MA 154 EXAM 2 FALL 1999

NAME_____

Circle the correct answer for problems 1-3. You must show your work to receive credit.

(8 pts) 1. $\sin 34° \cos 22° - \cos 34° \sin 22° =$

A. $\cos 56°$
B. $\cos 12°$
C. $\sin 56°$
D. $\sin 12°$
E. None of these

(8 pts) 2. If $\cos \alpha = k$ and $270° \le \alpha \le 360°$, $\sin\frac{\alpha}{2} =$

A. $\frac{k}{2}$
B. $\sqrt{\frac{1+k}{2}}$
C. $-\sqrt{\frac{1+k}{2}}$
D. $\sqrt{\frac{1-k}{2}}$
E. $-\sqrt{\frac{1-k}{2}}$

(8 pts) 3. Write as an algebraic expression in x for $x > 0$.

$\cos(\sin^{-1} x)$

A. x
B. $\frac{x}{\sqrt{1-x^2}}$
C. $\sqrt{1-x^2}$
D. $\frac{1}{\sqrt{1-x^2}}$
E. $\frac{\sqrt{1-x^2}}{x}$

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Place your answers in the space provided. You must show your work to receive credit.

(14 pts) 4. Verify the identity. Work with only one side.

$$\frac{2\tan\left(\frac{\alpha}{2}\right)}{1+\tan^2\left(\frac{\alpha}{2}\right)} = \sin\alpha$$

(12 pts) 5. Solve the equation: $\cos 2\theta + 3 = 5\cos\theta, \quad 0 \le \theta < 2\pi.$

$\theta =$ ☐

(10 pts) 6. Find the exact value of cos 105° and simplify. (Do not use a calculator.)

cos 105° = ☐

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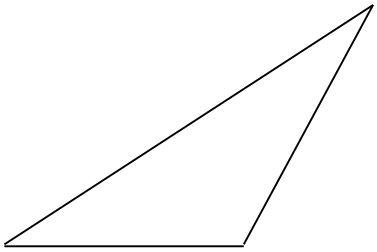
(12 pts) 7. Solve ΔABC:

$a = 10.7, b = 7.2, \gamma = 105°$



To the nearest degree, α = _____

To the nearest degree, β = _____

To the nearest tenth, c = _____

(14 pts) 8. Coast Guard Station Zulu is located 120 miles due west of Station X-ray. A ship at sea sends an SOS call that is received by each station. The call to Station Zulu indicates the location of the ship is on a bearing of 40° (N40°E) from the station; the call to Station X-ray indicates the location of the ship is on a bearing of 330° (N30°W) from the station. How far is the ship from each station? (Draw and label a sketch, set up an equation and solve.) Round to the nearest mile.

Distance to Zulu = _____

Distance to X-ray = _____

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Place your answers in the space provided. You must show your work to receive credit.

(14 pts) 9. The highest bridge in the world is the bridge over the Royal Gorge of the Arkansas River in Colorado. Sightings to the same point at water level directly under the bridge are taken from each end of the 880-foot-long bridge as angles of depression of 69.2° and 65.5°. How high is the bridge above the river? (Draw and label a sketch, set up an equation and solve.) Round your answer to the nearest foot.

Height = ☐

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$\sin(u + v) = \sin u \cos v + \cos u \sin v$

$\cos(u + v) = \cos u \cos v - \sin u \cos v$

$$\tan(u+v) = \frac{\tan u + \tan v}{1 - \tan u \tan v}$$

$$\sin\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{1-\cos\alpha}{2}}$$

$$\cos\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{1+\cos\alpha}{2}}$$