MATH 1060 Trigonometry Exam 3 Name_____

No notes or books are permited. Calculators will be allowed on this exam, but you must show your work to receive full credit. Each problem is equally weighted. Clearly indicate your answer on each problem.

Find the exact value of the expression without using a calculator or table.

1) $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$

A) $\frac{3\pi}{4}$ B) $\frac{\pi}{3}$ C) $\frac{2\pi}{3}$ D) $\frac{\pi}{4}$

Find all real numbers (in radians) that satisfy the equation.

2) $2 \sin x + \sqrt{3} = 0$

Find all values of θ in [0°, 360°) that satisfy the equation.

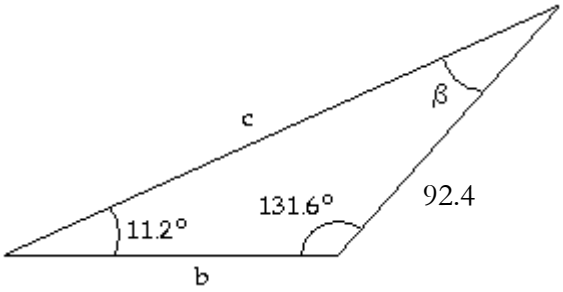
3) $2 \sin 2\theta - \sqrt{3} = 0$

Find all values of x in the interval [0°, 360°) that satisfy the equation. Round approximate answers to the nearest tenth of a degree.

4) $2 \sin^2 x - \sin x - 1 = 0$

Solve the triangle with the given parts. Round your results to the nearest tenth.

5)



Solve the triangle with the given information. Round your results to the nearest tenth.

6) $\beta = 63.5°$
$a = 12.2$
$c = 7.80$

Solve the problem.

7) A stained glass window is composed of 20 triangular sections, each with sides 5, 9, and 8 inches. Find the **total area of the window** (so all 20 triangles) to the nearest square inch.

Find the magnitudes of the horizontal and vertical components for the vector v with the given magnitude and given direction angle. Round to an appropriate number of significant digits.

8) $|\mathbf{v}| = 10.3$, $\theta = 64.8°$

Find the smallest positive angle between the given vectors to the nearest tenth of a degree.

9) <-1, -6>, <5, 9>

Determine whether the vectors are parallel, perpendicular, or neither. Carefully justify your answer with trigonometeric techniques.

10) $\mathbf{v} = \langle 3, 2 \rangle$, $\mathbf{w} = \langle 2, -3 \rangle$

A) perpendicular B) parallel C) neither

CHOOSE one of the following two problems to complete. CIRCLE the number of the problem you choose. You may complete the remaining problem for up to 3 points of extra credit.

Solve.

11) Two forces of 23 N and 55 N (newtons) act on an object at right angles. Find the magnitude of the resultant and the angle that it makes with the smaller force. Round your final answer to the nearest whole number.

Solve the problem.

12) An airplane flies on a compass heading of 90.0° at 450 mph. The wind affecting the plane is blowing from 304° at 35.0 mph. What is the true course and ground speed of the airplane? Round results to the nearest whole number.