

Student Name (print): \_\_\_\_\_

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This exam contains 5 pages (including this cover page) and 7 questions. The total number of possible points is 35. Enter your answers in the space provided. Draw a box around your final answer.

- **Mysterious or unsupported answers will not receive full credit.** A correct answer, unsupported by calculations, explanation, or algebraic work will receive no credit; an incorrect answer supported by substantially correct calculations and explanations may still receive partial credit.
- **Clearly identify your answer for each problem.**
- **No calculators or outside help allowed, unless it is with your instructor.**

Do not write in the table to the right.

Question	Points	Score
1	5	
2	5	
3	5	
4	5	
5	5	
6	5	
7	5	
Total:	35	

1. (5 points) The point  $P(x, y) = \left(\frac{-2}{5}, y\right)$  lies on the unit circle and is in the III Quadrant. Find the values of  $\sin$ ,  $\cos$ ,  $\sec$ ,  $\csc$ ,  $\cot$ ,  $\tan$  at this point, if they exist. (Leave in fraction form) No Calculator, show your work.

2. (5 points) You're given a triangle with sides  $a = 14$ ,  $b = 13$  and angle  $B = 60^\circ$ . Solve this using only the law of sines and the fact that the angles add up to  $180^\circ$ . Show your work. You can use a calculator here.

3. (5 points) You're given a triangle with sides  $a = 4$ ,  $b = 5$ ,  $c = 6$ . Solve this triangle using only the law of cosines **and find the area of the triangle**, don't switch to law of sines, and the fact that the angles  $A, B, C$  add up to  $180^\circ$ . Show your work. You can use a calculator here.
4. (5 points) You're given a triangle with a side  $a = 7$ ,  $B = 35^\circ$ ,  $C = 25^\circ$ . Solve this triangle only using the law of sines and the fact that the angles add up to  $180^\circ$ . Show your work. You can use a calculator here.

5. (5 points) Evaluate the following using your trig table, or if appropriate, the cancellation property:

$$\sin^{-1}\left(\sin \frac{19\pi}{8}\right) \quad \text{and} \quad \sin\left(\sin^{-1} \frac{19\pi}{8}\right).$$

Is it true  $\sin^{-1}(\sin(x)) = \sin(\sin^{-1}(x))$  for all  $x$ ? Show your work

6. (5 points) Using your table of trig functions evaluate the following:

$$\cos(\tan^{-1}(-\sqrt{3})) \quad \text{and} \quad \sin(\cot^{-1}(-\sqrt{3}))$$

Show your work

7. (5 points) The frequency of oscillation of an object suspended on a spring depends on the stiffness  $k$  of the spring (called the *spring constant*) and the mass  $m$  of the object. If the spring is compressed a distance  $a$  and then allowed to oscillate, its displacement is given by:

$$f(t) = a \cos \left( \sqrt{\frac{k}{m}} t \right).$$

Find the general formula for the frequency (In terms of  $k, m$ ) and when is the first time that it reaches its original position when  $t \neq 0$ ? (That is, when does  $y(t) = 0$  and  $t \neq 0$  for the first  $t > 0$ ?) Show your work.