1. Show that

$$(a-b)^2, (a^2+b^2) and (a+b)^2 \tag{1}$$

are in AP

2. In Fig. 1, $DE||AC$ and $DC||AP$. Prove that

$$\frac{BE}{EC} = \frac{BC}{CP} \tag{2}$$

.

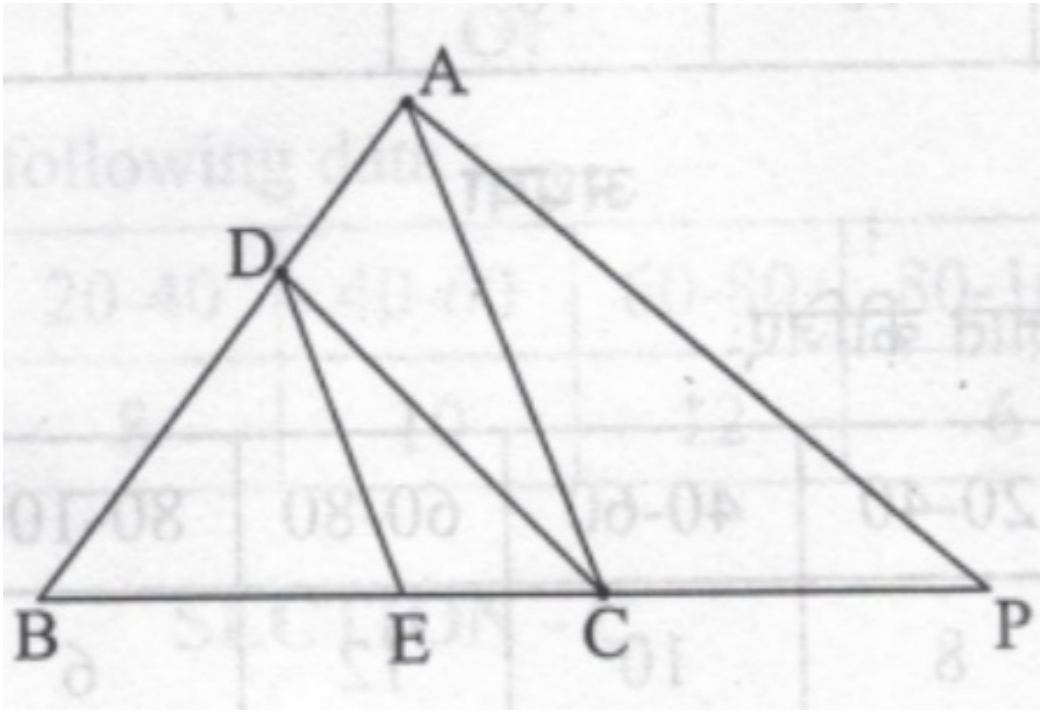

Figure 1: figure

3. In Fig.2, two tangents TP and TQ are drawn to a circle with centre O from an external point. prove that

$$\angle PTQ = 2\angle OPQ \tag{3}$$

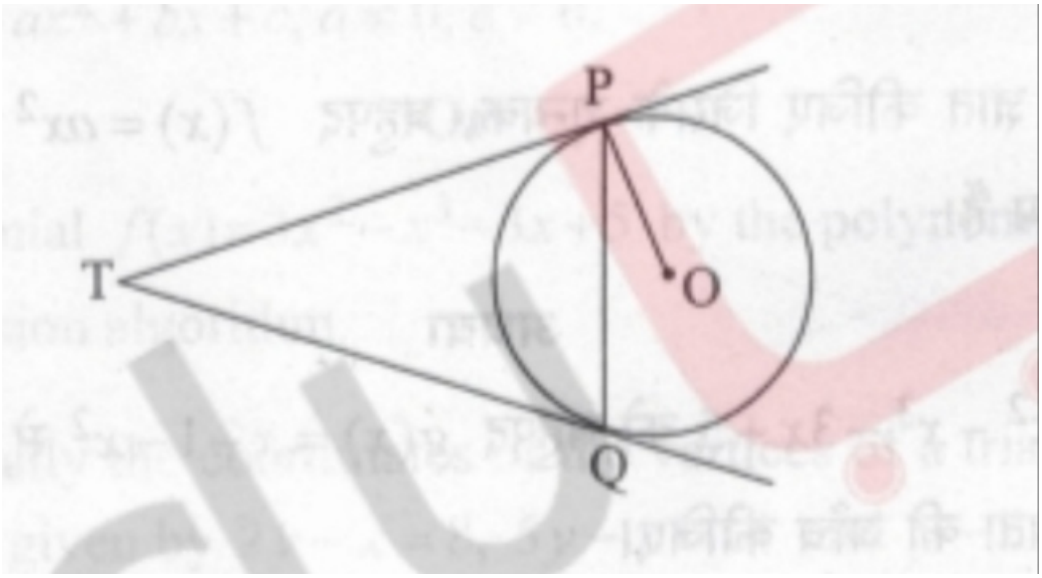

Figure 2: figure

4. The rod AC of a TV disc antenna is fixed at the right angles to the wall AB and a rod CD is supporting the disc as shown in $fig.3$. IF $AC = 1.5$ long and $CD = 3m$, find

$$(i) \tan\theta (ii) \sec\theta \tag{4}$$

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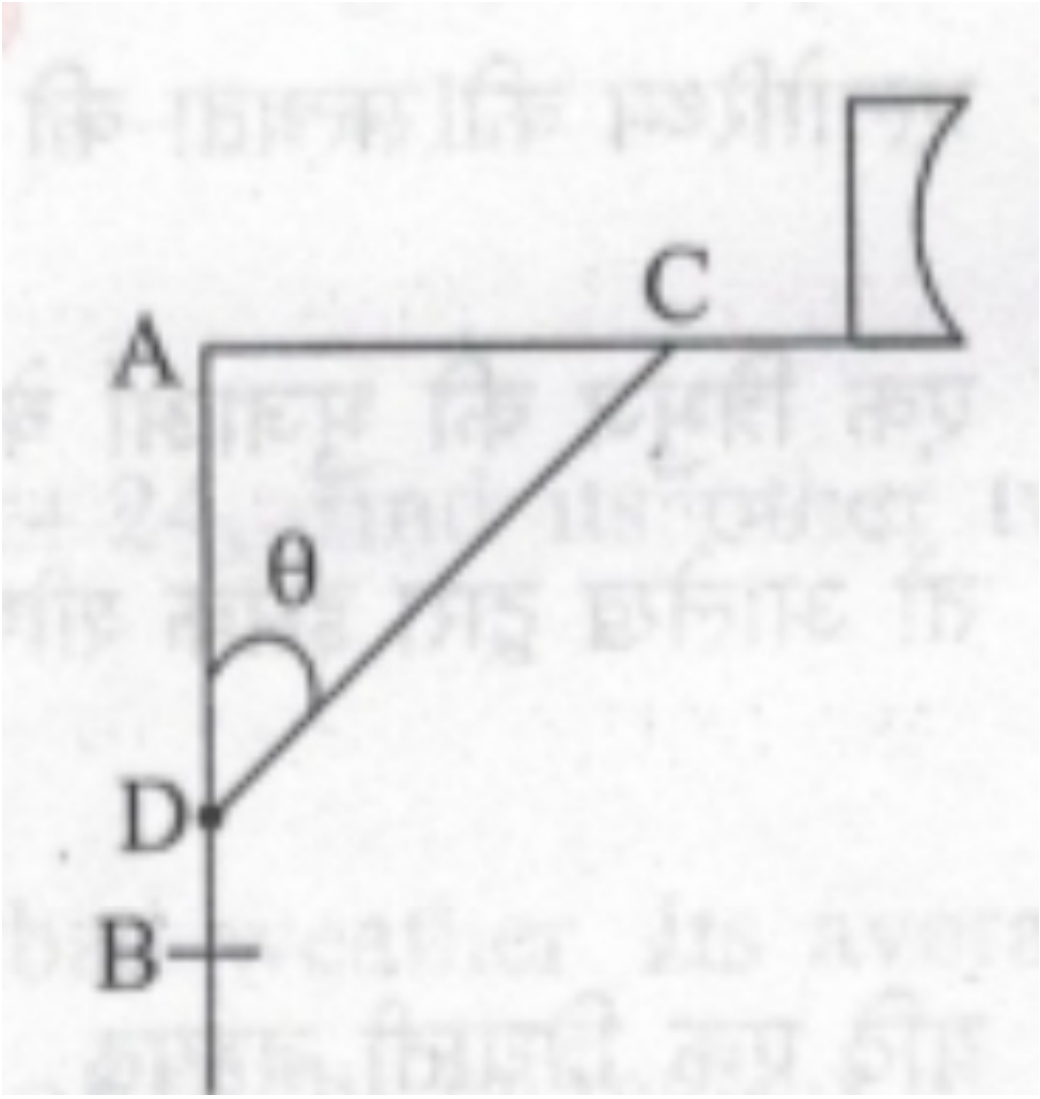

Figure 3

5. A piece of wire 22*cm* long is bent into the form of an arc of a circle subtending an angle of 60° as it's centre.Find the radius of the circle

$$\left[use\pi = \tfrac{22}{7}\right] \qquad (5)$$

6. If Anumber x is choosen at random from the numbers

$$-3, -2, -1, 0, 1, 2, 3 \tag{6}$$

. what is probability that

$$x^2 \leq 4 \tag{7}$$

7. Find quadratic polynomial whose zeroes are reciprocal of the zeroes of the polynomial

$$f(x) = ax^2 + bx + c, a \neq 0, c \neq 0 \tag{8}$$

8. Divide the polynomial

$$f(x) = 3x^2 - x^3 - 3x + 5 \tag{9}$$

by the polynomial

$$g(x) = x - 1 - x^2 \tag{10}$$

and verify the division algorithm

9. Determine graphically the coordinates of the vertices of a triangle , the equations of whose sides are given by

$$2y - x = 8, 5y - x = 14 and y - 2x = 1 \tag{11}$$

10. If y is a zero of the cubic polynomial

$$x^3 - 3x^2 - 10x + 2y \tag{12}$$

, find its other two zeroes

11. In a flight of $600km$, an aircraft was slowed due to bad weather . Its average speed for the trip was reduced by $200km/hr$ and time of flight increased by $30minutes$. Find the original duration of flight

12. Fnd the area of a triangle PQR formed by the points

$$P(-5,7), Q(-4,-5) and R(4,5) \tag{13}$$

.

13. If the point $c(-1,2)$ divides internally the line segment joining $A(2,5)$ and $B(x,y)$ in the ratio $3:4$, find the coordinate of B

14. If the point $c(-1,2)$ divides internally the line segment joining $A(2,5)$ an $B(x,y)$ in the ratio $3:4$, find the coordinate of B

15. In $Fig.4$,

$$\angle D = \angle E \tag{14}$$

and

$$\frac{AD}{DB} = \frac{AE}{EC} \tag{15}$$

,prove that BAC is an isosceles triangle

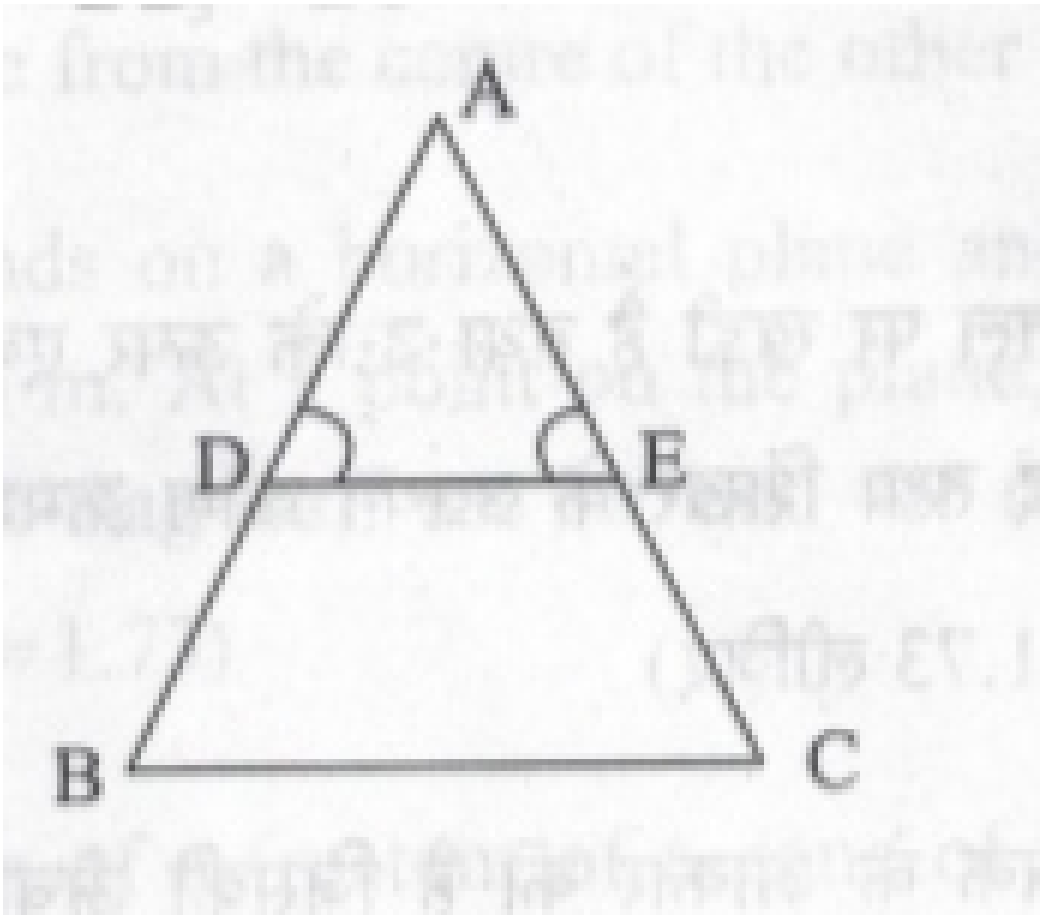

Figure 4: triangle

16. In a triangle ,if square of one side is equal to the sum of the squares of the other two sides,then prove that the angle opposite to the first side is a right angle

17. If

$$\sin\theta + \cos\theta = \sqrt{3} \tag{16}$$

, then prove that

$$\tan\theta + \cot\theta = 1 \tag{17}$$

.

18. A cone of base radius $4cm$ is divided into two parts by drawing a place through the mid-point if its height and parallel to its base. compare the volume of the two parts

19. show that the square of any positive integer cannot be of the form

$$(5q + 2) or (5q + 3) \tag{18}$$

for any integer q.

20. prove that one of every three consescutive positive integer is divisible by 3.

21. the sum of four consecutive numbers in AP is 32 and the ratio of the product of the first and last terms to the product of two middle terms is 7 : 15. Find the numbrs

22. draw a line segment AB of length $7cm$. taking A as centre, draw a circle of radius $3cm$ and and taking B as centre, draw another circle of radius $2cm$ construct tangents tangents to each circle from the centre of the other circle.

23. A vertical tower stands on a horizontal plane and is surrounded by a vertical flag-staff of height $6m$. At a point on the plane, the angle of elevation of the bottom and rop of the flag-staf are $30°$ and $45°$ respectively. find the height of the tower .(take $\sqrt{3} = 1.73$)

24. A bucket in the form of a fraction of a cone of height $30cm$ with radii of its lower and upper ends as $10cm$ and $20cm$, respectively. Find the capacity of the bucket.Also find the cost of milk which can completely fill the bucket at the rate of $Rs.40$ per litre.

$$\left(use \pi = \frac{22}{7}\right) i \tag{19}$$