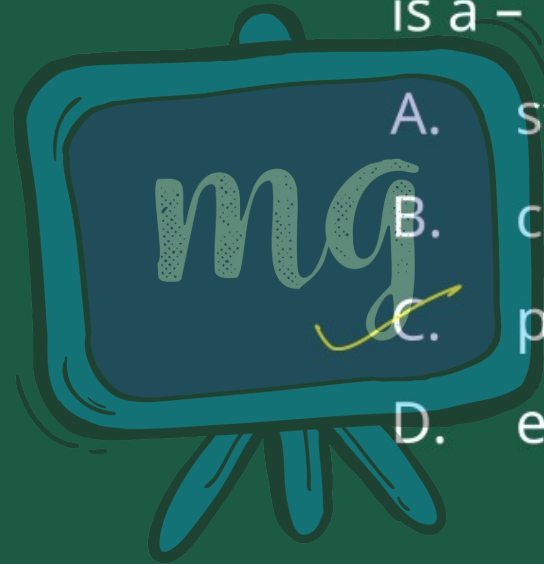


ii. The highway overpass is represented graphically. Zeroes of a polynomial can be expressed graphically. Number of zeroes of polynomial is equal to number of points where the graph of polynomial –

- A. Intersects x-axis
- B. Intersects y-axis
- C. Intersects y-axis and x-axis
- D. None of the above

iii. Graph of a quadratic polynomial

is a –



A. straight line

B. circle

C. parabola

D. ellipse

$$\alpha + \beta = 0$$

$$6 + \beta = 0$$

$$\beta = -6$$

$$\alpha = 6$$

$$x^2 - (\alpha + \beta)x + \alpha\beta$$

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 zeroes that polynomial $f(x) = (x - 2)^2 + 4$ can

have is -

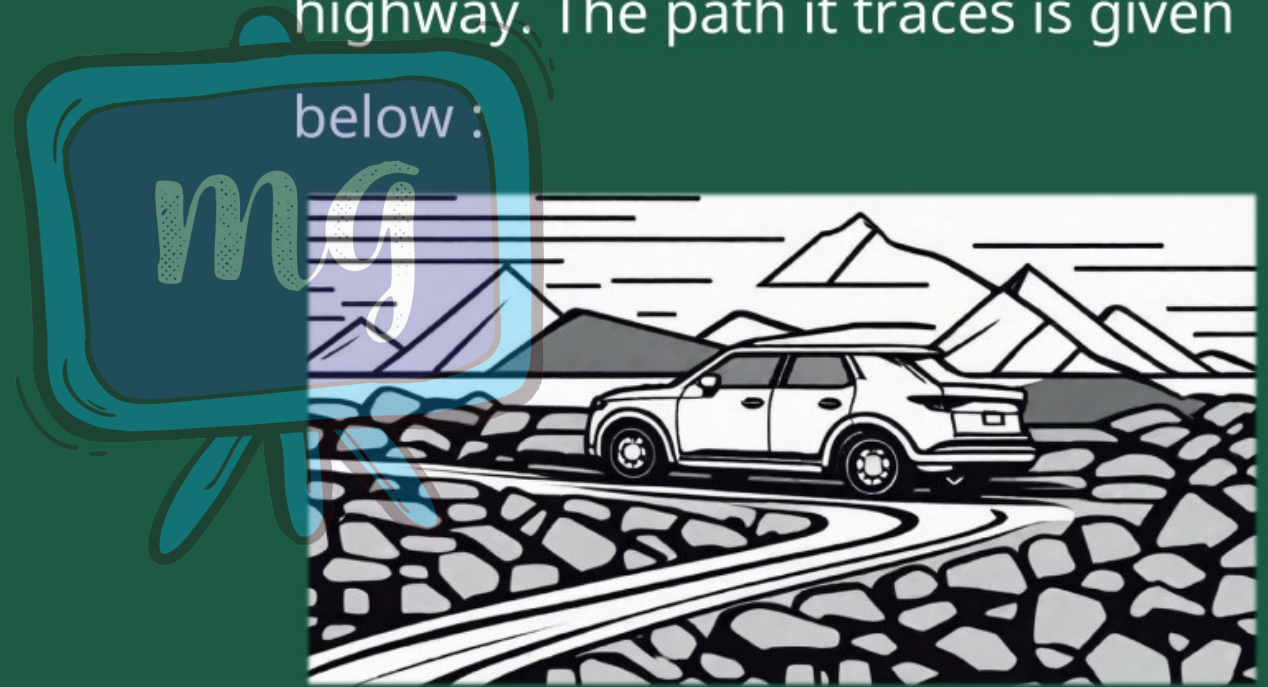
- $(-2)^2 = 4$
 $(-4)^2 = 16$
 $(-7)^2 = 49$
- A. 1
B. 2
C. 0
D. 3

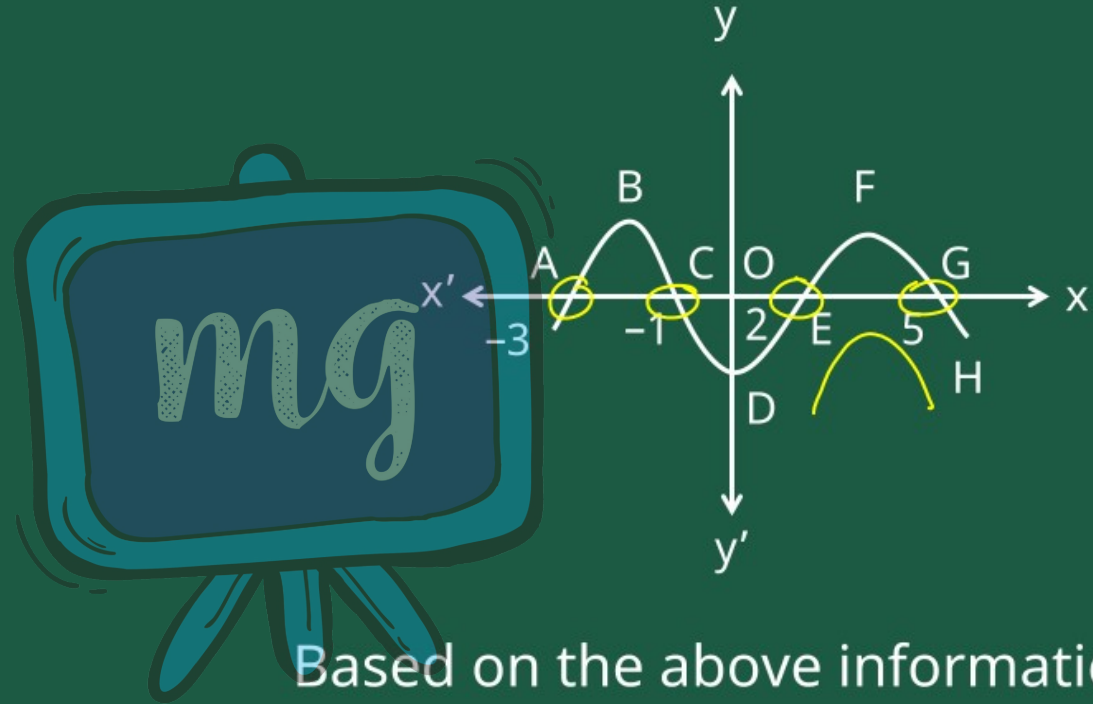
$$f(x) = (x-2)^2 + 4$$

+ve

$$8 = 4 + 4$$
$$16 = 4 + 4$$
$$49 = 4 + 4$$

8. **Case study** : A car moves on a highway. The path it traces is given below :



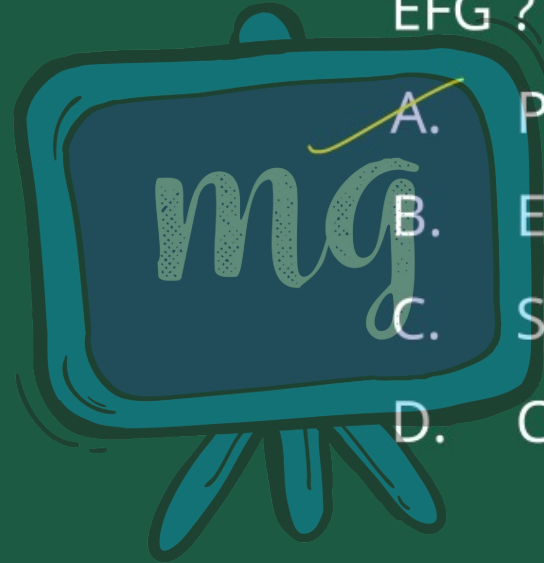


Based on the above information,
attempt all subparts.

(CBSE Term I, 2022)

i. What is the shape of the curve

EFG ?



- A. Parabola
- B. Ellipse
- C. Straight line
- D. Circle

$$p(x) = -(x^2 + 4x + 3)$$

$$① = (x^2 + 4x + 3)$$

$$x^2 - (\alpha + \beta)x + \alpha\beta$$

-4

$$\underline{x^2 + 4x + 3}$$

ii. If the curve ABC is represented by the polynomial $-(x^2 + 4x + 3)$, then its zeroes are -

A. 1 and -3

B. -1 and 3

C. 1 and 3 4

D. -1 and -3 -4

$$(-1), (2)$$

$$x^2 - (\alpha + \beta)x + \alpha\beta$$

$$x^2 - (1)x + (-2)$$

$$\underline{x^2 - x - 2}$$

iii. If the path traced by the car has zeroes at -1 and 2 , then it is given by -

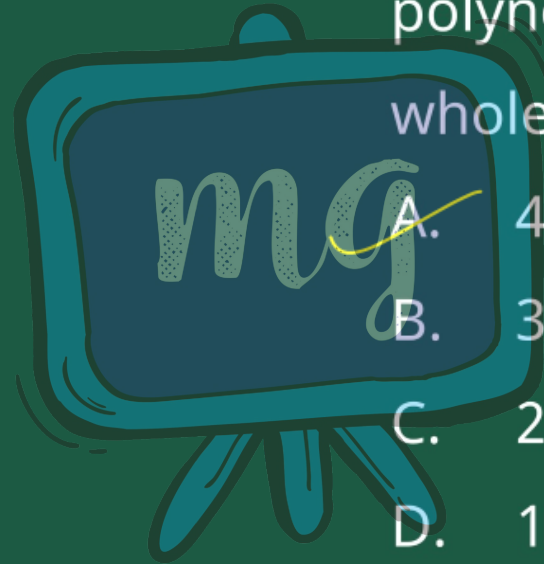
A. $x^2 + x + 2$

B. $x^2 - x + 2$

C. $x^2 - x - 2$

D. $x^2 + x - 2$

iv. The number of zeroes of the polynomial representing the whole curve, is –



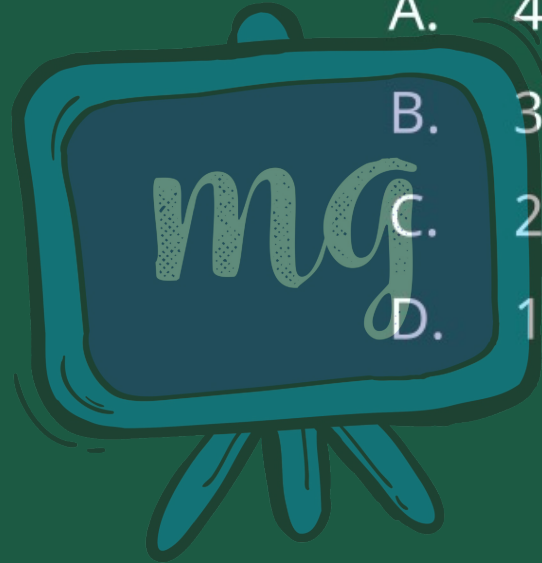
v. The distance between C and G is-

A. 4 units

B. 3 units

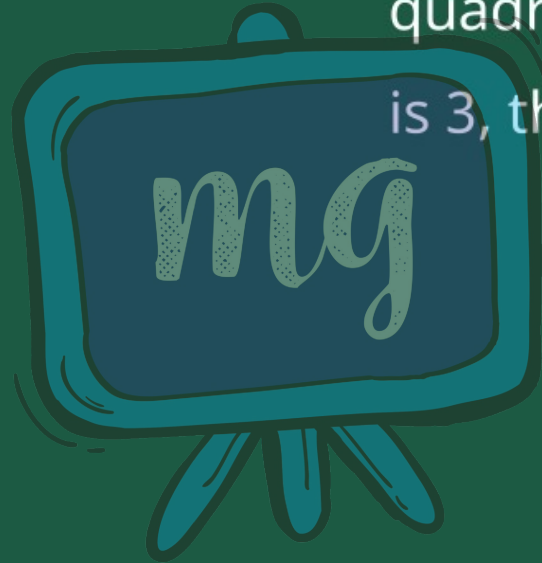
C. 2 units

D. 1 units



9. If the sum of the zeroes of the quadratic polynomial $3x^2 - kx + 6$ is 3, then find the value of k.

(CBSE 2021)

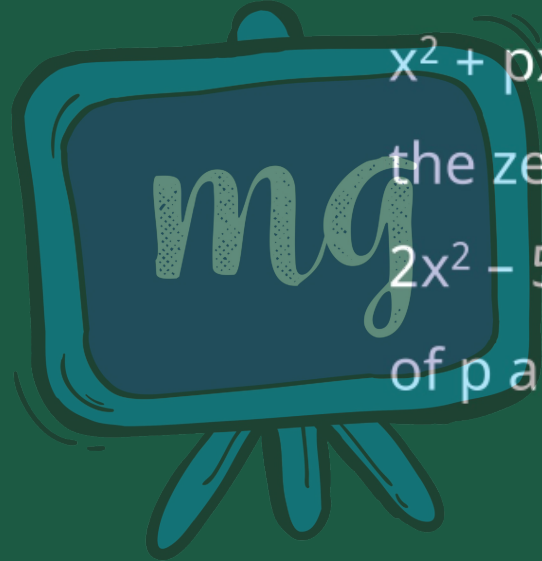


10. Find a quadratic polynomial
whose zeroes are $5 - 3\sqrt{2}$ and
 $5 + 3\sqrt{2}$.



(CBSE 2021)

11. If the zeroes of the polynomial $x^2 + px + q$ are double in value to the zeroes of the polynomial $2x^2 - 5x - 3$, then find the values of p and q .



(CBSE 2023)