Mathematics

REVISION and MODEL QUESTIONS

41). A chord of a circle of radius 12 cm subtends an angle of 120° at the centre. Find the area of the corresponding segment of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

Soln: **(…….Contd)**

$\therefore$ OD = 6 cm

So, the area of ΔAOB = ½ × base × height

Here, base = AB = $12\sqrt{3}$ and

Height = OD = 6

So, area of $\Delta AOB = \frac{1}{2} \times 12\sqrt{3} \times 6 = 36\sqrt{3}$ cm

$= 62.28$ cm^2

$\therefore$ area of the corresponding Minor segment =

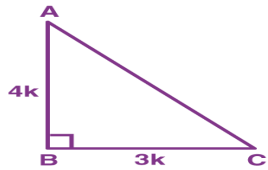
= Area of the Minor sector – Area of ΔAOB

= 150.72 cm^2 – 62.28 cm^2 = 88.44 cm^2

42) If 3 cot A = 4, check whether
$(1 - \tan^2 A)/(1 + \tan^2 A) = \cos^2 A - \sin^2 A$ or not.

Soln:

Let us consider a triangle ABC, right-angled at B.



Given, 3 cot A = 4

cot A = 4/3

Since, tan A = 1/cot A

tan A = 1/(4/3) = 3/4

BC/AB = 3/4

Let BC = 3k and AB = 4k

By using Pythagoras theorem, we get;

Hypotenuse^2 = Perpendicular^2 + Base^2

$AC^2 = AB^2 + BC^2$

$AC^2 = (4k)^2 + (3k)^2$

$AC^2 = 16k^2 + 9k^2$

$AC = \sqrt{25k^2} = 5k$

sin A = Opposite side/Hypotenuse

= BC/AC

=3k/5k

=3/5

In the same way,

cos A = Adjacent side/hypotenuse

= AB/AC

= 4k/5k

= 4/5

To check: $(1-\tan^2 A)/(1+\tan^2 A) = \cos^2 A - \sin^2 A$ or not

Let us take L.H.S. first;

$(1-\tan^2 A)/(1+\tan^2 A) = [1 - (3/4)^2]/[1 + (3/4)^2]$

$= [1 - (9/16)]/[1 + (9/16)] = 7/25$

R.H.S. = $\cos^2 A - \sin^2 A = (4/5)^2 - (3/5)^2$

$= (16/25) - (9/25) = 7/25$

Since, L.H.S. = R.H.S

. Hence, proved.

43) Two dice are numbered 1, 2, 3, 4, 5, 6 and 1, 1, 2, 2, 3, 3, respectively. They are thrown, and the sum of the numbers on them is noted. Find the probability of getting each sum from 2 to 9 separately.

Soln: Number of total outcome = n(S) = 36

(i) Let E_1 be the event 'getting sum 2'

Favourable outcomes for the event

$E_1 = \{(1,1),(1,1)\}$

$n(E_1) = 2$

$P(E1) = n(E1)/n(S) = 2/36 = 1/18$

(ii) Let E_2 be the event 'getting sum 3'

Favourable outcomes for the event

$E_2 = \{(1,2),(1,2),(2,1),(2,1)\}$

$n(E_2) = 4$

$P(E_2) = n(E_2)/n(S) = 4/36 = 1/9$

(iii) Let E_3 be the event 'getting sum 4'

Favourable outcomes for the event

$E_3 = \{(2,2)(2,2),(3,1),(3,1),(1,3),(1,3)\}$

$n(E_3) = 6$

$P(E_3) = n(E_3)/n(S) = 6/36 = 1/6$

(iv) Let E_4 be the event 'getting sum 5'

Favourable outcomes for the event

$E_4 = \{(2,3),(2,3),(4,1),(4,1),(3,2),(3,2)\}$

$n(E_4) = 6$

$P(E_4) = n(E_4)/n(S) = 6/36 = 1/6$

(v) Let E_5 be the event 'getting sum 6'

Favourable outcomes for the event

$E_5 = \{(3,3),(3,3),(4,2),(4,2),(5,1),(5,1)\}$

$n(E_5) = 6$

$P(E_5) = n(E_5)/n(S) = 6/36 = 1/6$

(vi) Let E_6 be the event 'getting sum 7'

Favourable outcomes for the event

$E_6 = \{(4,3),(4,3),(5,2),(5,2),(6,1),(6,1)\}$

$n(E_6) = 6$

$P(E_6) = n(E_6)/n(S) = 6/36 = 1/6$

(vii) Let E_7 be the event 'getting sum 8'

Favourable outcomes for the event

$E_7 = \{(5,3),(5,3),(6,2),(6,2)\}$

$n(E_7) = 4$

$P(E_7) = n(E_7)/n(S) = 4/36 = 1/9$

(viii) Let E_8 be the event 'getting sum 9'

Favourable outcomes for the event

$E_8 = \{(6,3),(6,3)\}$

$n(E_8) = 2$

$P(E_8) = n(E_8)/n(S) = 2/36 = 1/18$

44) Check whether – 150 is a term of the AP: 11, 8, 5, 2 . . .

Soln: Given AP: 11, 8, 5, 2, …

First term, a = 11

Common difference, $d = a_2 - a_1 = 8 - 11 = -3$

Let −150 be the nth term of this AP.

As we know, for an AP,

$a_n = a + (n - 1)\,d$

-150 = 11 + (n – 1)(-3)

-150 = 11 – 3n + 3

$\Rightarrow$ -164 = -3n

$\Rightarrow$ n = 164/3

Clearly, n is not an integer but a fraction.

Therefore, – 150 is not a term of the given AP.

tower = 42 m.