

G302 Class Notes – Angular Measurement

I. Angular Measurement

a. Angular Measurement (based on circle)

- i. Full Circle = 360 degrees
 1. 1 degree = $\frac{1}{360}$ th of circle

(1) Subdivisions of Degree

- (a) 1 degree = 60 minutes
- (b) 1 minute = 60 seconds
- (c) 1 degree = 60 min \times 60 sec/min = 3600 sec

(2) Famous Angular Measurements

- (a) Right Angle = 90 degrees
- (b) (Straight Angle) Line = 180 degrees
- (c) Circle = 360 degrees
- (d) Acute Angle < 90 degrees
- (e) Obtuse Angle: between 90-180 degrees
- (f) Complementary Angles – two angles add up to 90 degrees

2. Radians – unit of angular measurement based on the length of an arc circumscribed by a circle

a. Circumference of Circle = $2\pi r$,

where π = circumference of circle / radius of circle = 3.14, and r = radius of circle

b. Circle = 360 degrees = 2π radians; 180 degrees = π radians

Degree Measure of an Angle

Let an angle be in standard position. It is said to have the measure one **degree**, written 1° , if the angle is obtained by rotating its terminal side $\frac{1}{360}$ of a complete revolution in the positive (counterclockwise) direction. Thus, an angle obtained from one complete counterclockwise revolution has a measure of 360° ; an angle obtained from half a complete counterclockwise revolution has a measure of 180° ; an angle obtained from one quarter of a complete counterclockwise revolution has a measure of 90° , and so on. An angle obtained from half a complete revolution in the clockwise (negative) direction has a measure of -180° . If the terminal side is not rotated so that the initial and terminal sides coincide, then the angle has measure zero degrees, written 0° . Some angles are depicted in Figure 2.

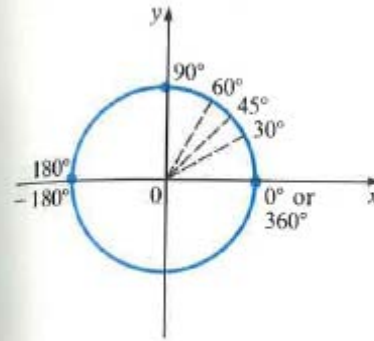


Figure 2

Some Special Angles

1. A **right angle** is an angle of 90° .
2. A **straight angle** is an angle of 180° .
3. θ is an **acute angle** if $0 < \theta < 90^\circ$.
4. θ is an **obtuse angle** if $90^\circ < \theta < 180^\circ$.
5. Two acute angles, θ_1 and θ_2 , are **complementary** if $\theta_1 + \theta_2 = 90^\circ$. We say that θ_2 is the **complement** of θ_1 , and vice versa.
6. Two positive angles, θ_1 and θ_2 , are **supplementary** if $\theta_1 + \theta_2 = 180^\circ$. We say that θ_2 is the **supplement** of θ_1 , and vice versa.

These ideas are illustrated in Figure 5.

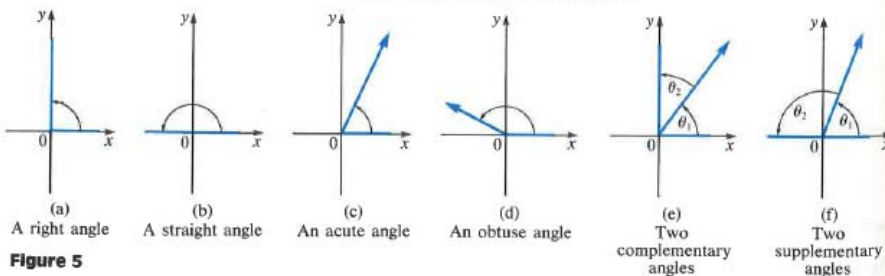


Figure 5