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 = \(4(x^3 + 2x^2)\)
= \(4x^3 + 8x^2\)

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 rearrange 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 $\alpha$ and $\beta$.
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 \( \alpha \) and \( \beta \) 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 \( \alpha \) and \( \beta \) 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. [Graph A]

B. [Graph 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.