

## Circles:

### A. Definitions

1. A circle is defined by the equation:

$$(x-a)^2 + (y-b)^2 = r^2$$

where  $r$  is the radius and  $(a,b)$  is the midpoint of the circle

2. The radius of a circle is the length from the edge of the circle to the midpoint.
3. The diameter of a circle is the length of a segment from one edge of the circle to the opposite edge of the circle in which the segment passes through the midpoint.
4. A chord is a segment that connects 2 sides of the circle but does not have to pass through the midpoint.
5. A tangent line is a line that connects with a circle in exactly one point and is perpendicular with the radius at that point.

### B. Basic Memorizations

$$\text{Area} = \pi \cdot r^2$$

$$\text{Area} = \pi \cdot (d/2)^2$$

$$\text{Circumference} = 2\pi r \text{ or } \pi \cdot d$$

$$\text{Diameter} = 2 \cdot r$$

### C. Examples

Ex [1] The diameter of a circle is equal to the circles area. The radius is \_\_\_\_\_.

- a. If the diameter is equal to its area then we have:  $(d/2)^2 = d$ . The only way this is possible is if the diameter is 4. Therefore the radius must be half this amount or 4.
- b. The answer is 4.

Ex [2] The ratio of the circumference to the area of a circle with a radius of 5 is \_\_\_\_\_.

- a. The circumference of this circle is  $10\pi$  and the area is  $25\pi$ . So the ratio is  $\frac{10\pi}{25\pi} = \frac{2}{5}$ .
- b. The answer is  $\frac{2}{5}$ .