Trigonometry Final Exam

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This exam is comprehensive over the entire course and includes 12 questions. You have 60 minutes to complete the exam.

The exam is worth 100 points. The 8 multiple choice questions are worth 5 points each (40 points total) and the 4 free response questions are worth 15 points each (60 points total).

Mark your multiple choice answers on this cover page. For the free response questions, show your work and make sure to circle your final answer.

1. (5 pts)   A   B   C   D   E

2. (5 pts)   A   B   C   D   E

3. (5 pts)   A   B   C   D   E

4. (5 pts)   A   B   C   D   E

5. (5 pts)   A   B   C   D   E

6. (5 pts)   A   B   C   D   E

7. (5 pts)   A   B   C   D   E

8. (5 pts)   A   B   C   D   E

1. **(5 pts)** What is the approximate area of the triangle with side lengths 9, 10, and 11?

| A | 98 | C | 60 | E | 36 |

| B | 90 | D | 42 |

2. **(5 pts)** A bicycle whose wheels are 24 inches in diameter is traveling at 12 miles per hour. What is the angular velocity ω in revolutions per second?
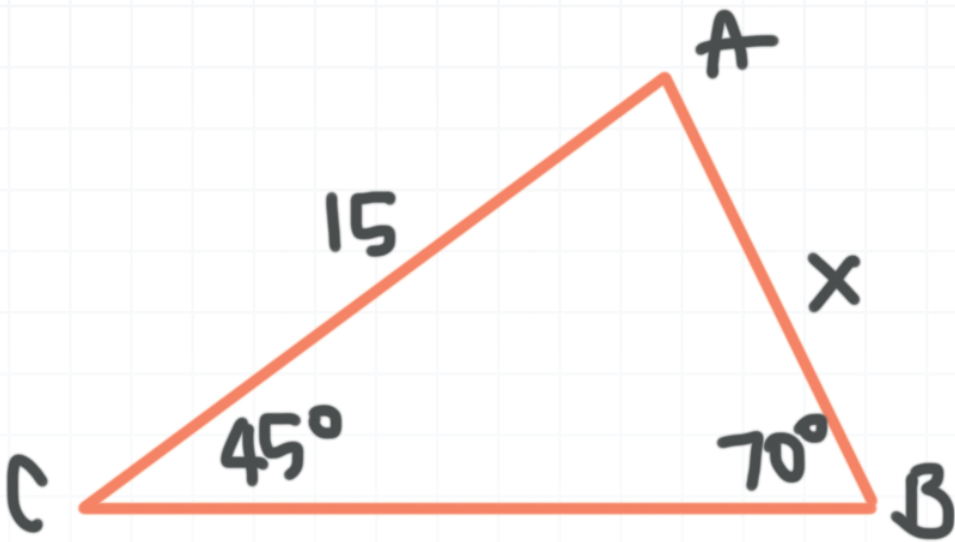
| A | 2.8 rev/sec | C | 3 rev/sec | E | 16.8 rev/sec |

| B | 8.8 rev/sec | D | 12 rev/sec |

3. **(5 pts)** Use the law of sines to solve for the approximate value of x.

A	16.5	C	18	E	12
B	11.3	D	6.5		

4. **(5 pts)** If a circular floor rug has diameter 6 feet, what is the area A (in square feet) of the sector with central angle $70°$?

A	$A = 12\pi$	C	$A = \dfrac{21}{12}\pi$	E	$A = \dfrac{7}{4}\pi$
B	$A = \dfrac{8}{36}\pi$	D	$A = \dfrac{7}{6}\pi$		

5. **(5 pts)** What is the period of the function?

$$y = -3 \csc \frac{\theta}{12}$$

A 12π C 24π E $\frac{\pi}{8}$

B $-\frac{\pi}{4}$ D 6π

6. **(5 pts)** What is the exact value of $\cos 135° \sin 15°$?

A $\frac{1+\sqrt{3}}{4}$ C $\frac{1-\sqrt{3}}{2}$ E $\frac{\sqrt{3}-1}{4}$

B $\frac{1+\sqrt{3}}{2}$ D $\frac{1-\sqrt{3}}{4}$

7. **(5 pts)** What is the exact value of $\cos 165°$?

A $-\dfrac{\sqrt{2}+\sqrt{6}}{4}$

C $-\dfrac{\sqrt{2}+\sqrt{3}}{2}$

E $\dfrac{\sqrt{2}-\sqrt{3}}{4}$

B $-\dfrac{\sqrt{6}-\sqrt{2}}{4}$

D $-\dfrac{\sqrt{6}-\sqrt{2}}{2}$

8. **(5 pts)** Write the equation of a cosine function with a vertical stretch of 1/5, horizontal compression of 3, downward shift of 5, and a shift to the left of $\pi/3$.

A $y = 5\cos(\theta + \pi) - 5$

D $y = 5\cos\left(3\theta - \dfrac{\pi}{4}\right) + 5$
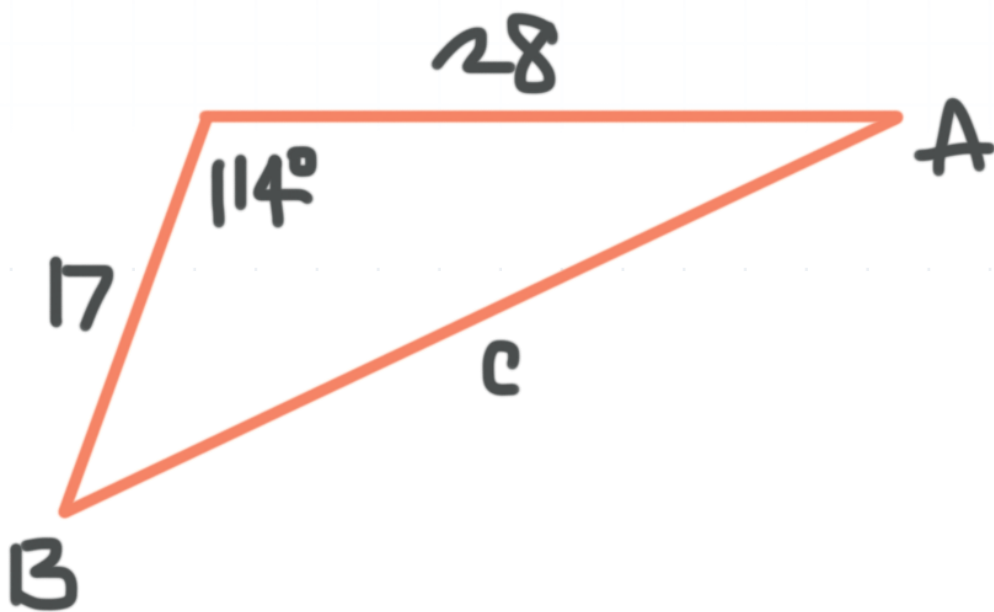
B $y = \dfrac{1}{5}\cos(3\theta + \pi) - 5$

E $x = \dfrac{1}{5}\cos\left(\dfrac{\theta}{3} - \dfrac{\pi}{5}\right) + 5$

C $y = 3\cos\left(\dfrac{1}{5}\theta + \dfrac{\pi}{3}\right) - 5$

9. **(15 pts)** A person is flying a hang glider at an altitude of 525 feet above the ground. They see a barn on the ground at an angle of depression of $40°$. What is the slant distance to the nearest foot from the hang glider to the barn?

10. **(15 pts)** Solve the triangle.

28

114°

17

A

C

B

11. **(15 pts)** Simplify the sum.

$(-\sin 60°)(\cos 38°) + (\cos 60°)\sin(38°)$

12. **(15 pts)** Sketch the graph of $y = -4\sin 3x$.