

KENDRIYA VIDYALAYA CRPF PALLIPURAM

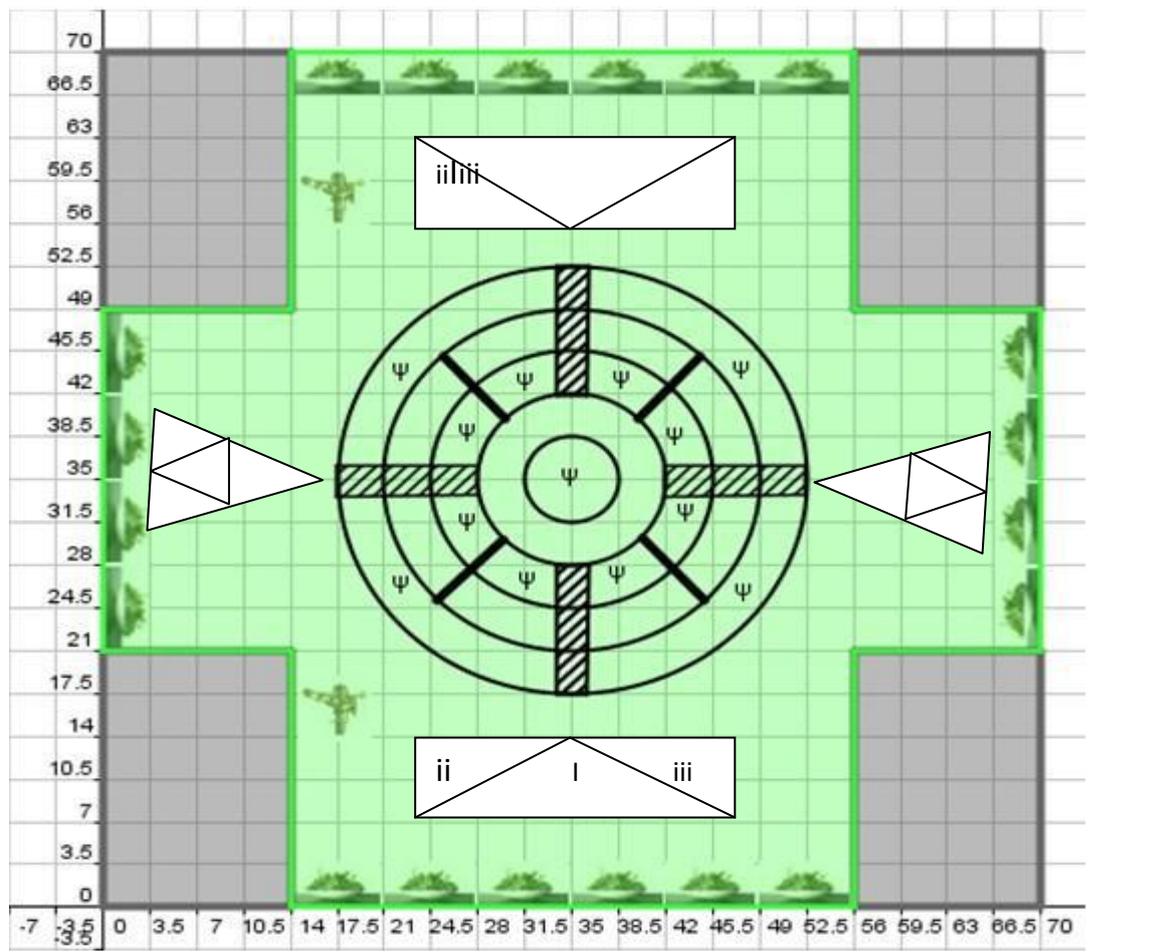
OTBA WORKSHOP IN MATHEMATICS ON 23-11-2013

THEME I

HOT QUESTIONS

QUESTION 1

Esha invited Mrs. Sharma to the garden site to show her the area selected to plant herbs. The teacher liked the way they set the area. She asked how they distributed the area. Esha explained it.



ABCD is a rectangle divided into 3 triangular regions and DEF is a triangle divided into 4 triangles where P,Q,R are the mid points of the sides of the triangle DEF.

- (1) Are the triangles formed in the triangular region equal in area. Justify (3)
- (2) Is the area of triangle I is equal to the sum of the areas of triangles II & III.
Justify (2)

Ans :

(1) Using midpoint theorem (2)

Each area of the smaller triangle = $\frac{1}{4}$ th the area of triangle DEF (1)

(2) If a parallelogram and a triangle are on the same base and between the same parallels then the area of triangle = $\frac{1}{2}$ area of parallelogram. (1)

Area of triangle I = Area of triangle II + Area of triangle III

QUESTION 2

The school garden has a tank of capacity 1m^3 . Is one tank of water enough to water the garden area, using the sprinkler. If each square feet of garden requires 500 ml of water, How many litres of water is required daily? How many tanks of water is required (approximately) daily?

Ans :

$$1\text{m}^3 = 1000 \text{ Litre}(\frac{1}{2})$$

$$\text{Area of the garden} = 70 \times 70 - 4 \times 21 \times 4$$

$$= 4900 - 1176$$

$$= 3724 \text{ Sq. ft} \quad (1)$$

Water required for 1 sq. ft of garden = 500 ml

$$\text{Water required for } 3724 \text{ sqft of garden} = 3724 \times 500$$

$$= 1862000 \text{ ml}$$

$$= 1862 \text{ Litres} \quad (1)$$

One tank is not enough.

The garden requires 2 tanks of water daily approximately. $(\frac{1}{2})$

QUESTION 3

From the given sprinkler, the water can go a maximum distance of 17.5 feet.

If the sprinkler rotates only 120° then how much area of the garden can wet it (3)

Ans :

$$\theta = 120^\circ$$

$$r = 17.5 \text{ feet} (\frac{1}{2})$$

area = $\frac{1}{3}$ Area of the circle.

$$= \frac{\pi r^2}{3} \quad (1)$$

$$= \frac{22}{7} \times 17.5 \times 17.5 \times \frac{1}{3} \quad (1)$$

$$= 320.6 \text{ sq.feet} \quad (1/2)$$

QUESTION 4

1 (a) How many litres of pesticide is needed to apply in the herbal garden if 1 litre is required for 100 square feet (3)

(b) Pesticides are available in cans 1 litre each. How many cans are required to be purchased? What will be the cost of this pesticide (2)

Ans :

(a) Area of total land = $70 \times 70 = 4900$ sq. feet

Area of 1 room = (21×14) sq. feet

Area of 4 rooms = $4 \times (21 \times 14)$

$$= 1176 \text{ sq. feet} \quad (1)$$

Area of herbal garden = Area of land – area of 4 rooms

$$= 4900 - 1176 = 3724 \text{ sq. feet} \quad (1)$$

Quantity of pesticide needed for 100 sq. feet = 1 litre

$$\text{Quantity of pesticide required for 3724 sq. feet} = \frac{3724}{100} = 37.24 \text{ litre} \quad (1)$$

(b) Quantity of pesticide in 1 can = 1 litre

So for 37.24 we have to buy 38 cans (1)

Cost of 1 litre of pesticide = ` 450

Cost of 38 cans = 450×38

$$= \text{` } 17100 \quad (1)$$

QUESTION 5

A sprinkler can throw water up to a distance of 10 feet. How much area correct to nearest sq. metre can be watered using four such sprinklers if they are placed in such a way that the area watered is maximum. ($\pi = 3.14$) (3)

Ans :

$r = 10$ feet

Area watered by one sprinkler = πr^2

$$= \pi \times 10^2$$

$$\begin{aligned} &= 3.14 \times 100 \text{ sq. feet} \\ &= 314 \text{ sq. feet} \quad (1) \end{aligned}$$

Area watered by 4 sprinkl = 3.14×4 sq. feet

$$\begin{aligned} &= 1256 \text{ sq. feet} \\ &= 1256 \times 0.0929 \text{ m}^2 \\ &= 116.68 \text{ m}^2 \\ &= 117 \text{ m}^2 \quad (1) \end{aligned}$$

To make area watered by them maximum they must be placed so that area watered does not overlap (1)

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THEME I

VALUE BASED QUESTIONS

QUESTION 1

1 (a) To add to the aesthetic beauty, it was decided to make a circular flower bed at the centre of the park with diameter 10 feet. What will be the area of this flower bed in square metre. ($\pi = 3.14$)

(b) What are the values depicted in the construction of a garden

Ans :

$$\text{Radius} = d/2 = 10/2 = 5 \text{ feet} \quad (1/2)$$

$$\text{Area of flower bed} = \pi r^2$$

$$= 3.14 \times 5 \times 5 = 78.5 \text{ sq. feet} \quad (1)$$

$$= (78.5 \times 0.3048 \times 0.3048) \text{ sq. metre}$$

$$= 7.29 \text{ m}^2 \quad (1 1/2)$$

(b) Value depicted are Team spirit, Love for nature, Dignity of labor. (2)

QUESTION 2

(a) What fraction of ground area is available to make the garden ? Convert it into % form (2)

(b) How much composite fertilizer (in Kg) is needed for the whole ground, if 100 sq. feet of garden requires 200 gm of fertilizer (2)

(c) What are the importance of using composite fertilizer (1)

Ans :

(a) Area of ground = 4900

Area of 4 rooms = 1176

Area of garden = 4900 – 1176

$$= 3724 \text{ sq. feet} \quad (1/2)$$

$$\text{Fraction of garden area} = \frac{3724}{4900} = \frac{931}{1225} = \frac{19}{25} \quad (1/2)$$

$$\begin{aligned} \text{\% of garden area available} &= \frac{3724}{4900} \times 100 \% \\ &= 76 \% \quad (1) \end{aligned}$$

(b) Fertilizer required for 100 sq. feet of garden = 200 gms($1/2$)
 Area of the garden = 3724 sq. feet
 Fertilizer required for 3724 sq. feet = $3724 \times 200/100$ (1)
 $= 7448 \text{ gm}$
 $= 7.448 \text{ Kg}(1/2)$

Value

- (1) Using composite fertilizer, we can improve the fertility of land
- (2) It would not make any soil pollution
- (3) It will improve the quality of plant products. (Any 1 value, 1 mark)

QUESTION 3

- (1) Two herbal plants are to be planted per 15 square metres. What will be the cost of purchasing these plants ?
- (2) What value is depicted from planting herbal plants? (5 marks)

Ans :

(1) Area of land available to make herbal garden =
 Area of waste land – 4 X area of room
 $= 70 \times 70 - 4 \times 21 \times 14$
 $= 3724 \text{ sq. feet}$
 $= 345.96 \text{ m}^2 \quad (1)$

Each unit be 15 m^2

The number units = $345.96/15$
 $= 23.064 \quad (1\frac{1}{2})$

This means 23 complete units

Cost of plants = $30 \times 23 \times 2$
 $= 1380 \quad (1)$

(2) Love for nature

Herbal medium is good for health
Avoid air pollution
Protecting heritage (2)

QUESTION 4

- (1) Find the quantity of the soil required for the construction of the garden (2)
(2) Find the quantity of composite fertilizer required for constructing the garden (2)
(3) What will you prefer for your garden, chemical fertilizer or composite manure? Why? (1)

Ans :

$$\begin{aligned} (1) \text{ Area of the garden} &= \text{Area of the land} - \text{Area of 4 rooms.} \\ &= 70 \times 70 - 4 \times 29 \times 144 \\ &= 3724 \text{ sq. feet} \end{aligned}$$

$$\begin{aligned} \text{Quantity of soil for garden} &= \text{Area of garden} \times 5/12 \text{ cubic feet.} \\ &= 3724 \times 5/12 \\ &= 1552 \text{ cubic feet approximately} \end{aligned}$$

$$\begin{aligned} (2) \text{ Quantity of fertilizer} &= 2/5 \times 1552 \\ &= 620.8 \text{ cubic feet} \end{aligned}$$

- (3) We prefer to use composite for manure for our garden because it is pollution free and takes care for ecological balance.

QUESTION 5

A group of 10 students given the charge of clearing the circular garden. Find the area cleared by each student. What moral values are depicted here (3)

Ans :

$$r = 17.5$$

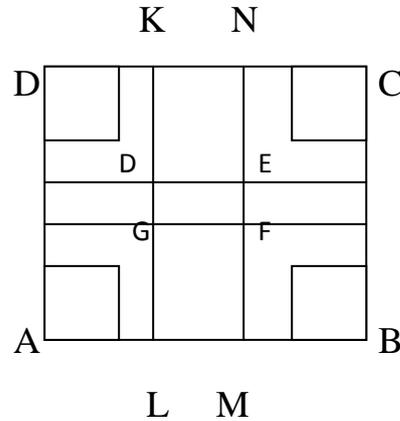
$$\begin{aligned} \text{Area of circle} &= \pi r^2 \\ &= 22/7 \times 17.5^2 \\ &= 962.5 \text{ sq. feet} \end{aligned} \quad (1)$$

$$\begin{aligned} \text{Area cleared by each student} &= 962.5/10 \\ &= 96.25 \text{ sq. feet} \end{aligned} \quad (1/2)$$

Clean the surroundings (1)

QUESTION 3

Cross paths are constructed each feet wide passing through the center of the garden such that one path is parallel to the horizontal side and the other arise parallel to the vertical side. What will be the area of these cross paths? (5)



$$\text{Area of PQRS} = PQ \times AR$$

$$PQ = AB = 70 \text{ FEET}$$

$$QR = 4 \text{ FEET}$$

$$= (70 \times 4) = 280 \text{ sq. FEET} \quad (1)$$

$$\text{Area of KLMN} = KL \times KN$$

$$KL = BC = 70 \text{ FEET}$$

$$KN = 4 \text{ FEET}$$

$$\text{Area} = 70 \times 4 = 280 \text{ sq. FEET} \quad (1)$$

$$\text{Area of DEFG} = 4 \times 4 = 16 \text{ sq. feet} \quad (1)$$

$$= 280 \text{ SQ. FEET}$$

$$\text{Area of cross paths} = \text{area of PQRS} + \text{area of KLMN} - \text{area of DEFG}$$

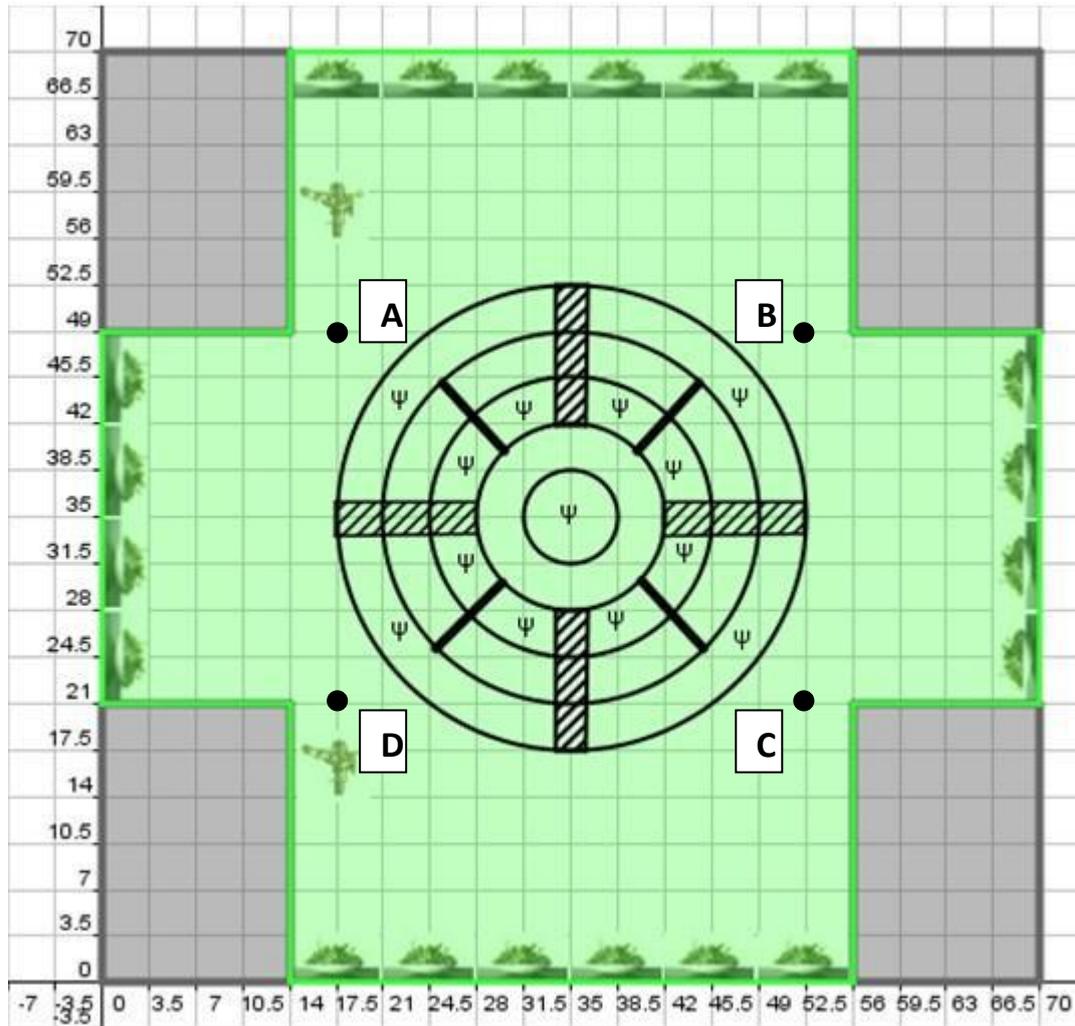
$$= (280 + 280 - 28)$$

$$= 560 - 28$$

$$= 532 \text{ sq. feet} \quad (1)$$

QUESTION 4

Marked on the sketch of the garden are points A,B,C,D the spots located for planting 4 different herbs. Find the co-ordinates of A,B,C,D. Find the area of the region covered by ABCD. (3)



Ans :

A (17.5, 49)

B (52.5, 49)

C (52.5, 21)

D (17.5, 21)

Area = l X b = 35 X 28 Sq. Unit

= 980 sq.unit (3)

QUESTION 5

A plant is selected at random from the list of herbs.

What is the probability of selecting

a) A plant of 1 foot (2)

b) A plant of 2 feet or more (1)

c) A plant selected is not of 2 feet (2)

a) No: of 1 foot plants=4

No: of 2 feet plants=3

No: of 3-4 feet plants=5

Prob. Of selecting a plant of 1 foot= $(\frac{4}{12})=(\frac{1}{3})$

b) No.of plants of 2 feet or more= $4+3=7$

Prob(Selecting a plant of 2 feet or more)= $(\frac{7}{12})$

c) No. of plants selected which are not of 2 feet

$$=12 -(4+5)=3$$

P(selecting a plant which is not of 2 feet)= $(\frac{3}{12})=(\frac{1}{4})$
