

Term I - Part Test

Subject: Mathematics

Time: 01:30 hrs

Instructions:

- The question paper contains three sections.
- Section A (**1 - 20**) has 20 questions. Attempt any 16 questions.
- Section B (**21 - 40**) has 20 questions. Attempt any 16 questions.
- Section C (**41 - 50**) has 10 questions based on two Case Studies. Attempt any 8 questions.
- All questions carry equal marks.
- There is no negative marking.

1. If $f(x) = 4x^3 - 6x^2 + 5x - 1$ and α, β and γ are its zeros, then $\alpha\beta\gamma =$

A. 3

B. 5

C. -3

D. $\frac{1}{4}$

2. If L.C.M. (150, 100) = 300, then find H.C.F. (150, 100).

A. 25

B. 50

C. 45

D. 75

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3. Simplify the expression-
 $(\operatorname{cosec}^2\theta - 1) \times (\sec^2\theta - 1)$
- A. $\cot^2\theta$
- B. $\tan^2\theta$
- C. 1
- D. 0
4. Each of letters of the word PILOTS is on separate cards, face down on the table. If you pick a card at random, what is the probability that the letter will be a T or a L?
- A. $\frac{1}{6}$
- B. $\frac{1}{3}$
- C. $\frac{1}{2}$
- D. $\frac{2}{3}$
5. Which of the following is not an irrational number?
- A. $\sqrt{2}$
- B. π
- C. $\sqrt{3}$
- D. 4.8

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6. A box contains 3 black balls, 4 red balls and 3 green balls. All the balls are identical in shape and size. Rohit takes out a ball from the bag without looking into it. What is the probability that the ball drawn is a black ball?

A. $\frac{3}{10}$

B. $\frac{4}{10}$

C. $\frac{2}{5}$

D. $\frac{1}{2}$

7. $\frac{1 - \tan^2 45^\circ}{1 + \tan^2 45^\circ} =$

A. $\tan 90^\circ$

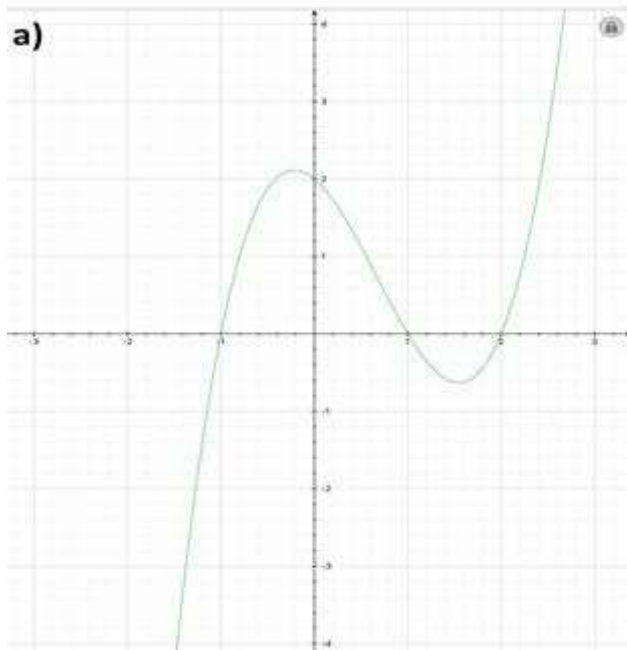
B. 1

C. $\sin 45^\circ$

D. 0

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8. Identify the number of zeroes of the polynomial represented by the graph shown below.



- A. 0
- B. 3
- C. 2
- D. 1
9. If the probability of an event E is 0.6 and the total number of outcomes is 100, then find the number of favourable outcomes.
- A. 30
- B. 40
- C. 50
- D. 60

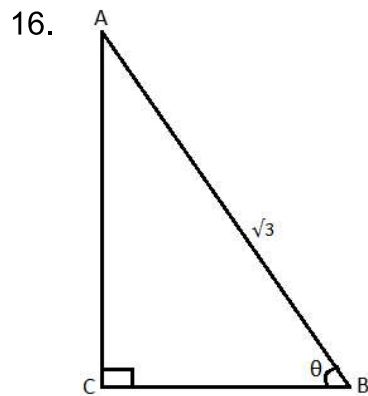
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10. If the value of $2\sin 2\theta = \sqrt{3}$, then the value of θ is _____.
- A. 45°
 - B. 30°
 - C. 60°
 - D. 90°
11. The difference of two numbers is 1365. On dividing the larger number by the smaller, we get 6 as quotient and 15 as remainder. What is the smaller number ?
- A. 240
 - B. 270
 - C. 295
 - D. 360
12. If one of the zeroes of the quadratic polynomial $(k-1)x^2 + kx + 1$ is -3 , then the value of k is:
- A. $\frac{2}{3}$
 - B. $\frac{-2}{3}$
 - C. $\frac{4}{3}$
 - D. $\frac{-4}{3}$

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13. Find the total number of outcomes when two coins and a die are tossed and rolled simultaneously.
- A. 10
 - B. 14
 - C. 24
 - D. 36
14. $\sqrt{3}$ is proved irrational by ____.
- A. factorisation
 - B. rationalisation
 - C. contradiction
 - D. expansion
15. The distance between A (1, 3) and B (x, 7) is 5. The value of x if $x > 0$ is :
- A. 4
 - B. 2
 - C. 1
 - D. 3

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Find the length of side AC.

- A. $\sin \theta$
- B. $\frac{\sin \theta}{\sqrt{3}}$
- C. $\sqrt{3} \sin \theta$
- D. $\sqrt{3} \sin^2 \theta$
17. What is the value of $\frac{\sin^2 63^\circ + \sin^2 27^\circ}{\cos^2 17^\circ + \cos^2 73^\circ}$?
- A. 0
- B. 1
- C. $\frac{1}{2}$
- D. 2
18. A bag contains coins numbered from 1 to 50. If one coin is picked up at random, find the probability that it bears a square number.
- A. $\frac{1}{2}$
- B. $\frac{7}{50}$
- C. $\frac{2}{3}$
- D. $\frac{1}{3}$

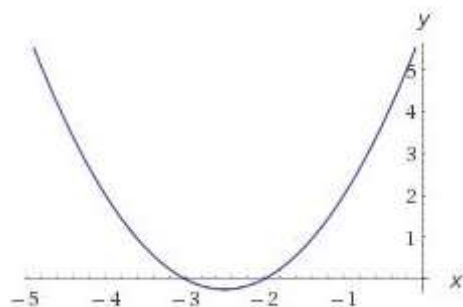
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19. The co-ordinates of the point on y-axis which is equidistant from the points A(3, 1) and B(1, 5) is:
- A. (0,4)
 - B. (0,2)
 - C. (4,0)
 - D. (2,0)
20. The decimal expansion of the rational number $\frac{14587}{1250}$ will terminate after _____ decimal place(s).
- A. 1
 - B. 2
 - C. 3
 - D. 4

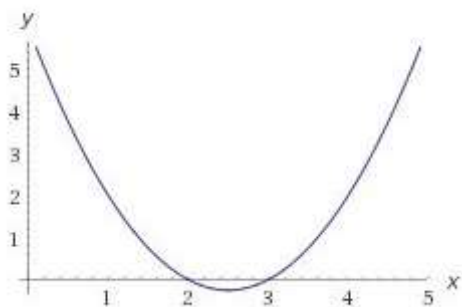
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21. Which of the following graph represents a quadratic polynomial which has sum of its zeroes is zero?

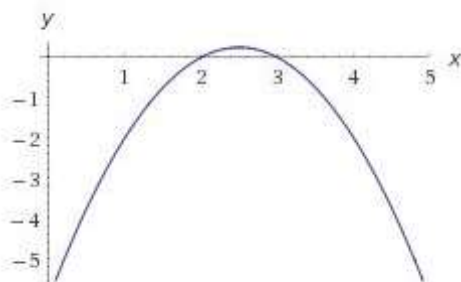
A.



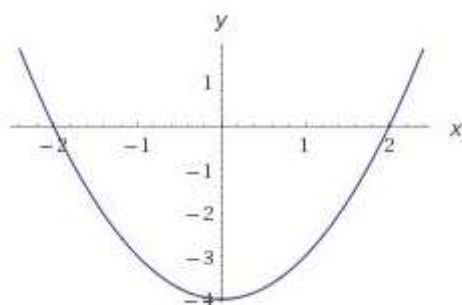
B.



C.



D.



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22. What is the probability of getting a sum of 13 when rolling a pair of dice?
- A. 0
- B. $\frac{1}{13}$
- C. $\frac{1}{12}$
- D. $\frac{1}{11}$
23. If $3\sin\theta + 4\cos\theta = 5$, then the value of $\sin\theta$ is _____.
- A. $\frac{2}{3}$
- B. $\frac{4}{5}$
- C. $\frac{3}{5}$
- D. $\frac{5}{3}$
24. The greatest four digits number which is divisible by 15, 25, 40 and 75 is
- A. 9000
- B. 9400
- C. 9600
- D. 9800
25. Simplify :
 $4(1 - \sin^2\theta)(1 + \tan^2\theta)$
- A. 4
- B. 1
- C. 2
- D. 0

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26. Determine the ratio in which the line $2x + y - 4 = 0$ divides the line segment joining the points A(2, -2) and B (3, 7).
- A. 2 : 9
- B. 9 : 2
- C. 9 : 1
- D. 1 : 9
27. The sum of two numbers is 135 and their H.C.F. is 27. If their L.C.M. is 162, the numbers are:
- A. 108, 27
- B. 72, 54
- C. 81, 54
- D. 99, 36
28. Two dice are thrown simultaneously. What is the probability of not getting same numbers on both dice?
- A. $\frac{1}{6}$
- B. $\frac{1}{4}$
- C. $\frac{5}{6}$
- D. $\frac{3}{4}$

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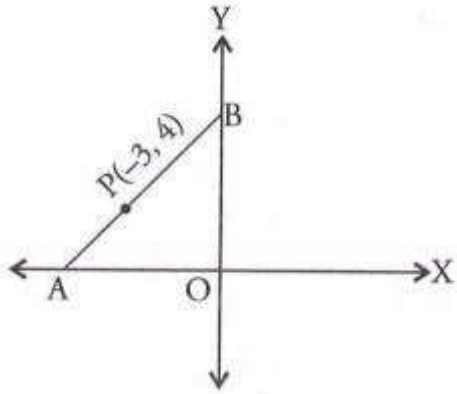
29. The HCF of two numbers is 27 and their LCM is 162. If one of the numbers is 54, what is the other number?
- A. 36
 - B. 45
 - C. 9
 - D. 81
30. Find a cubic polynomial whose zeroes are 2, -3 and 4.
- A. $x^3 - 3x^2 - 10x + 24$
 - B. $x^3 - x^2 - x + 2$
 - C. $x^3 + x^2 + x$
 - D. $2x^3 + x^2 + 1$
31. If $\sec(4A) = \operatorname{cosec}(A - 20^\circ)$, where $4A$ is an acute angle, then what is the value of A ?
- A. 110°
 - B. 22°
 - C. 55°
 - D. 44°
32. Which of the following words has highest probability of getting vowel if a letter is picked randomly from them?
- A. Aeroplane
 - B. Cashew
 - C. Eerily
 - D. Aside

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33. The co-ordinates of the point which divides the line joining the points $(-1, 7)$ and $(4, -3)$ in the ratio 2:3 is _____.
- A. $(1, 3)$
 - B. $(-1, 3)$
 - C. $(1, -3)$
 - D. $(-1, -3)$
34. What can you say about the product of a rational and an irrational number ?
- A. Always rational
 - B. Always irrational
 - C. rational or irrational
 - D. cannot be determined
35. $(\sin A + \operatorname{cosec} A)^2 - (\sin A - \operatorname{cosec} A)^2 =$
- A. 0
 - B. 1
 - C. 2
 - D. 4

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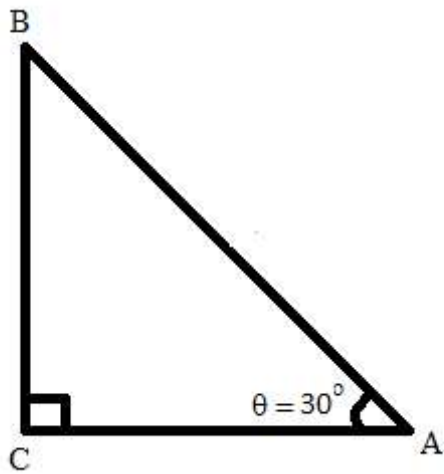
36. In the figure, line segment AB meets x - axis at A and y - axis at B. The point P(-3, 4) on AB divides it in the ratio 2 : 3. The coordinates of A and B respectively are _____ .



- A.** (-10, 0) and (0, 10)
- B.** (-5, 0) and (0, 5)
- C.** (-5, 0) and (0, 10)
- D.** (-10, 0) and (0, 10)
37. Decide whether 52.123456789 is a rational number or not. If rational (in the form $\frac{p}{q}$), what can you say about the prime factors of q?
- A.** Rational Number, Prime factors of q will have either 2 or 5 or both
- B.** Not rational number
- C.** Rational Number, Prime factor of q will have a factor other than 2 or 5.
- D.** Rational Number, Prime factor of q will be only 2.

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38. What is the value of $\tan\theta$ in $\triangle ABC$, if θ is increased by 30° .



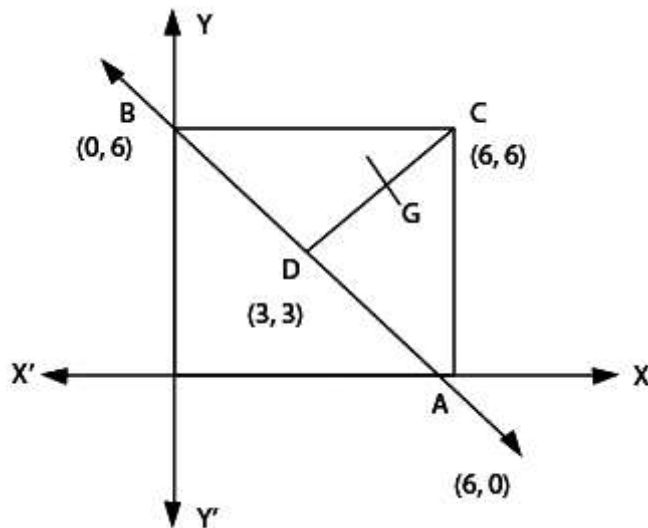
- A. $\sqrt{3}$
 - B. $\frac{1}{\sqrt{3}}$
 - C. 0
 - D. Not defined.
39. A book has pages numbered from 1 to 85. What is the probability that the sum of the digits on the page is 8, if a page is chosen at random?
- A. $\frac{6}{85}$
 - B. $\frac{7}{85}$
 - C. $\frac{9}{85}$
 - D. $\frac{8}{85}$

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40. What is the probability of not picking a face card when you draw a card at random from a pack of 52 cards?

- A. $\frac{1}{13}$
- B. $\frac{4}{13}$
- C. $\frac{10}{13}$
- D. $\frac{12}{13}$

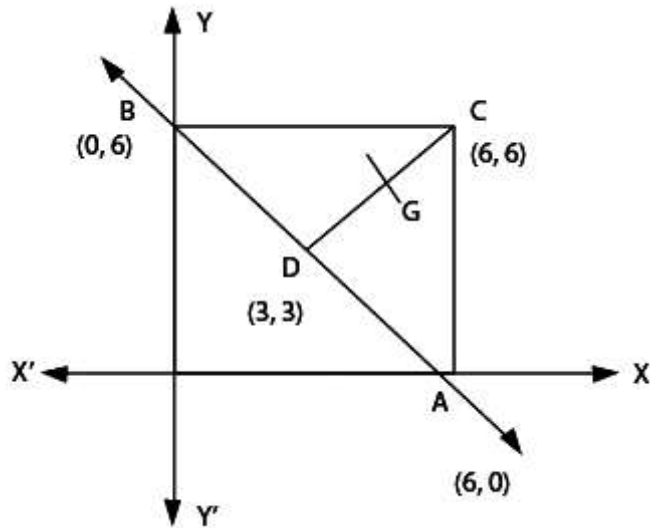
41. The houses of 4 friends are located at the points (6, 6), (0, 6), (3, 3) and (6, 0) as shown in the figure. A, C and B are the vertices of a right triangle. Find the distance between the houses at points C and D.



- A. $\sqrt{6}$ units
- B. $\sqrt{3}$ units
- C. $3\sqrt{2}$ units
- D. $\sqrt{5}$ units

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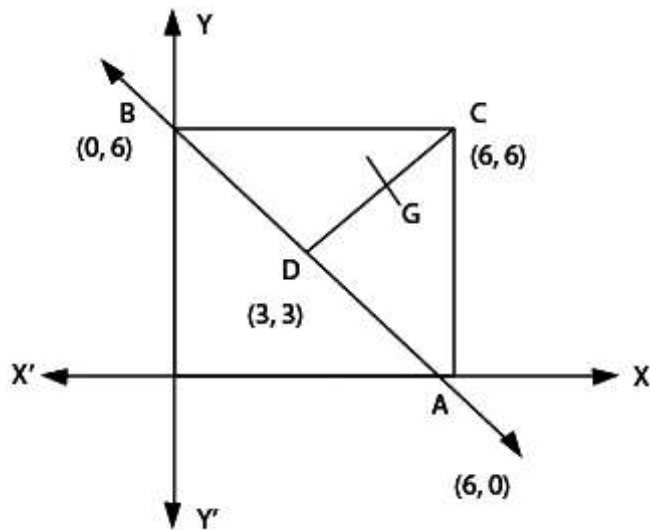
42. The houses of 4 friends are located at the points $(6, 6)$, $(0, 6)$, $(3, 3)$ and $(6, 0)$ as shown in the figure. A, C and B are the vertices of a right triangle. Find the distance between the houses at points B and D.



- A. $3\sqrt{2}$ units
- B. $2\sqrt{5}$ units
- C. $2\sqrt{3}$ units
- D. $\sqrt{6}$ units

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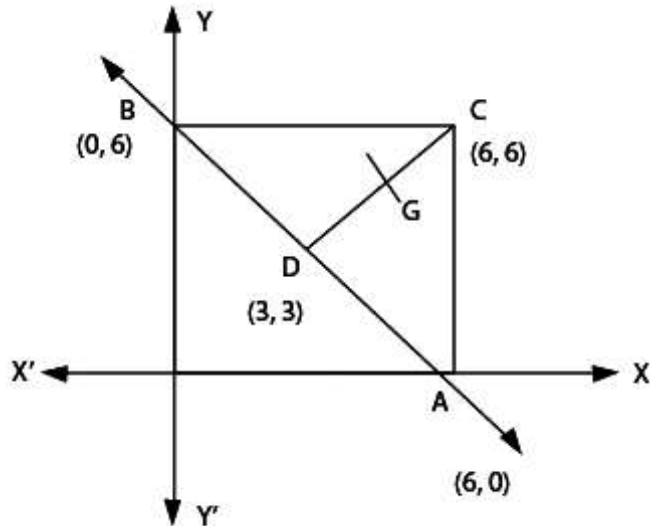
43. The houses of 4 friends are located at the points $(6, 6)$, $(0, 6)$, $(3, 3)$ and $(6, 0)$ as shown in the figure. A, C and B are the vertices of a right triangle. Find the ratio in which the line segment joining the houses B $(0, 6)$ and A $(6, 0)$ is divided by the house D $(3, 3)$.



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

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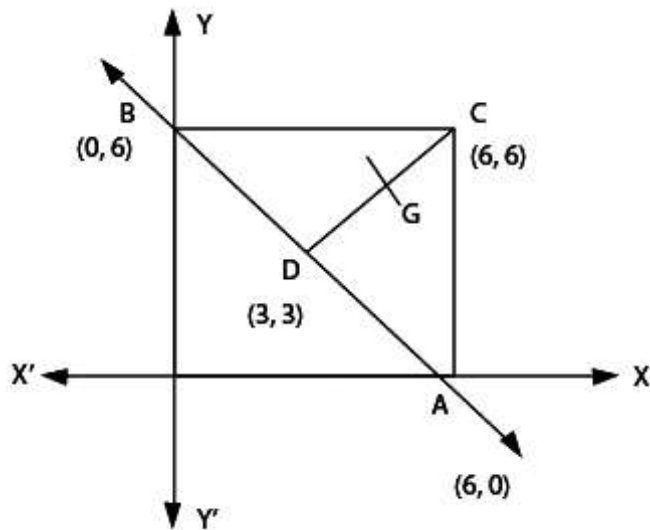
44. The houses of 4 friends are located at the points $(6, 6)$, $(0, 6)$, $(3, 3)$ and $(6, 0)$ as shown in the figure. A, C and B are the vertices of a right triangle. Find the coordinates of the midpoint of the line segment joining the points $B(0, 6)$ and $C(6, 6)$.



- A. $(0, 3)$
- B. $(3, 6)$
- C. $(6, 3)$
- D. $(6, 6)$

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45. The houses of 4 friends are located at the points $(6, 6)$, $(0, 6)$, $(3, 3)$ and $(6, 0)$ as shown in the figure. A, C and B are the vertices of a right triangle. Find the coordinates of the midpoint of the line segment joining the houses A $(6,0)$ and C $(6,6)$.

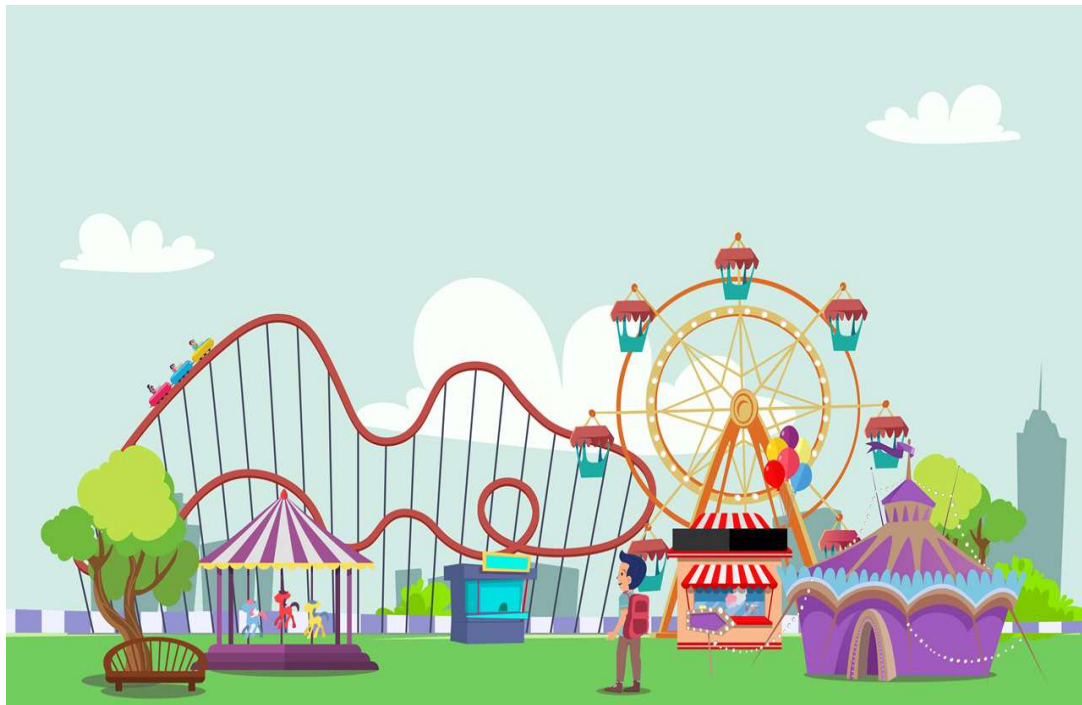


- A. $(2,3)$
- B. $(6,3)$
- C. $(3,2)$
- D. $(3,6)$

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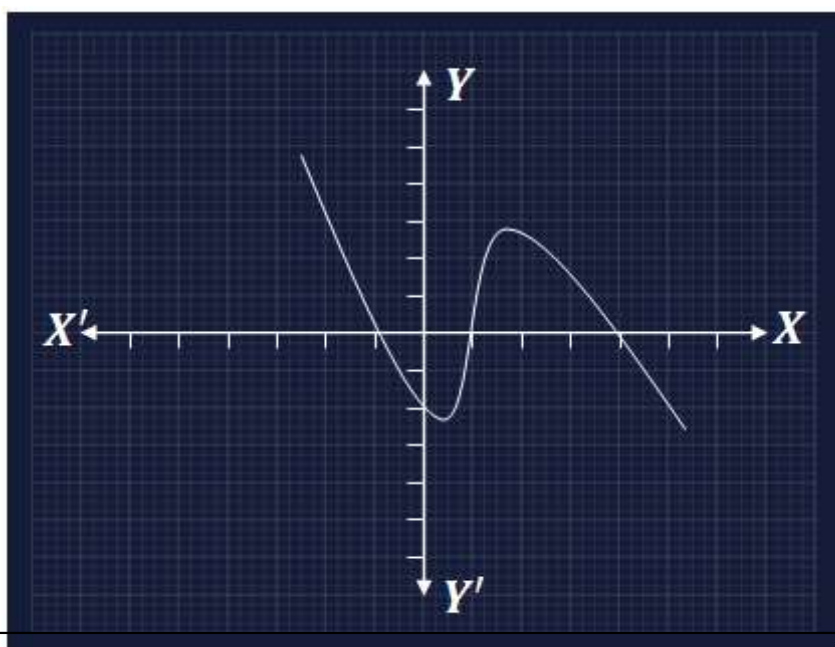
Polynomials in Real Life



Polynomials are everywhere. It is found in a roller coaster of an amusement park, the slope of a hill, the curve of a bridge or the continuity of a mountain range. They play a key role in the study of algebra, in analysis and on the whole many mathematical problems involving them.

Based on the given information, answer the following question:

If the roller coaster is represented by the following graph $y = p(x)$, then name the type of the polynomial it traces.



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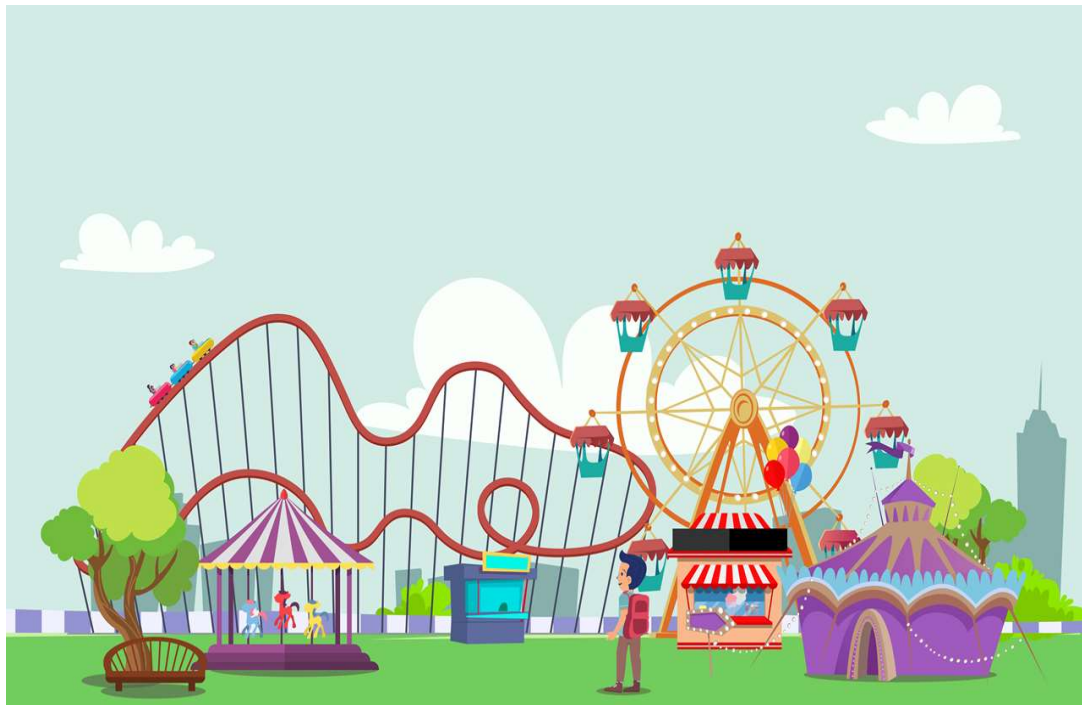
- A. Linear
- B. Quadratic
- C. Cubic
- D. Bi-quadratic

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47.

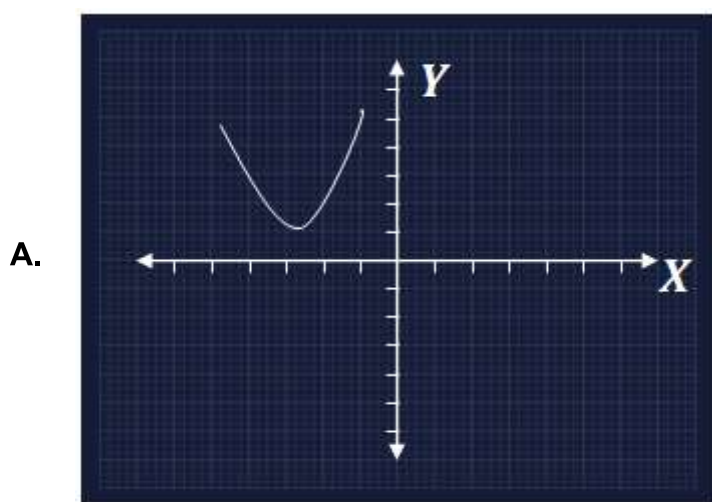
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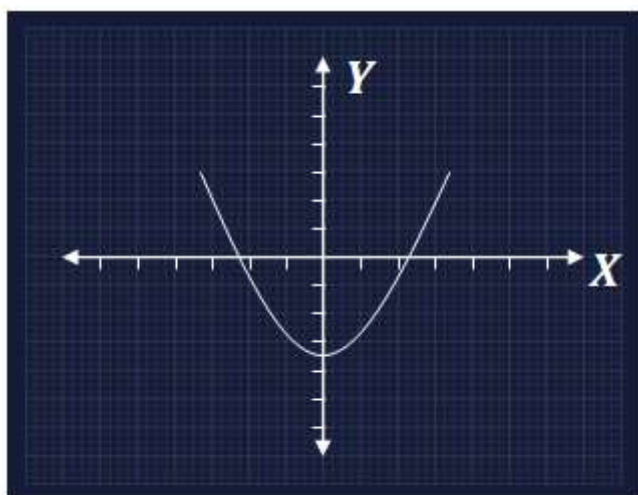
Based on the given information, answer the following question:

Which of the following polynomials has exactly one zero?

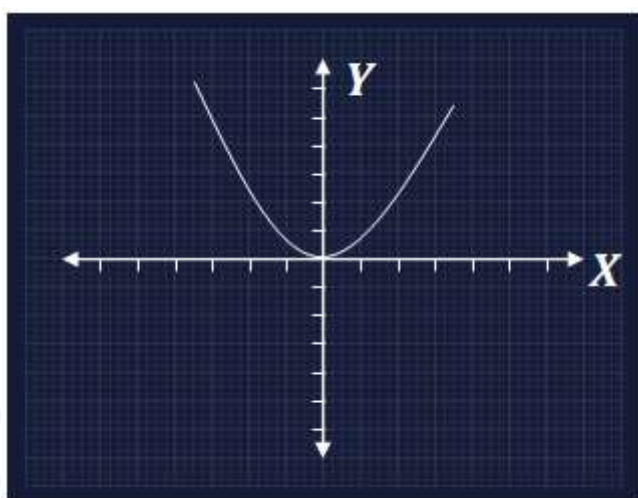


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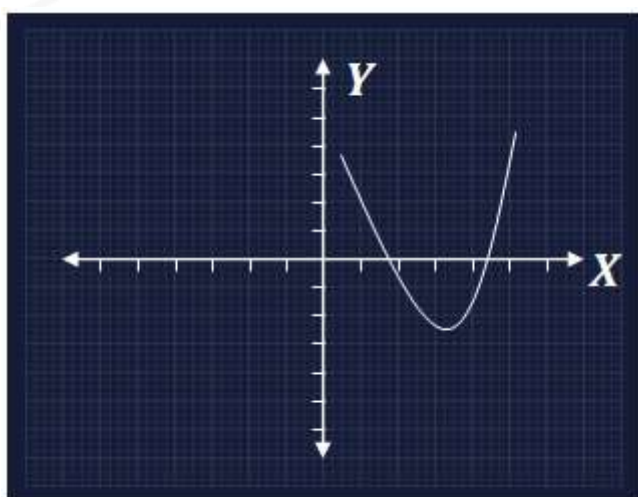
B.



C.



D.



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Polynomials in Real Life



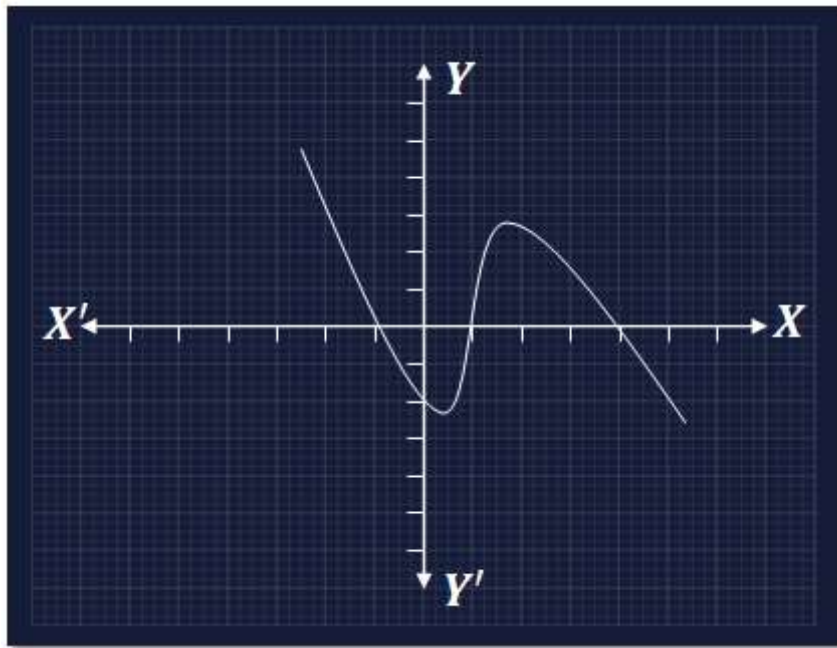
Polynomials are everywhere. It is found in a roller coaster of an amusement park, the slope of a hill, the curve of a bridge or the continuity of a mountain range. They play a key role in the study of algebra, in analysis and on the whole many mathematical problems involving them.

Based on the given information, answer the following question:

If the path traced by the Roller Coaster is represented by the graph

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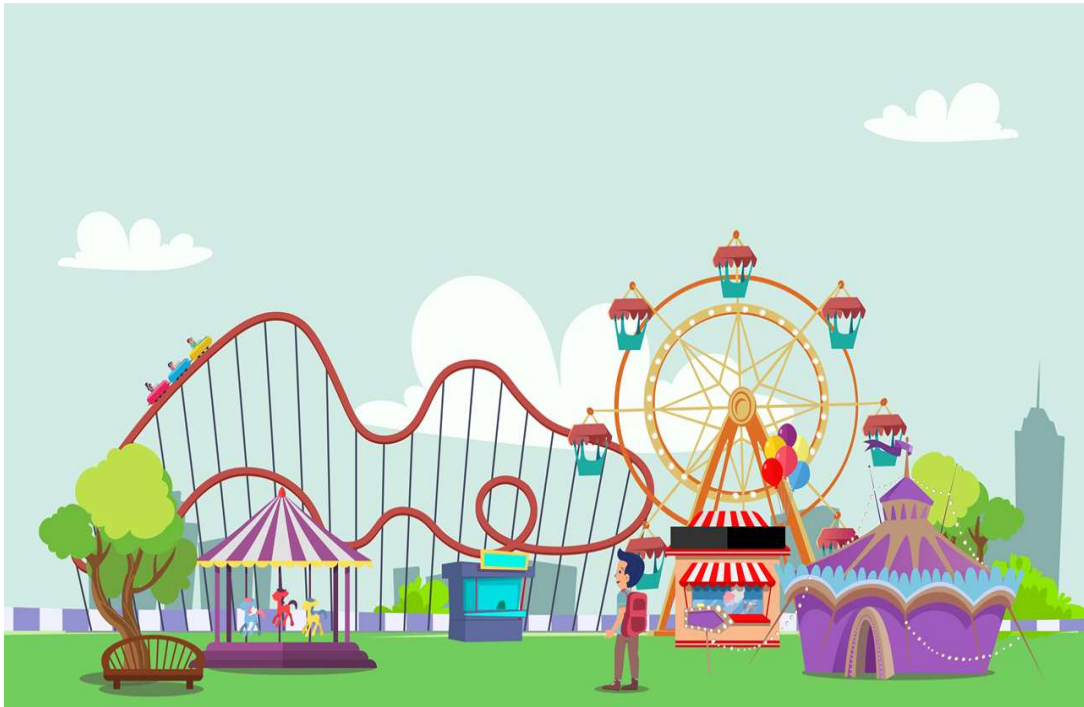
$y = p(x)$, find the number of zeroes?



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

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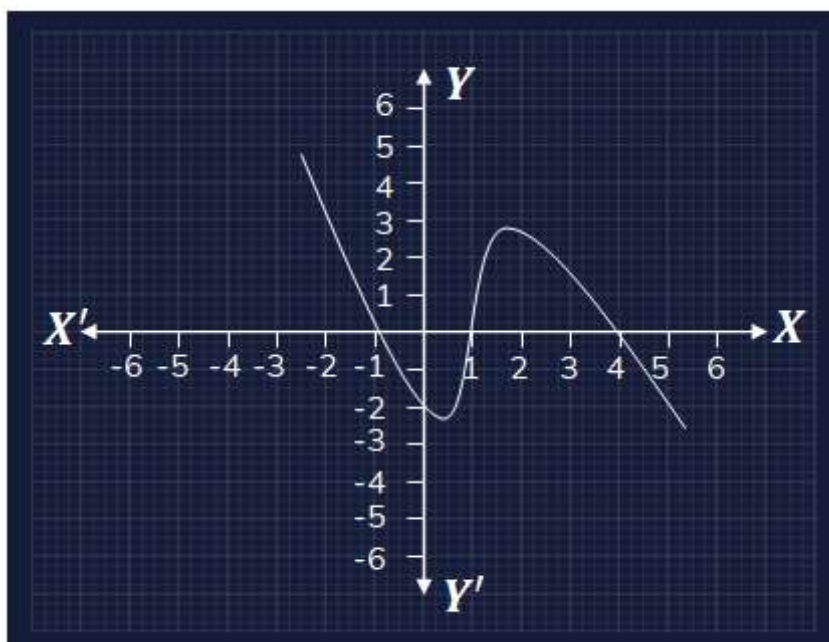
49. Polynomials in Real Life



Polynomials are everywhere. It is found in a roller coaster of an amusement park, the slope of a hill, the curve of a bridge or the continuity of a mountain range. They play a key role in the study of algebra, in analysis and on the whole many mathematical problems involving them.

Based on the given information, answer the following question:

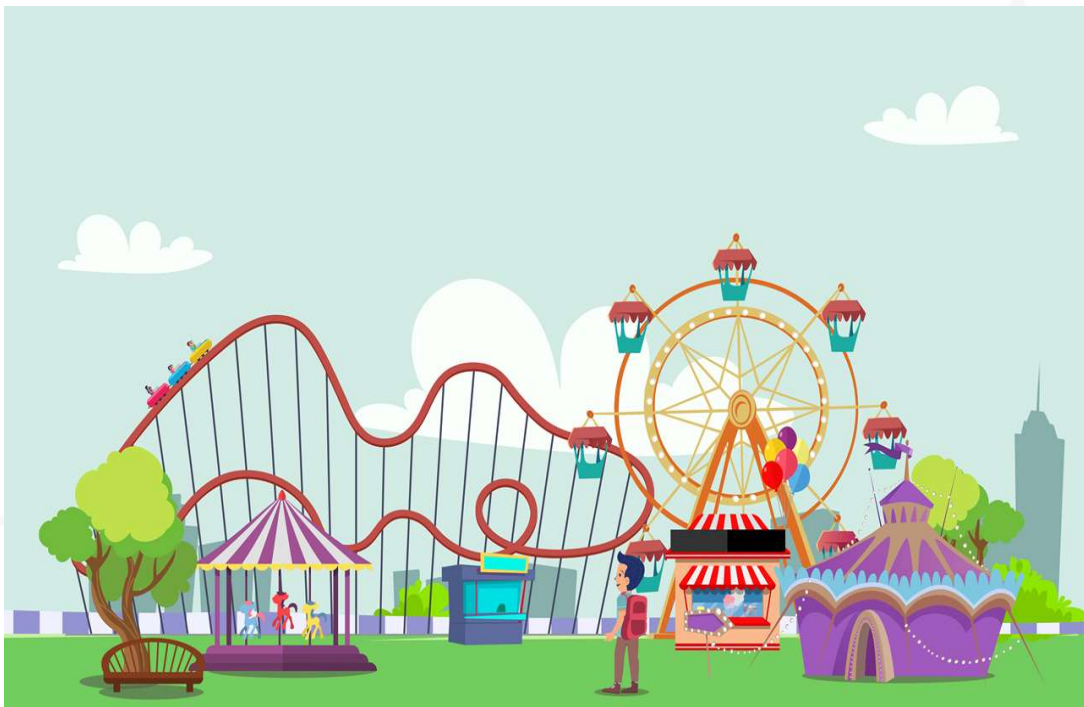
If the path traced by the Roller Coaster is represented by the above graph $y = p(x)$, find its zeroes?



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- A. -1, 1, 4
- B. -2, -1, 2
- C. -1, 1, 2
- D. -2, 1, 4

50. **Polynomials in Real Life**



Polynomials are everywhere. It is found in a roller coaster of an amusement park, the slope of a hill, the curve of a bridge or the continuity of a mountain range. They play a key role in the study of algebra, in analysis and on the whole many mathematical problems involving them.

Based on the given information, answer the following question:

If the zeroes of the polynomial $p(t) = 18t^2 + (3k - 9)t + 36$ are negative of each other, then find the value of k .

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