1) Draw both special triangles learned in this unit. Make sure to label all angles and side lengths.

2) Find a reference angle for the following obtuse angles

a) $\theta = -137°$

b) $\theta = 330°$

3) Determine the exact sine value and cosine value of each angle.

a) $\theta = 330°$

b) $\theta = 135°$

4) Determine two angles that are coterminal with angle $\theta = 97°$.

5) Determine **_TWO_** angles between 0° and 360° that have the following trigonometric function value. Write each angle to one decimal place.

a) $\tan \theta = -0.32$

b) $\sin \theta = -0.46$

6) State each <u>exact value</u> using special triangles.

a) $\sin 225°$

b) $\cot 300°$

7) Find the <u>exact value</u> of the following trigonometric ratios using special triangles and the definition of the inverse functions.

a) sec 120°

b) csc 150°

c) cot 225°

8) Determine two angles between 0 and 360° that have the following trigonometric function value.

a) $\sin \theta = \frac{\sqrt{3}}{2}$

b) $\tan \vartheta = -\sqrt{3}$

9) One of the primary trig ratios of an angle is given, as well as the quadrant in which the terminal arm lies. Find the other two primary trig ratios.

a) $\cos A = -\frac{8}{17}$, second quadrant
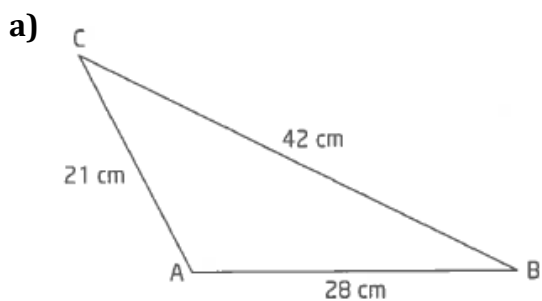
b) $\sin B = -\frac{4}{5}$, third quadrant

10) Each point lies on the terminal arm of an angle in standard position. Determine exact expressions for the six trigonometric ratios for the angle.
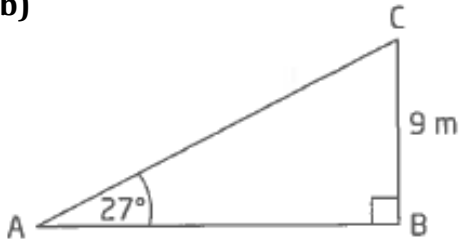
a) P(-3, 4)   **b)** Q(-12, -5)

11) The shadow of a tree that is 18.5 m tall measures 10.2 m in length. Determine the angle of elevation of the sun.
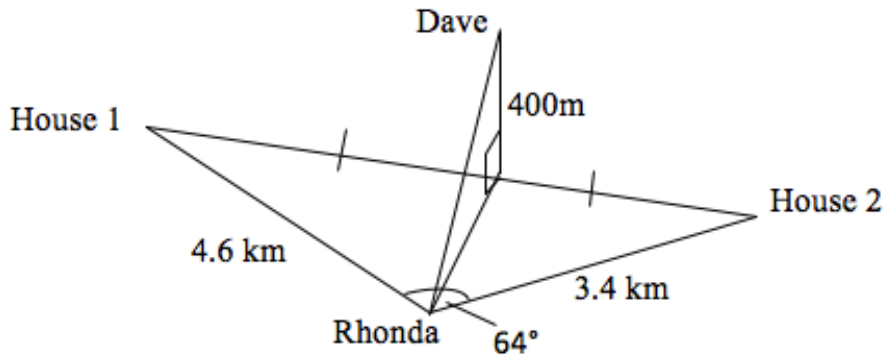
12) Solve each of the following triangles.

a)

b)

13) Dave is in a hot air balloon 400m in the air exactly halfway between two houses on the ground. His wife, Rhonda, is at her friend's house which is 4.6km from the first house and 3.4km from the second house. The angle of the two houses, from Rhonda's point of view, is 64°. Find the angle of elevation if Rhonda looks up at Dave.

14) Prove the following trigonometric identities.

a) $\sec\theta\cos\theta + \sec\theta\sin\theta = 1 + \tan\theta$
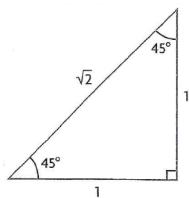
b) $tan^2x + cos^2x + sin^2x = \dfrac{1}{cos^2x}$

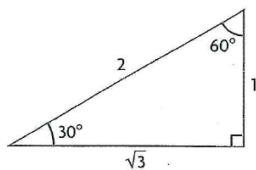**c)** $csc^4x + cot^4x = 1 + 2csc^2xcot^2x$

d) $\dfrac{cotx - tanx}{csc^2x - sec^2x} = \dfrac{1}{cscxsecx}$

e) $\dfrac{cotx - tanx}{sinxcosx} = csc^2x - sec^2x$

Answers

1)

2) a) 43° **b)** 30°

3) a) $\sin 330 = -\frac{1}{2}$; $\cos 330 = \frac{\sqrt{3}}{2}$ **b)** $\sin 135 = \frac{1}{\sqrt{2}}$; $\cos 135 = -\frac{1}{\sqrt{2}}$

4) 457° and 817°

5) a) 342.3° and 162.3°   **b)** 332.6° and 207.4°

6) a) $-\frac{1}{\sqrt{2}}$ **b)** $-\frac{1}{\sqrt{3}}$

7) a) $\sec 120 = -2$ **b)** $\csc 150 = 2$ **c)** $\cot 225 = 1$

8) a) 60° and 120°   **b)** 300° and 120°

9) a) $\sin A = \frac{15}{17}$, $\tan A = -\frac{15}{18}$ **b)** $\cos B = -\frac{3}{5}$, $\tan B = \frac{4}{3}$

10) a) $\sin \theta = \frac{4}{5}$, $\csc \theta = \frac{5}{4}$, $\cos \theta = -\frac{3}{5}$, $\sec \theta = -\frac{5}{3}$, $\tan \theta = -\frac{4}{3}$, $\cot \theta = -\frac{3}{4}$

   b) $\sin \theta = -\frac{5}{13}$, $\csc \theta = -\frac{13}{5}$, $\cos \theta = -\frac{12}{13}$, $\sec \theta = -\frac{13}{12}$, $\tan \theta = \frac{5}{12}$, $\cot \theta = \frac{12}{5}$

11) 61.1°

12) a) $\angle A = 117.3°$, $\angle B = 26.4°$, $\angle C = 36.3°$ **b)** $b = 19.8$, $c = 17.7$, $\angle C = 63°$

13) 6.65°

14) See posted solutions