Week 10 Monday

March 11, 2019 8:09 AM

Test Average = 78%

If exam grade > term mark, then final grade = exam grade

Quiz tomorrow 6.4

Omit 6.8 #13

6.8 Exponential Growth and Decay Cnt'd

Exponential Decay e.g. radioactive decay

$A = Pe^{rt}$ ← formula sheet

A = amount remaining

P = initial amount

r = decay rate (r<0)

t = time

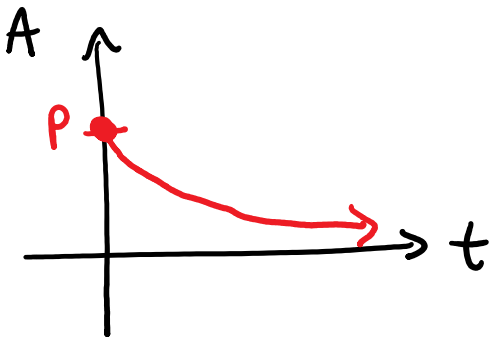
Various notations:

$A = A_0 e^{rt}$

$N = N_0 e^{rt}$

$N = N_0 e^{kt}$

$\text{Amount} = (\text{Initial Amount})\, e^{\#t}$



$A = Pe^{rt}$

DEF

Half-life: time for 50% of the substance to decay

Ex: Half-life of Carbon-14 is 5600 years. How long for 70% of a sample to decay?

→ Longer than 5600 years

$A = Pe^{rt}$ t: years

$t = 5600$

A = 50% of original amount $\rightarrow A = 0.5P$

$\rightarrow A = Pe^{rt}$

$0.5P = Pe^{5600r}$

$0.5 = e^{5600r}$

$\ln 0.5 = \ln e^{5600r}$

$\ln 0.5 = 5600r \ln e$

$\ln e = 1$

$\frac{\ln 0.5}{5600} = r$

$$A = Pe^{\left(\frac{\ln 0.5}{5600}\right)t}$$

CAUTION:

70% decayed

= 30% remaining

= 30% of original amount remaining

Sub $A = 0.3P$ → equation

$$0.3P = Pe^{\left(\frac{\ln 0.5}{5600}\right)t}$$

$$0.3 = e^{\left(\frac{\ln 0.5}{5600}\right)t}$$

$$\ln 0.3 = \ln e^{\left(\frac{\ln 0.5}{5600}\right)t}$$

$$\ln 0.3 = \left(\frac{\ln 0.5}{5600}\right)t \ln e$$

$\ln e = 1$

$$\frac{5600 \ln 0.3}{\ln 0.5} = t$$

$$t \simeq 9727 \text{ years}$$

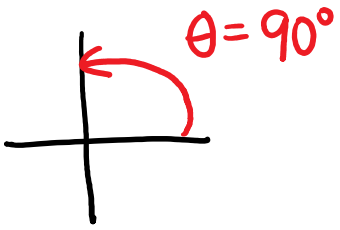
Could round r, but carry lots of decimal places!

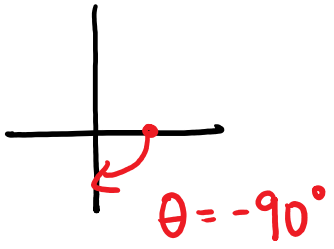
Ch 7 } TRIGONOMETRY
Ch 8 }

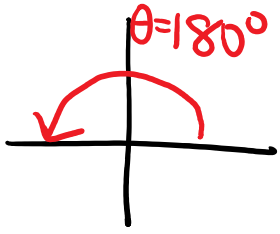
Ch 13 Sequences and Series (shorter topic)

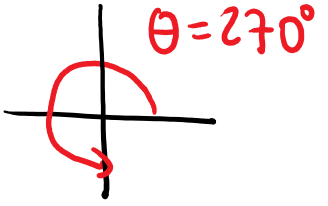
7.1 Angles

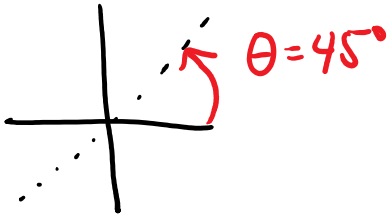
Angle: measured from positive x-axis
counterclockwise is positive direction

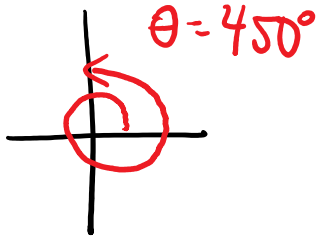






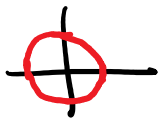






Two common descriptions for an angle:
degrees or radians

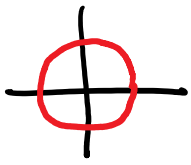
Unit circle : circle of radius 1



circumference $= 2\pi r = 2\pi$

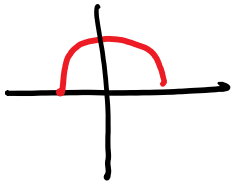
DEF

Angle in radians: arclength around the unit circle



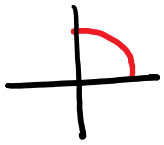
$\theta = 2\pi$ radians

$\theta = 360°$



$\theta = \pi$ radians

$\theta = 180°$



$\theta = \frac{\pi}{2}$

$\theta = \frac{\pi}{2}$ radians

$\theta = 90°$

Degrees $\Longleftrightarrow$ Radians