IIITB COMET FOUNDATION

Name: Charan Kora
ID: COMETFWC049
Date: 29-01-26

Question Numbers 19 to 31

19. A man standing on the deck of a ship observes the angle of elevation of the top of the depression of the base of hill as ¿ Find the distance of the hill from the ship.

20. Three different coins are tossed. (i) exactly two heads (ii) at least two heads (iii) at least two tails.

Question Numbers 21 to 31 carry 4 marks

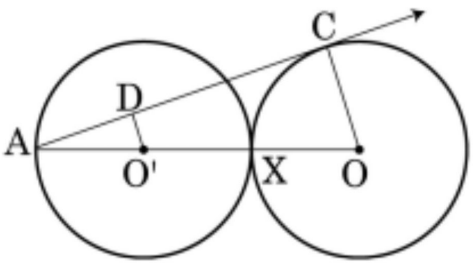
21. Due to heavy floods in a state, 50 schools collectively offered to the state canvas for 1500 tents to be fixed by the gov¿

The lower part of each tent is cylindrical with conical upper part of same base radius. If the canvas costs Rs 120 per sq.m, find the amount shared by each school to set up the tents. (Use $\pi = \frac{22}{7}$)

22. Prove that the lengths of the tangents drawn from an external point to a circle are equal.

23. Draw a circle of radius 4 cm. Draw tangents making an angle of 60° to each other.

24. In Fig., two equal circles, with centres O and C are produced meets the circle with centre A. AC is tangent to the circle with centre O. OD is perpendicular to AC. Find the value of $\frac{DO}{CO}$.



25. Solve for x:

$$\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}, \quad x \neq -1, -2, -4.$$

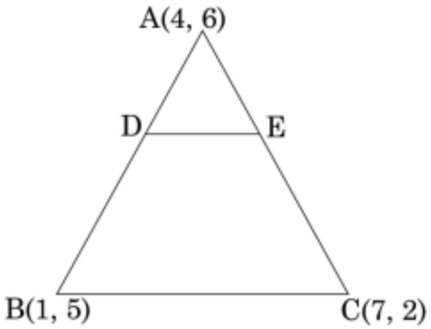
26. The angle of elevation of the top of a tower from the ground is 60°. From a point Y, 40 m vertically above the ground, the angle of elevation of the top of the tower is 45°. Find the height of the tower PQ and the distance of the foot of the tower from the point of observation. (Use $\sqrt{3} = 1.73$)

27. The houses in a row are numbered consecutively. Show that there exists a value of X such that the house numbered X is equal to the sum of the numbers of the houses preceding it.

28. In Fig., the vertices of $\triangle ABC$ are shown. A line-segment DE is drawn to intersect the sides respectively such that

$$\frac{AD}{AB} = \frac{AE}{AC} = \frac{1}{3}.$$

Calculate the area of $\triangle ADE$ and compare it with the area of $\triangle ABC$.



29. A number x is selected at random. Another number y is selected at random from the numbers 1 to 10. Find the probability that the product of x and y is even.

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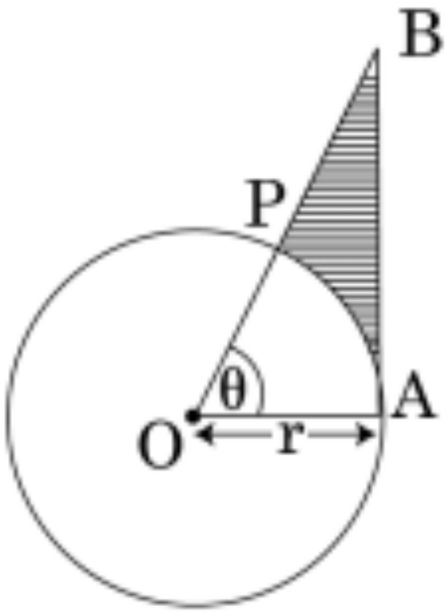
30. In Fig., a sector OAP subtends an angle θ. AB is perpendicular to the radius OA. Prove that the perimeter of the shaded region is

$$r\left(\tan\theta + \sec\theta + \frac{\pi}{2}\right)$$



31. A motor boat whose speed is 24 km/h in still water takes 32 km upstream and then returns downstream to the starting p¿ Find the speed of the stream.