$\qquad$

1. Find the exact value of the given expression using a sum or difference formula. $\tan \frac{19 \pi}{12}$
2. Write the given expression as the cosine of an angle. $\cos 60 \cos 55-\sin 60 \sin 55$
3. Write the given expression as the sine of an angle. $\sin 25 \cos 55-\sin 55 \cos 25$
4. Use the figure below to determine the exact value of the given function.

5. Find the exact solutions of the given equation on the interval $[0,2 \pi)$. $\sin 2 x=\cos x$
6. Use the figure below to find the exact value of the given trigonometric expression.

7. Use the half-angle formulas to determine the exact value of the given trigonometric expression.
$\tan \frac{3 \pi}{8}$
8. Use the product-to-sum formula to write the given product as a sum or difference. $8 \sin \frac{\pi}{10} \cos \frac{\pi}{10}$
9. Use the sum-to-product formulas to write the given expression as a product. $\cos 9 \theta-\cos 7 \theta$
10. Given $\mathrm{C}=123^{\circ}, \mathrm{a}=12.9$, and $\mathrm{c}=8.3$, use the Law of Sines to solve the triangle (if possible) for the value(s) of $b$. If two solutions exist, find both. Round answer to two decimal places.
11. After a severe storm, three sisters, April, May, and June, stood on their front porch and noticed that the tree in their front yard was leaning $3^{\circ}$ vertical toward the house. From the porch, which is 101 feet away from the base of the tree, they noticed that the angle of elevation to the top of the tree was $32^{\circ}$. Approximate the height of the tree. Round answer to two decimal places.
12. A vertical pole 39 feet tall stands on a hillside that makes an angle of $18^{\circ}$ with the horizontal. Determine the approximate length of cable that would be needed to reach from the top of the pole to a point 73 feet downhill from the base of the pole. Round answer to two decimal places.
13. Find the magnitude and direction angle of vector $\vec{v}=4 i-6 j$. Round direction angle to nearest hundredth.
14. Find the component form of vector $\vec{v}$ if $\|\vec{v}\|=4$ and the angle it makes with the x -axis is $60^{\circ}$.
15. Three forces with magnitudes of 66 pounds, 78 pounds, and 132 pounds act on an object at angles of $130^{\circ}, 220^{\circ}$, and $290^{\circ}$, respectively, with the positive x -axis. Find the magnitude and direction of the resultant force. Round answers to two decimal places.
16. A force of F pounds is required to pull an object weighing W pounds up a ramp inclined at $\theta$ degrees from the horizontal. Find F if $\mathrm{W}=5000$ pounds and $\theta=26^{\circ}$.
