Solutions to Quiz #1

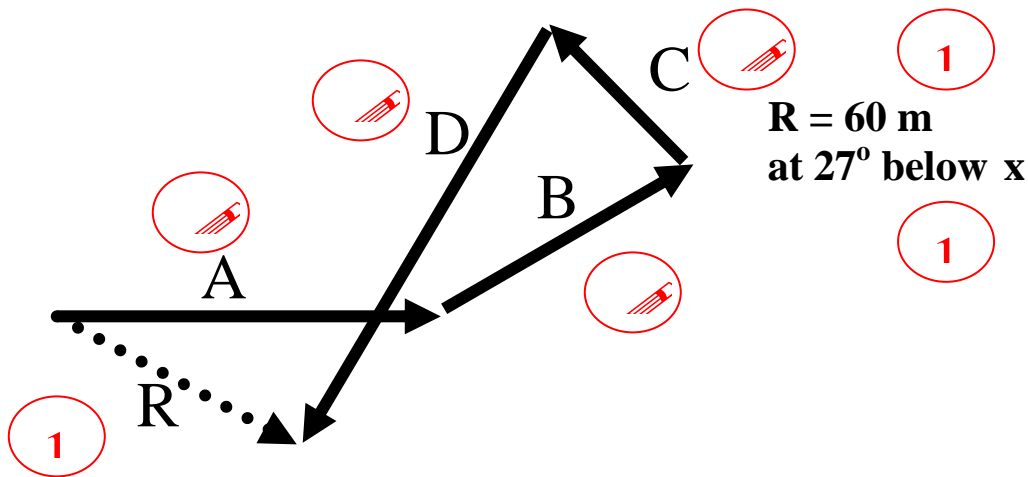## Question 1

An acre is equal to 160 square rods, where 1 rod = 5.5 yards and 1 yard = 0.914 meters. How many square meters are there in an acre?

$$\times \frac{30.25\,yd^2}{1rod^2} \quad \times \frac{0.835m^2}{1yd^2} \quad = 4041.4\,\tfrac{m^2}{acre}$$

Question 2a (5 points)

A particle undergoes four displacements as follows: A = 80 m along pos. x; B = 60 m at 30° above x; C = 40 m at 45° above -x; D = 100 m at 60° below -x. Graphical Solution

R = 60 m at 27° below x

Question 2b (5 points)

A particle undergoes four displacements as follows: A = 80 m along pos. x; B = 60 m at 30° above x; C = 40 m at 45° above -x; D = 100 m at 60° below -x. Component Solution

$$\sum d_x = 80m + 60m(\cos 30) - 40m(\cos 45) - 100m(\cos 60) = 53.68m$$

$$\sum d_y = 0m + 60m(\sin 30) + 40m(\sin 45) - 100m(\sin 60) = -28.32m$$

$$R = \sqrt{(53.68)^2 + (-28.32m)^2} = 60.7m \qquad \tan\theta = \frac{-28.32m}{53.68m} = -0.528$$

$$\theta = 27.8^o \text{ below pos. x axis}$$

Question 3 (6 points)

If a force of 86 N parallel to the surface of a 20° inclined plane will push a 120 N block up the plane at constant speed, what force parallel to the plane will push it down at constant speed? What is coefficient of kinetic friction?

86 N

20°

N

86 N

F_f

120N(sin20)

120N(cos20)

120 N