

Name: _____

Score: _____

Show your work to receive credit for your answers.

1. Use the fact that $105^\circ = 60^\circ + 45^\circ$ to find the exact value (no decimal approximation) of $\sin 105^\circ$.

2. Use the fact that $285^\circ = 330^\circ - 45^\circ$ to find the exact value of $\cos 285^\circ$.

3. Simplify the following expression (should get a single term):
 $\sin 8x \cos 2x + \cos 8x \sin 2x$.

4. Given that $\tan u = \frac{3}{4}$, $0 < u < \frac{\mathbf{p}}{2}$, $\sec v = \frac{25}{24}$, and $\frac{3\mathbf{p}}{2} < v < 2\mathbf{p}$, evaluate $\sin(u + v)$.

5. Find all solutions of the following equation in the interval $[0, 2\pi)$: $3\sin(2x - \mathbf{p}) = 3$.

6. Find all solutions of the following equation in the interval $[0, 2\pi)$: $\cos 2x + \sin x = 0$.

7. Given that $\cos u = -\frac{4}{7}$ and $\mathbf{p} < u < \frac{3\mathbf{p}}{2}$, evaluate $\cos 2u$.

8. Given that $\cos \mathbf{q} = -\frac{7}{9}$ and $\tan \mathbf{q} < 0$, evaluate $\sin 2\mathbf{q}$.

9. Given that triangle ABC has angle measures $A = 10^\circ$ and $B = 30^\circ$, and side length $b = 14$, find the length of side c .
10. Given that triangle ABC has angle measure $A = 12^\circ$, and side lengths $a = 12$ and $c = 37$, find the two possible values of the length of side b .
11. If an oblique triangle has side lengths $b = 600$ and $c = 634$, and angle measure $B = 78^\circ$, how many solutions are there for the length of side a ?

12. Given a triangle has side lengths $a = 72$ and $b = 51$, and angle measure $A = 27^\circ$, find the area of the triangle.

13. Given that triangle ABC has side lengths $a = 80$, $b = 51$, and $c = 113$, find the measure of angle C.

14. A television antenna sits on a roof. Two 78-foot guy wires are positioned on opposite sides of the antenna. The angle of elevation each makes with the ground is 23° . How far apart are the ends of the two guy wires?