

Exam will last for exactly 1 hour. (The other 40 minutes will be devoted to the new material as scheduled.)

1. (10 pts) Convert $17\pi/6$ radians to degrees and -400 degrees to radians. Also draw each of the angles.

2. (16 points) Prove the following identity:

$$\frac{\cos x}{2-2\cos x} - \frac{\cos x}{2+2\cos x} = \cot^2 x$$

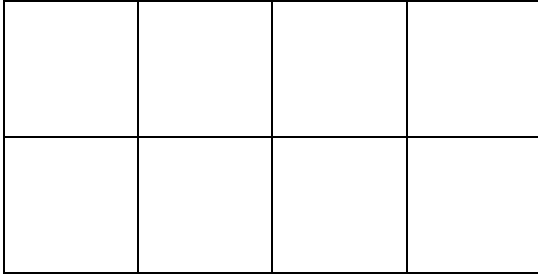
3. (20 pts) Solve **exactly** each of the equations for $[0, 2\pi)$. NO PICTURE NO CREDIT.

a) $\cot^2 x = 3$

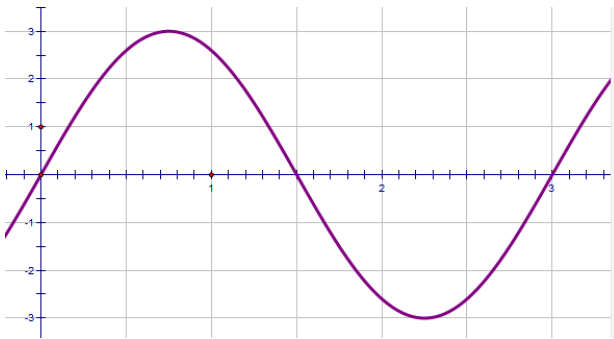
b) $2\sin^2 x + 1 = 0$

4. (20 points) Given $\csc \theta = 3$ and $\tan \theta < 0$, find the values of the 5 other trigonometric functions. NO PICTURE NO CREDIT. Use 3 as your radius for circle. Drop or raise the perpendicular to the x -axis to create a triangle. Draw and label the angle (θ) as well as the reference angle (ref \angle).

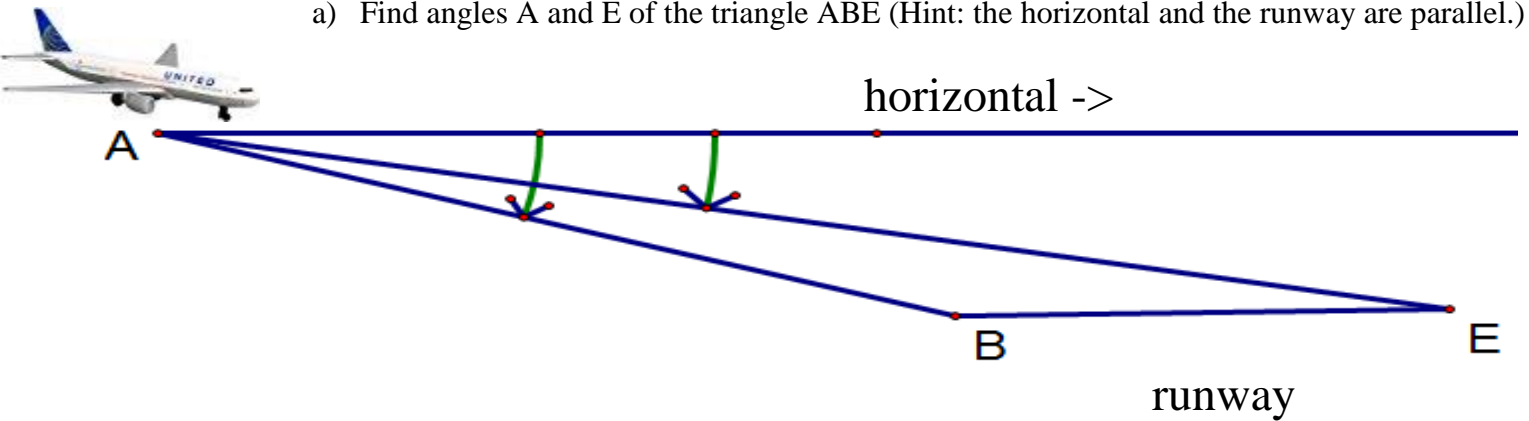
5. (14 points) a) Graph 1 period of $y = -2 \cos\left(\frac{3}{4}t\right)$ on axes below. Amplitude is ____ and period is ____.



- b) Find the equation for the graph below. Amplitude is ____ and period is ____.



6. (20 points) When an airplane A is landing on a 2.03-mile-long runway BE, the angles of depression to the beginning B and end E of the runway are 10.12° and 8.13° , respectively.
 a) Find angles A and E of the triangle ABE (Hint: the horizontal and the runway are parallel.)



- b) How far is the plane from the near end of the runway (i.e., find the length of AB)? Round to the nearest **hundredth**. Write your answer as a **sentence** and include **units**.