TS EAMCET 2025 Mathematics Chapter-Wise Questions with Solutions PDF

Algebra

Q 1. If A= {1,2,3,4,5,6}, then the number of subsets of A which contain at least two elements is:

a) 64

b) 63

c) **57**

d) 58

Solution:
Total number of subsets of A is 2n(A)=26=64
Number of subsets of A which contain at least two elements is
64−(6C0+6C1)
=64−(1+6)
=57

Q 2. As per the principle of mathematical induction, for all n∈N, the expression 3^{2n+2} - 8n - 9 is divisible by:

a) 9

b) **8**

c) 7

d) 5

Solution:
We can write,
P (n) : 3^{2n+2} - 8n - 9 is divisible by 8
We note that
P (1) : $3^{2.1+2}$ - 8n - 9 = 34 - 8 - 9 = 81 - 17 = 64, which is divisible by 8.
Thus P (n) is true for n = 1
Let P (k) be true for some natural number k.
i.e., P (k) : 3^{2k+2} - 8k - 9 is divisible by 8
We can write
3^{2k+2} - 8k - 9 = 8a ....(1)
where a ∈ N
Now, we will prove that P (k + 1) is true whenever P (k) is true.
Now,
$3^{2(k+1)+2}$ - 8(k + 1) - 9
= 3^{2k+4} - 8k - 8 - 9
= $3^2.3^{2k+2}$ - 8k - 17
= 3^2 (3^{2k+2} - 8k - 9 + 8k + 9) - 8k - 17 (added and subtracted 8k and 9)
= 3^2 (3^{2k+2} - 8k - 9) + 3^2 (8k + 9) - 8k - 17
= 3^2.8a + 72k + 81- 8k - 17 .... [from (1)]
= 9.8a + 64k + 64

= 8(9a + 8k + 8)
From the last line, we see that
8(9a + 8k + 8) is divisible by 8.

Q 3. If (24, 92) = 24 m + 92 n, then (m, n) is

a) (-4, 3)

b) **(4, -3)**

c) (4, -1)

d) (-1, 4)
Solution:

Since, 92=3−24+20

24=1·20+4

20=4·5+0

∴(24,92)=4

=24−1·20

=24−1·(92−3·24)

=24−92+3·24

=4·24−92…(i)

But (24,92)=24m+92n…(ii)

∴ From Eqs. (i) and (ii) , we get

m=4 and n=−1

∴(m,n)=(4,−1)

Trigonometric Functions

Q 1. Find the values of the trigonometric functions in sin 765°.

a) **1/√2**

b) 1/√6

c) 1/√4

d) 1/√3

Solution:
We know that the value of sun x repeats after an interval of 2π or 360°.

Sin (765°) = sin (2×360°+45°)

= sin 45°

= 1/√2

Q 2. A wheel makes 360 revolutions in one minute. Through how many radians does it turn in one second?

a) In one second, the wheel will rotate an angle of 8π radians

b) In one second, the wheel will turn an angle of 6π radians

c) In one second, the wheel will spin an angle of 10π radians

d) **In one second, the wheel will turn an angle of 12 π radians**

Solution:
Given that a wheel makes 360 revolutions in one minute

Then, the number of revolutions in one second = 360/60 =6.

In 1 complete revolution the wheel turns 360°= 2 π radian.

So, In 6 revolutions, the wheel will turn 6×2π radian = 12π radian.

Hence, in one second the wheel will turn an angle of 12π radian.

Q 3. Find the values of the trigonometric functions in Cot (-15π/4).

a) 2

b) 1

c) 5

d) 7

Solution:
A (-15π/4) = cot (2 X 2π -15π/4) = cot (16π -15π/4) cot = cot π/4 = 1.

Probability

Q 1. What is the probability of rolling a sum of 7 with two fair six-sided dice?

a) **1/6**

b) 1/12

c) 1/8

d) 1/36

Solution:
Let A = sum of numbers is 7 = { (1, 6)(2, 5)(3, 4) (4, 3) (5, 2) (6, 1)}

n(A) = 6

P (Sum of numbers is 7) = n(A) / n(S)

= 6/36 = 1/6

Therefore, the probability of rolling two dice and getting a sum of 7 is 1/6.

Q 2. In a deck of 52 playing cards, what is the probability of drawing a heart or a king?

a) 13/52

b) 17/52

c) 16/52

d) 14/52

Solution:

Let A be the event of taking a heart.

Then P(A) = 13/52

Let B be the event of taking a queen card

Then P(B) = 4/52

No.of queen heart = 1 => P(AnB) = 1/52.

So, probability of taking heart or queen

=p(AuB)= P(A)+P(B)-P(AnB)= 13/52 + 4/52 - 1/52

=16/52 or 4/13.

Q 3. If you have 5 red balls and 3 blue balls in a bag, what is the probability of randomly drawing a red ball?

a) 3/8

b) **5/8**

c) 1/2

d) 3/5

Solutions:

Correct option is A. 58
Total no. of balls is 5+3=8
No. of red balls is 5
The probability is 5/8

The Straight Lines

Q 1. Find the slope of the line passing through the points (2, 3) and (4, 7).

a) **2**

b) 3

c) 4

d) 5

Solution:

Given points are= A(4, 7) B(2, 3)

The slope = change in y coordinates/change in x coordinates

The formula to find the slope of the line is $m = (y_2 - y_1)/ (x_2 - x_1)$

Substituting the given points

m = (3 - 7)/ (2 - 4)

m = -4/-2

m = 2

Q 2. What is the equation of the line that has a slope of -3 and passes through the point (1, 2)?

a) y=−3x+5

b) **y=−3x−1**

c) y=−3x+7

d) y=−3x−4

Solution:

The slope of line is 3
The point it passes through is (1,2)
The equation of line is y−2=3(x−1)
y−2=3x−3
3x−y−1=0
y= -3x-1

Q 3. If a line is perpendicular to the line with the equation 2x−3y+6=0, what is the slope of the perpendicular line?

a) 3/2

b) −2/3

c) 2/3

d) **−3/2**

Solution:

y=2/3x−2
Using the slope-intercept form, the slope is 2/3.
m=2/3
The equation of a perpendicular line must have a slope that is the negative reciprocal of the original slope.

$M^{perpendicular}=-1/_{2/3}$
Simplify the result.
$M^{perpendicular}=-3 / 2$