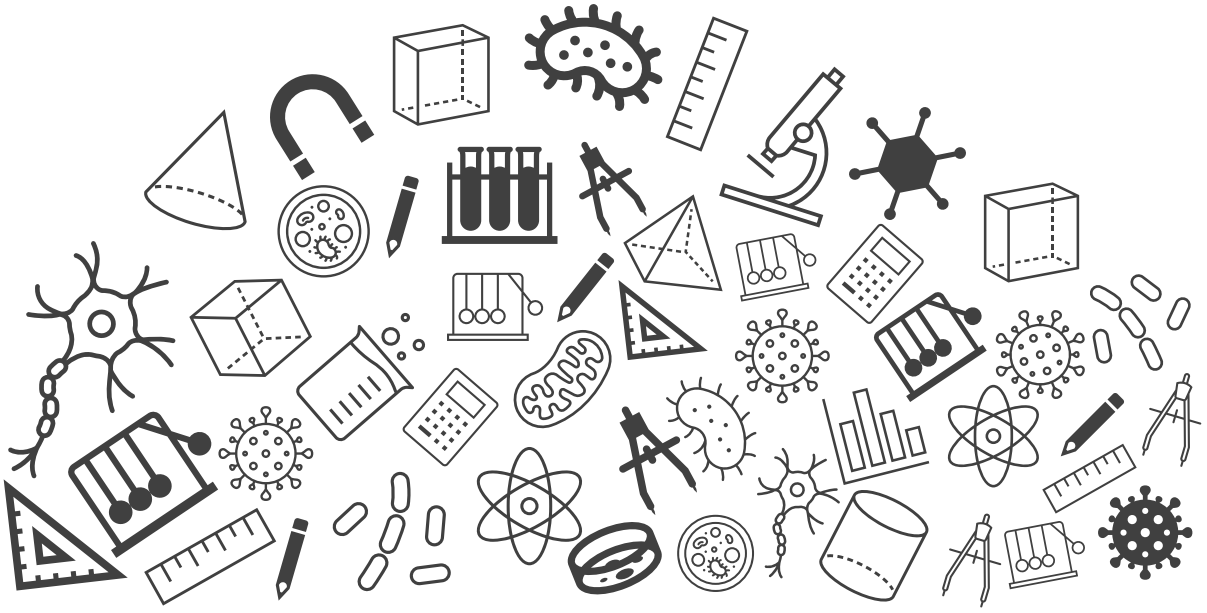
Grade 10

Mathematics

Exam Important Questions

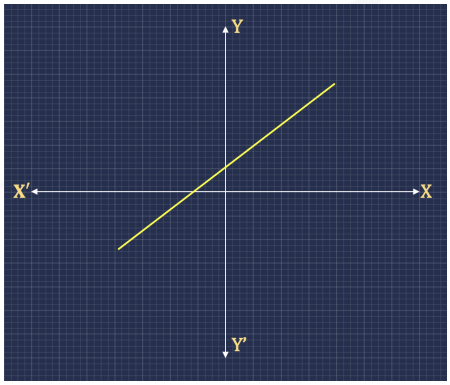


Topic: Exam Important Questions

1. Ravi bought 4 aquariums each of size $(x+2)\times x \times x$. How much water is required to fill all the aquariums?

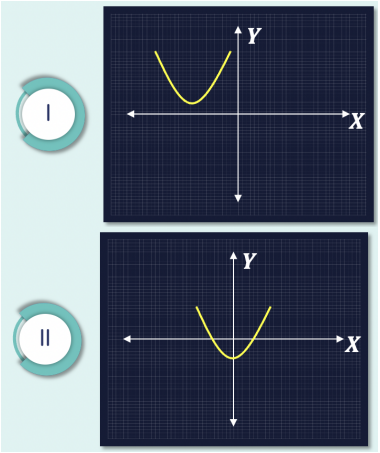
   The aquariums are of cuboid shape, so:
   The volume of a cuboid = $l \times b \times h$
   Now, given that the size of the aquarium is $(x+2)\times x \times x$
   So, the volume will be $x^3 + 2x^2$
   So, the total amount of water filled in all the 4 aquariums =
   $4\left(x^3 + 2x^2\right)$
   $= 4x^3 + 8x^2$

2. How many zeroes does the given graph $y = p(x)$ have?



   If we look closely, we see that the graph $p(x)$ is cutting the x-axis at one point only. So, the number of zeroes of graph y is 1.

3. Find the number of zeroes of the following quadratic polynomials.



The zeroes of a polynomial are the points where the graph intersects the x-axis.

In the first graph, the curve doesn't intersect the x-axis, therefore, the number of zeroes of the polynomial is 0.

In the second graph, the curve intersects the x-axis at two points, therefore, the number of zeroes of a polynomial is 2.

4. Find the zeroes of quadratic polynomial $3x^2 - x - 4$ and verify the relationship between the zeroes and the coefficients.

Given the polynomial is,
$3x^2 - x - 4$
It can be solved as ,

$3x^2 + 3x - 4x - 4 = 0$
$3x(x + 1) - 4(x + 1) = 0$
$(3x - 4)(x + 1) = 0$
Therefore, $x = \frac{4}{3}$ and $x = -1$

Therefore, the zeroes of a polynomial are $\frac{4}{3}$ and -1

Verifying the sum of the roots:
$\alpha + \beta = \frac{-b}{a}$
$-1 + \frac{4}{3} = \frac{-\text{coefficient of } x}{\text{coefficient of } x^2}$
$\frac{1}{3} = \frac{1}{3}$
Verifying the product of roots :
$\alpha\beta = \frac{c}{a}$
$(-1)\left(\frac{4}{3}\right) = \frac{-\text{constant term}}{\text{coefficient of } x^2}$
$-\frac{4}{3} = -\frac{4}{3}$

5. The product of zeroes of $P(x) = 6x^2 - 3 - 7x$ is _____.

✗ **A.** $\frac{-7}{6}$

✗ **B.** $\frac{1}{2}$

✓ **C.** $-\frac{1}{2}$

✗ **D.** -2

If we rearrage the terms according to the standard form:

$P(x) = 6x^2 - 7x - 3$
Product of zeroes $= \frac{c}{a} = -\frac{3}{6} = -\frac{1}{2}$

6. Find the quadratic polynomial, sum, and product of whose zeroes are **–3** and **2** respectively.

Let the zeroes be α and β.
According to the question
$\alpha + \beta = -3$
$\alpha\beta = 2$
The quadratic polynomial whose sum and product of the zeroes are given by :
$x^2 - (\alpha + \beta)x + \alpha\beta$
Then, the product of the polynomial will be :
$x^2 - (-3)x + 2$
$= x^2 + 3x + 2$
Hence, the quadratic polynomial is $x^2 + 3x + 2$.

7. If –2 is a zero of the polynomial $3x^2 + 4x + 2k$ then find the value of k.

- **A.** -2
- **B.** 7
- **C.** 2
- **D.** -7

Correct option is A.
For the polynomial equation $3x^2 + 4x + k$ one zero is -2.

Putting the value of x=-2
We get, $3(2)^2 + 4(2) + 2k = 0$
$12 - 8 + 2k = 0$
$4 + 2k = 0$
$k = -\frac{4}{2} = -2$

8. If α and β are the zeroes of the polynomial $p(x)= 2x^2 + 5x + k$ satisfying the relation $\alpha^2 + \beta^2 + \alpha\beta = \frac{21}{4}$, then find the value of k.

A. $k = 1$

B. $k = 2$

C. $k = -2$

D. $k = 4$

Let α and β be the zeroes of the polynomial.

Then, $\alpha + \beta = -\frac{5}{2}$

$\alpha\beta = \frac{k}{2}$

$(\alpha + \beta)^2 = \left(\frac{-5}{2}\right)^2$

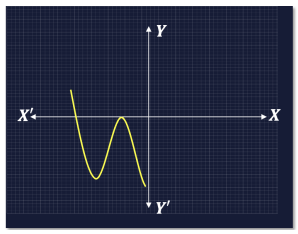
$\alpha^2 + \beta^2 + \alpha\beta + \alpha\beta = \frac{25}{4}$

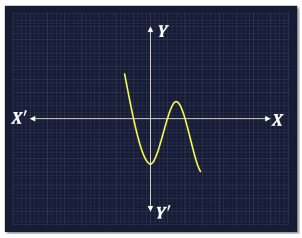
$\frac{21}{4} + \frac{k}{2} = \frac{25}{4}$

$\frac{k}{2} = \frac{25}{4} - \frac{21}{4} = \frac{4}{4} = 1$

$k = 2$

9. Which among the following cubic polynomials has three zeroes?

A. 

B. 

Option B is the correct answer.

The zeroes of the polynomial are the points where graph intersects the x-axis.

In the given graph, the curve in the option B intersects the x-axis at three points, therefore, the number of zeroes of a polynomial representing curve in option B is 3.