Aim/Objective :

Date ....

ACTIVITY NO: 6

objective: To verify the distance formula, $d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$, by plotting points and using a ruler.

Materials required: A piece of cardboard, white chart papers, Graph paper, scissors, glue, a ruler and a pencil or pen

Method of construction:

1. Take a piece of graph paper and a cardboard of a convenient size and paste a white chart paper on it.
2. Draw the x-axis ($X'OX$) and the y-axis ($Y'OY$) on the graph paper and paste it on white chart paper.
3. plot two distincts points, $A(x_1, y_1)$ and $B(x_2, y_2)$, on the graph paper. For example take two pts as $A(2, 3)$ and $B(5, 7)$.
4. Draw a straight line segment connecting pts. A and B.
5. From pt. A, draw a horizontal line ∥ to the x-axis and from pt. B, draw a vertical line ∥ to the y-axis.
6. The two new lines will intersect at a new pt. C. The coordinates of C will be (x_2, y_1)

Demonstration and observation:

1. Measure the st. line distance of the segment AB using a ruler.

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2. calculate the length of AC by finding the difference in the x-coordinates: $AC = |x_2 - x_1|$.

3. calculate the length of BC by finding the difference in the y-coordinates: $BC = |y_2 - y_1|$.

4. use the lengths of AC and BC to find the Length of the hypotenuse AB using the pythagorean therem:
$AB = \sqrt{(AC)^2 + (BC)^2}$.

5. compare the results:

(a) The distance calculated using the formula should be approximately the same as the distance measured with the ruler.

(b) Result: The distance between A(2,3) and B(5,7) is $\sqrt{(5-2)^2 + (7-3)^2} = \sqrt{3^2 + 4^2} = \sqrt{9+16} = \sqrt{25} = 5$ units. this will same as in (a)

Observation:

- Record the coordinates of points A and B.
- Note the calculated distance using the formula ....
- Record the measured distance using the ruler.....
- Write a conceuluding sentence stating that the calcuated distance is equal to the measured distance

Application:

This activity demonstrates how the pythagorean theorem is the basis of the distance formula in a coordinate plane. This result is used to prove a particular type of quadrilateral, triangle, finding the centre of a circle etc.

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Aim/Objective :

Activity No:-7.

objective: To find the number of tangents from a point to a circle.

pre-requisite knowledge: various terms related to circle

- Meaning of tangent to a circle

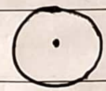
Materials required : cardboard, coloured sheets. Geometry box

- A pair of scissors. gum

procedure : (i) Take a cardboard of a convenient size and paste a coloured sheet on it.

(ii) Draw a circle of a suitable radius on a coloured sheet and cut it out.

(iii) paste the cutout circle on the cardboard (Fig-2)



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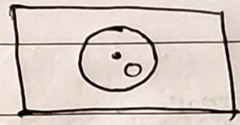


Fig-2.

(iv) Now take any point P in the exterior, on the boundary or in the interior of the circle and fix a nail on it.

(v) Take a string and tie one end of it at the point p and move the other end towards the centre of the circle. Also move it up and down from the centre such that it may touch the circle.

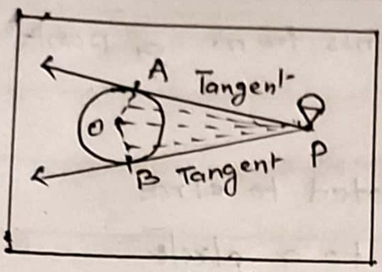


Fig-3

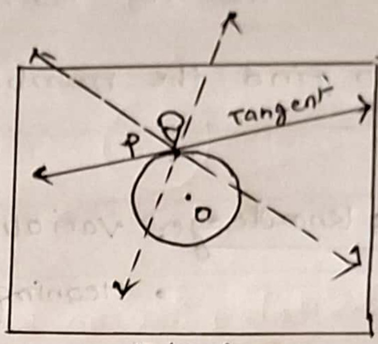


Fig-4

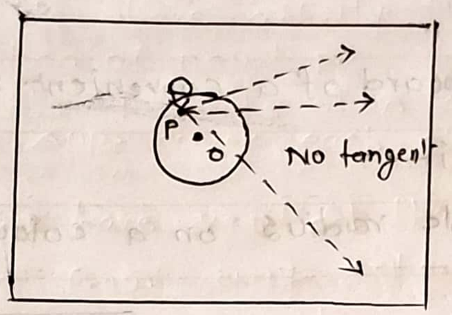


Fig-5

OBSERVATION:

(i) In Fig-3, The no. of tangents through the pt P is two

(ii) In Fig-4, The no. of tangents through the pt P is one

(iii) In Fig-5, The no. of tangent through the pt is zero

We observe that, if the point P is, at the exterior of the circle, then there are two tangents. on the boundary of the circle, then there is only one tangent at P. in the interior of the circle, there is no tangent at P.

Result: We have found the no. of tangents from a point to a circle.

Aim/Objective :

Activity No- 8.

OBJECTIVE: To verify that the lengths of tangents to a circle from some external pt. are equal.

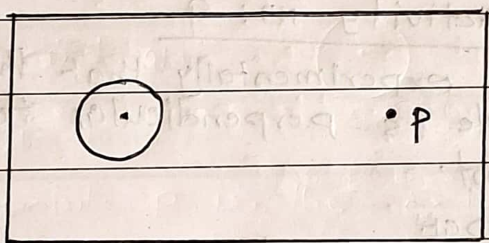
PRE-REQUSITE KNOWLEDGE: • concept of tangent to a circle
• concept of length of tangent

MATERIALS REQUIRED: • White chart paper • coloured glazed paper • Sketch pens • scissors • Geometry box • Adhesive.

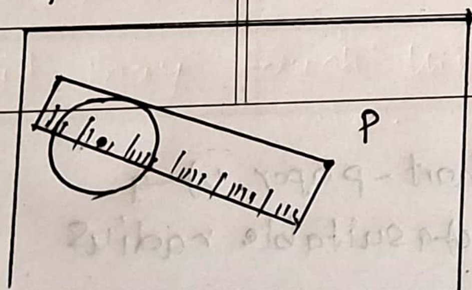
PROCEDURE: (i) cut a pink glazed paper as a circle of any radius with centre O.

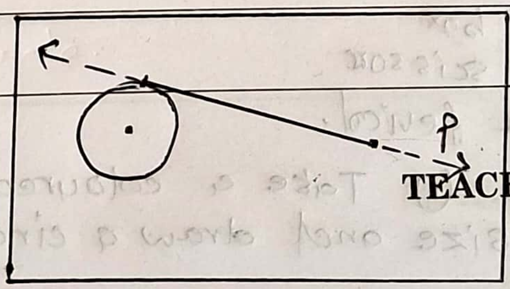
(ii) paste the cutout circle on a white chart paper.

(iii) Take any point P outside the circle.



(iv) place a ruler touching the point P and the circle. Lift the white chart paper and fold it to form a crease. This crease is the first tangent to the circle from point P. Mark the point of contact of the tangent as A. Repeat the process for 2nd tangent.





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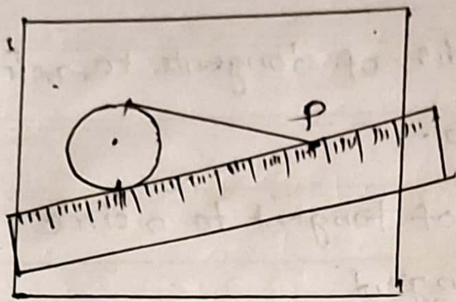

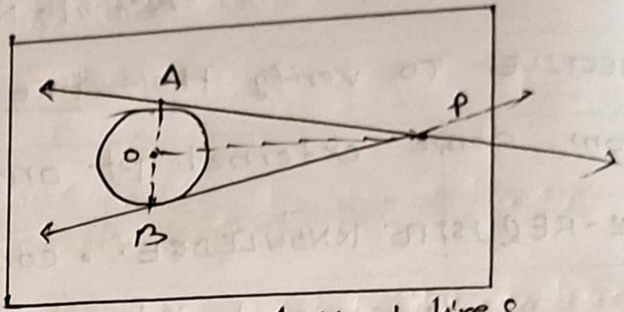

(v) Join PB. Also join OA, OB and OP using dotted lines
(VI) fold the white chart paper along dotted line OP.
(VII) Repeat the above activity for circles of different radii and position of point P.

OBSERVATION:- From the above activity, we observe that $\triangle OAP$ and $\triangle OBP$ cover each other completely $\therefore AP = BP$.

RESULT:- We have verified that the lengths of tangents to a circle from any external point are equal.

Activity NO: 9

OBJECTIVE: To verify experimentally that the tangent at any point to a circle is perpendicular to the radius through that point.

PRE-REQUSITE KNOWLEDGE
- Meaning of tangent to a circle
- Terms related to a circle.

MATERIALS REQUIRED:-
- cardboard
- coloured chart papers
- Geometry box
- A pair of scissors
- Adhesive fevicol.

PROCEDURE: (i) Take a coloured chart-paper of a convenient size and draw a circle of a suitable radius

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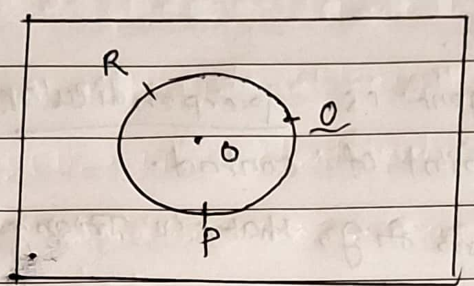
on it · cutout the circle and paste it on a cardboard.

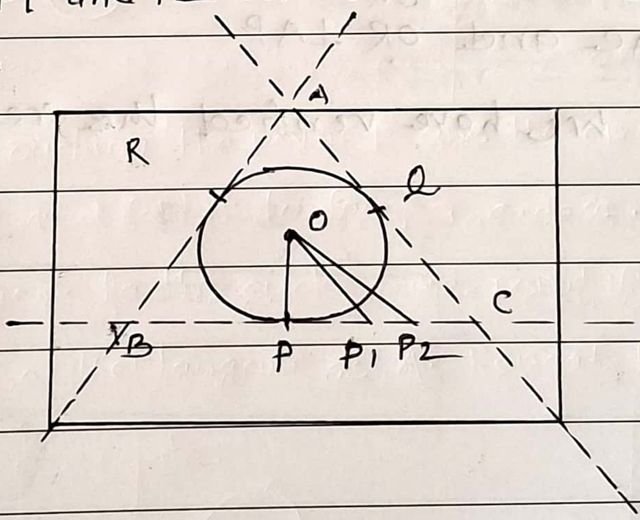
(ii) Mark points P, Q and R on the circle.



(iii) Through the points P, Q and R, form a number of creases and select those which touch the circle. These creases will be the tangents to the circle.

(iv) Let the creases intersect at the points A, B and C. Forming a △ABC.

(v) Take points P_1 and P_2 on the crease BC. Draw dotted lines OP_1 and OP_2.



P-4

OBSERVATION:

From fig, by actual measurement, we have

OP = ... OQ = ... OR = ...

OP_1 = ... OP_2 = ...

$OP < OP_1$, $OP < OP_2$, $OP < OP_3$ ....

$\therefore$ $OP \perp BC$.

Thus, the tangent is perpendicular to the radius through the point of contact.

we observe from fig, that in Triangles POP_1 and POP_2

clearly, $OP_1 > OP$, $OP_2 > OP$ ....

in fact, OP is less than any other line segment joining O to any point on BC other than P, i.e OP is the shortest of all these.

$\therefore$ $OP \perp BC$.

Hence, tangent to the circle at a pt. is $\perp$r to the radius through the point. similarly, we have $OQ \perp AC$ and $OR \perp AP$.

Result: we have verified the result experimentally

Aim/Objective :

Activity NO : 10

OBJECTIVE: To obtain the total surface area of a right-circular cylinder in terms of the radius (r) and height (h)

PRE-ACQUIRED KNOWLEDGE: (i) A rectangle can be rolled to form a cylinder

(ii) concept of area of a rectangle

(iii) concept of area of a circle

MATERIALS REQUIRED: (i) origami sheets

(ii) pair of scissors

(iii) Adhesive (iv) pencil v) Ruler.

procedure: Area of Rectangle = CSA of cylinder = L × b

$2\pi r \times h$ = CSA of cylinder.

Total S.A. of cylinder = CSA + area of top + area of base

$= 2\pi rh + \pi r^2 + \pi r^2 = 2\pi rh + 2\pi r^2$

Fig-1

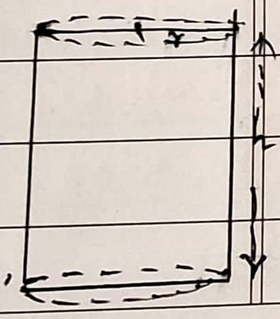
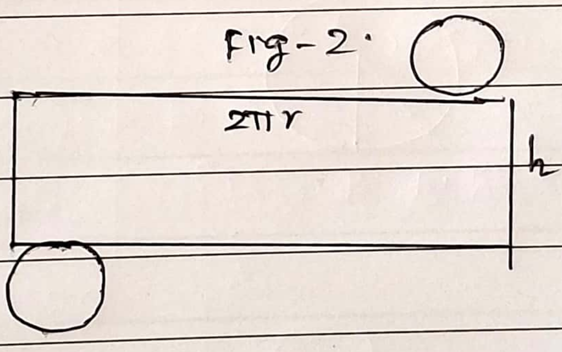


Fig-2.



P-5.

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OBSERVATION: 1. The base and top of the cylinder are congruent circular regions.

(2) The curved surface area of the cylinder opens to form a rectangular region.

(3) The breadth of the rectangle is the height of the cylinder

(4) The length of the rectangle is the circumference of the base of the cylinder.

(5) curved surface area of cylinder (C) = area of rectangle

$$= L \times b$$

$$\Rightarrow C = 2\pi r \times h = 2\pi rh$$

(6) Total surface area of cylinder = C.S.A(C) + 2 area of base circle

$$= 2\pi rh + 2\pi r^2$$

$$= 2\pi r(h+r)$$

CONCLUSION: Total surface area of right circular cylinder is $2\pi r(h+r)$.