EXERCISE 2.1

Choose the correct answer from the given four options in the following questions:

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

(A) 4/3 **(B) -4/3**

(C) 2/3 **(D) -2/3**

Solution:

(A) 4/3

Explanation:

According to the question,

-3 is one of the zeros of quadratic polynomial $(k-1)x^2+kx+1$

Substituting -3 in the given polynomial,

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

$(k-1)9+k(-3)+1 = 0$

$9k-9-3k+1=0$

$6k-8=0$

$k=8/6$

Therefore, $k=4/3$

Hence, **option (A)** is the correct answer.

2. A quadratic polynomial, whose zeroes are –3 and 4, is

(A) $x^2 – x + 12$ **(B) $x^2 + x + 12$**

(C) $(x^2/2)-(x/2)-6$ **(D) $2x^2 + 2x –24$**

Solution:

(C) $(x^2/2)-(x/2)-6$

Explanation:

Sum of zeroes, $\alpha+ \beta= -3+4 =1$

Product of Zeroes, $\alpha\beta = -3\times 4 -12$

Therefore, the quadratic polynomial becomes,

x^2- (sum of zeroes)$x+$(product of zeroes)

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

$= x^2 - (1)x + (-12)$

$= x^2 - x -12$

Hence, **option (C)** is the correct answer.

3. If the zeroes of the quadratic polynomial $x^2 + (a + 1)\,x + b$ are 2 and –3, then

(A) $a = –7, b = –1$ **(B) $a = 5, b = –1$**

(C) $a = 2, b = – 6$ **(D) $a = 0, b = – 6$**

Solution:

(D) $a = 2, b = – 6$

Explanation:

According to the question,

$x^2 + (a+1)x + b$

Given that, the zeroes of the polynomial = 2 and -3,
When x = 2
$2^2 + (a+1)(2) + b = 0$
$4 + 2a+2 + b = 0$
$6 + 2a+b = 0$
$2a+b = -6$------ (1)
When x = -3,
$(-3)^2 + (a+1)(-3) + b = 0$
$9 - 3a-3 + b = 0$
$6 - 3a+b = 0$
$-3a+b = -6$------ (2)
Subtracting equation (2) from (1)
$2a+b - (-3a+b) = -6-(-6)$
$2a+b+3a-b = -6+6$
$5a = 0$
$a = 0$

Substituting the value of 'a' in equation (1), we get,
$2a + b = -6$
$2(0) +b = -6$
$b = -6$

Hence, **option (D)** is the correct answer.

4. The number of polynomials having zeroes as –2 and 5 is

(A) 1 **(B) 2**
(C) 3 **(D) more than 3**

Solution:

(D) more than 3

Explanation:

According to the question,

The zeroes of the polynomials = -2 and 5
We know that the polynomial is of the form,
$p(x) = ax^2 + bx + c.$
Sum of the zeroes = - (coefficient of x) ÷ coefficient of x^2 i.e.
Sum of the zeroes = - b/a
$- 2 + 5 = - b/a$
$3 = - b/a$
b = - 3 and a = 1
Product of the zeroes = constant term ÷ coefficient of x^2 i.e.
Product of zeroes = c/a
$(- 2)5 = c/a$
$- 10 = c$
Substituting the values of a, b and c in the polynomial $p(x) = ax^2 + bx + c.$
We get, $x^2 - 3x - 10$
Therefore, we can conclude that x can take any value.

Hence, **option (D)** is the correct answer.

5. Given that one of the zeroes of the cubic polynomial $ax^3 + bx^2 + cx + d$ is zero, the product of the other two zeroes is

(A) (–c/a) **(B) c/a**
(C) 0 **(D) (–b/a)**

Solution:

(B) (c/a)

Explanation:

According to the question,

We have the polynomial,

$ax^3 + bx^2 + cx + d$

We know that,

Sum of product of roots of a cubic equation is given by c/a

It is given that one root = 0

Now, let the other roots be α, β

So, we get,

$\alpha\beta + \beta(0) + (0)\alpha = c/a$

$\alpha\beta = c/a$

Hence the product of other two roots is c/a

Hence, **option (B)** is the correct answer