Exam #3

March 9, 2018

Name _____

- You will be told when to begin the work and when to terminate work on the examination. You must stop when instructed. Points may be deducted in case of violations.

- Please show your work to support your answers that require calculations. Correct but unsupported answers may not be given full credit.

- The use of a cell phone or other electronic communication devices during the examination is not allowed. The exam will be canceled and a grade of "0" will be assigned to anyone who uses a cell phone during the examination or if one is found within hands reach.

- Calculators are not allowed on this exam.

Choose your answer from available choices. No partial credit will be given for wrong answers.

1. (6 pts) Find the exact value of $\cos^{-1}(-\frac{\sqrt{3}}{2})$

(a) $\frac{5\pi}{6}$ (b) $\frac{7\pi}{6}$ (c) $\frac{\pi}{6}$ (d) $-\frac{\pi}{6}$ (e) None of the above

2. (6 pts) Find the exact value of $\sin^{-1}(\sin(\frac{4\pi}{3}))$

(a) $\frac{4\pi}{3}$ (b) $-\frac{4\pi}{3}$ (c) $\frac{\pi}{3}$ (d) $-\frac{\pi}{3}$ (e) None of the above

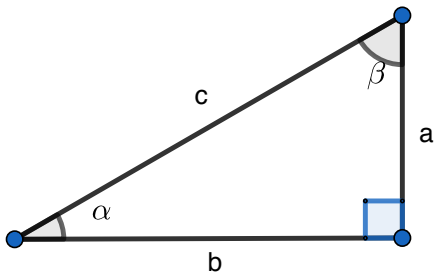3. (6 pts) Find the exact value of $\sin(210°)$

(a) $\frac{1}{2}$ (b) $\frac{-1}{2}$ (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{-\sqrt{3}}{2}$ (e) None of the above

4. (6 pts) Use the sum and difference formulas to find the exact value of $\cos(15°)$

(a) 1   (b) $\frac{\sqrt{2}-\sqrt{6}}{4}$ (c) $\frac{\sqrt{3}-1}{2\sqrt{2}}$ (d) $\frac{\sqrt{2}+\sqrt{6}}{4}$ (e) None of the above

5. (6 pts) Given the triangle depicted below with $a = \sqrt{3}$ and $b = 1$, find β.

(a) $\beta = \frac{\pi}{6}$ (b) $\beta = \frac{\pi}{4}$ (c) $\beta = \frac{\pi}{3}$ (d) $\beta = -\frac{\pi}{6}$ (e) None of the above

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6. (6 pts each) Is the following statement true or false? If it is false, **rewrite** it to make it true. (Do not explain why is the statement false)

(a) The domain if $y = \csc^{-1} x$ is $\left[-\frac{\pi}{2}, 0\right) \cup \left(0, \frac{\pi}{2}\right]$.

(b) The double angle formula for sine has 3 different variations.

(c) The graph of $y = \tan(x)$ has infinite number of vertical asymptotes.

7. (10 pts each) Solve the following equations

(a) $4\cos(x) + 2 = 0$ in $[0, 2\pi)$

(b) $2\sin^2\theta = 3\cos(-\theta) + 3$ in $[0, 2\pi)$

8. (6 pts) Find the exact value of
$$1 + \cos^2(64°) + \cos^2(26°)$$

9. (10 pts each) Verify the identity

(a) $\cos(x - y) - \cos(x + y) = 2\sin x \sin y$

(b) $\tan \theta + \cot \theta = \frac{2}{\sin(2\theta)}$

10. (6 pts) **Why** can't we cancel $\tan x$ from both sides when finding the solutions of $\tan x \sin x = \tan x$?

11. (10 pts) A hot air balloon is east of a stadium $700\,\text{ft}$ above the ground. Two sightings of the balloon are made, one at the farther side of the stadium with an angle of elevation $27°$ and one from the side of the stadium closest to the balloon with an angle of elevation $38°$. How wide is the stadium? Draw a sketch first. [Hint: Your answer should be left in a calculator ready form, i.e., $\frac{\sqrt{3}}{\sin 10°}$, $\frac{\cos 12°}{\tan 39°+\sin 49°}$, etc.]