PreCalculus trig-worksheet-1
Do not use a calculator on problems 1-5.

1. Given the point on the plane, give the trigonometric function values of the angle
the line segment from the origin to the point makes with the x-axis.

(a) (2, 3) \( \sin \theta = \frac{3}{\sqrt{13}} \quad \cos \theta = \frac{2}{\sqrt{13}} \quad \tan \theta = \frac{3}{2} \)

(b) (-5, 4) \( \sin \theta = \frac{4}{\sqrt{41}} \quad \cos \theta = -\frac{5}{\sqrt{41}} \quad \tan \theta = -\frac{4}{5} \)

(c) (-6, -8) \( \sin \theta = -\frac{4}{5} \quad \cos \theta = -\frac{3}{5} \quad \tan \theta = \frac{4}{3} \)

(d) (3, 1) \( \sin \theta = \frac{1}{\sqrt{10}} \quad \cos \theta = \frac{3}{\sqrt{10}} \quad \tan \theta = \frac{1}{3} \)

2. A 40 ft ladder leans against a wall making an angle of 60° with the ground.

(a) At what height is the tip of the ladder touching the wall? \( 20\sqrt{3} \) ft

(b) How far from the wall is the foot of the ladder? \( 20 \) ft

3. A 70 ft ladder leans against a wall making an angle of 45° with the ground.

(a) At what height is the tip of the ladder touching the wall? \( 35\sqrt{2} \) ft

(b) How far from the wall is the foot of the ladder? \( 35\sqrt{2} \) ft

4. Consider a right triangle (as if in the first quadrant). From the given trigonometric
value of the base angle, \( \theta \), determine the other trigonometric values of the angle \( \theta \).

(a) \( \cos(\theta) = \frac{1}{3} \quad \sin(\theta) = \sqrt{8}/3 \quad \tan(\theta) = \sqrt{8} \)

(b) \( \cos(\theta) = .8 \quad \sin(\theta) = .6 \quad \tan(\theta) = .75 \)

(c) \( \sin(\theta) = \frac{4}{9} \quad \cos(\theta) = \sqrt{65}/9 \quad \tan(\theta) = 4/\sqrt{65} \)

(d) \( \tan(\theta) = .75 \quad \sin(\theta) = .6 \quad \cos(\theta) = .8 \)
5. Solve the following equations for all possible $\theta$ so that $0 \leq \theta < 2\pi$ (values within one revolution of the unit circle).

(a) $\sin^2(\theta) - 1 = 0$ \hspace{1cm} $\theta = \frac{\pi}{2}, \frac{3\pi}{2}$

(b) $4 \cos^2(\theta) = 1$ \hspace{1cm} $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

(c) $2 \sin^2(\theta) - \sin(\theta) - 1 = 0$ \hspace{1cm} $\theta = \frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$

(d) $\sin^2(\theta) = 3 \cos^2(\theta)$ \hspace{1cm} $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

6. Solve the following equations for all possible $\theta$ so that $0 \leq \theta < 2\pi$ (values within one revolution of the unit circle).

(a) $\sin(\theta) = .4$ \hspace{1cm} $\theta = 0.4115168, 2.730076$

(b) $\tan(\theta) = \frac{1}{2}$ \hspace{1cm} $\theta = 0.46364761, 3.6052403$

(c) $12 \cos^2(\theta) - 7 \cos(\theta) + 1 = 0$
\hspace{1cm} $\theta = 1.2309594, 5.0522589, 1.318116, 4.96507$

(d) $15 \cos^2(\theta) - \cos(\theta) - 6 = 0$
\hspace{1cm} $\theta = 2.2142974, 4.06888787, 0.84106876, 5.4421166$

(e) $\tan^2(\theta) + \tan(\theta) - 12 = 0$
\hspace{1cm} $\theta = 1.249046, 4.3906384, 4.9573676, 1.815775$

(f) $3 \sin^2(\theta) - 10 \sin(\theta) + 3 = 0$ \hspace{1cm} $\theta = 0.3398369, 2.80175574$