## **Directorate of Education GNCT of Delhi** Worksheet: 49 **Subject:** Mathematics Date: 29/10/2020 Class: X Name of Student..... Name of Class Teacher..... Perimeter and Area of a circle Activity 1: To Find the Value of $\pi$ and determine the perimeter (Circumfernce ) of circle: Find the ratio of circumference to diameter of circle. What you observed? **Observation:** -Circumference of circle bears a constant ratio with its diameter. 0. r This constant ratio is denoted by Greek letter $\pi$ (read as 'Pi'). $\pi = \frac{\text{Circumference}}{\text{Diameter}} = \frac{62832}{20000} \approx 3.1416.$ the value of $\pi$ as 22/7 or 3.14, approximately. Which is an irrational number. We generally take Here circumference = $\pi \times \text{diameter} = \pi \times d = \pi \times 2r = 2 \pi r$ . C = 2 $\pi r$ where r is radius of circle. So, **Perimeter of circle = Circumference of circle = 2** $\pi r$ . Activity 2: To determine the Area of the circle: **Example 1:** If the perimeter 1. Take a circle of radius r. and area of the circle are numerically equal. Then find 2. Cut this circle into a number of sectors. (say in 16 parts or sectors). the diameter of the circle. 3. Now rearranging them as shown in figure. What you observed? Solution: Given that numerically, Perimeter of circle = Area of circle $\Rightarrow 2 \pi r = \pi r^2 \Rightarrow r = 2$ units $\Rightarrow$ d=2× r = 2 × 2 = 4 units **Observation:** Area of Rectangle = Area of Circle= length × breath= $\frac{1}{2}$ × 2 $\pi$ r × r = $\pi$ r<sup>2</sup> square unit Example 2: The wheels of a car are of a diameter 80 cm each. How many complete revolutions does each wheel make in 10 minutes when the car is traveling at a speed of 66 km per hour? Solution: Radius of wheel= $r = \frac{80}{2} = 40$ cm= $\frac{40}{100}$ m, C=2 $\pi r = 2 \times \frac{22}{7} \times \frac{40}{100} = \frac{176}{70}$ m,

Solution: Nadius of wheel  $1 = \frac{1}{2} = 40$  cm<sup>2</sup> 100 m,  $C = 2\pi r = 2 \times \frac{1}{7} \times \frac{100}{70} = \frac{70}{70}$  m, Speed =  $66 \frac{\text{km}}{\text{h}} = \frac{5}{18} \times 66 = \frac{55}{3}$  m/s Number of revolutions =  $\frac{\text{Distance travelled by a wheel in 10 minutes}}{\text{Distance travelled by a wheel in one revolution}} = \frac{\text{Speed} \times time}{2\pi r} = \frac{55 \times 10 \times 60 \times 70}{176 \times 3} = 4375$ 

Now Answer These: Q 1: If the diameter of a semi-circular protractor is 14 cm, Find its perimeter.

Q 2: Find the number of revolutions made by a circular wheel of area 6.16 m<sup>2</sup> in rolling a distance of 572 m Q 3: The cost of fencing a circular field at the rate of 24 per metre is ₹ 5280. The field is to be ploughed at the rate of ₹ 0.50 per m<sup>2</sup>. Find the cost of ploughing the field. {Take  $\pi = 22/7$ }.

**COVID** appropriate behavior (CAB) message:

To stay safe in the fight against COVID-19, wear a mask

