Precalculus
4.7, 4.8, 6.1, 6.2 Test Review

Solve the following triangles.
2. $\quad a=31, \mathrm{c}=20, \mathrm{~b}=29$
4. $m \angle \mathrm{~B}=82^{\circ}, \mathrm{a}=22, \mathrm{~b}=37$
6. $\quad b=22, c=27, m \angle \mathrm{~A}=105^{\circ}$
8. $m \angle \mathrm{C}=16^{\circ}, m \angle \mathrm{~A}=21^{\circ}, \mathrm{b}=37$

Find the area of each triangle to the nearest tenth.
9. $\triangle$ FDE: $\mathrm{d}=6 \mathrm{mi}, m \angle \mathrm{~F}=106^{\circ}, \mathrm{e}=7 \mathrm{mi}$
10. $\Delta \mathrm{CAB}: \mathrm{a}=7 \mathrm{in}, \mathrm{b}=8.9 \mathrm{in}, \mathrm{c}=14.3$ in
11. $\triangle$ EFD: $\mathrm{d}=6 \mathrm{mi}, m \angle \mathrm{E}=107^{\circ}, \mathrm{f}=5 \mathrm{mi}$
12. $\triangle$ HPK: $\mathrm{p}=15 \mathrm{~km}, \mathrm{k}=7 \mathrm{~km}, \mathrm{~h}=11.1 \mathrm{~km}$
13. A poll tilts towards the sun at an $8^{\circ}$ angle from the vertical as it casts a 22 foot shadow. The angle of elevation from the shadow to the top of the pole is $43^{\circ}$. How tall is the pole?

14. A boat is sailing due east parallel to the shoreline at a speed of 20 miles per hour. At a given time the bearing to a lighthouse is $\mathrm{S} 68^{\circ} \mathrm{E}$, and 30 minutes later the bearing is $\mathrm{S} 52^{\circ} \mathrm{E}$. Find the distance from the boat to the light house at Boat Position 2.

Boat position 1

## Boat position 2

## - Lighthouse

15. Two planes leave an airport at the same time. One plane is flying 650 mph at a bearing $\mathrm{N} 37^{\circ} \mathrm{E}$, and the other plane is flying at 825 mph at a bearing of $\mathrm{N} 53^{\circ} \mathrm{w}$. How far apart are the planes after flying for 2 hours?
16. The height of a radio transmission tower is 70 meters, and it casts a shadow of length 30 meters. Draw a diagram and find the angle of elevation of the sun.
17. A footbridge is to be built across a small lake from a gazebo to a dock. From a tree 100 yards from the gazebo the bearing in $\mathrm{E} 24^{\circ} \mathrm{S}$. From the tree to the dock the bearing is $\mathrm{S} 15^{\circ} \mathrm{E}$. The bearing from the gazebo to the dock is $\mathrm{S} 33^{\circ} \mathrm{W}$. What is the length of the bridge?
18. A footbridge is to be built across a small lake from a gazebo to a dock. From a tree 100 yards from the gazebo the bearing in $\mathrm{E} 16^{\circ} \mathrm{S}$. From the tree to the dock the bearing is $\mathrm{S} 28^{\circ} \mathrm{E}$. The bearing from the gazebo to the dock is $\mathrm{S} 41^{\circ} \mathrm{W}$. What is the length of the bridge?
19. A town planning board wishes to place sod on their village commons that is in the shape of a triangle whose sides have lengths of 120 feet, 165 feet, and 200 feet. If the sod costs $\$ 0.35$ per square foot, determine the cost, to the nearest dollar, for covering the commons in sod.

Use your unit circle to answer the following questions.

| $20 . \quad \sin ^{-1}\left(-\frac{1}{2}\right)=$ | $21 . \quad \tan \pi / 4=$ |
| :--- | :--- | :--- |
| $22 . \quad \sec (5 \pi / 6)=$ | $23 . \quad \cos ^{-1} 1=$ |
| $24 . \quad \tan ^{-1} 1=$ | $25 . \quad \sin (4 \pi / 3)=$ |
| $26 . \quad \tan (3 \pi / 2)=$ | $27 . \quad \cos ^{-1}\left(-\frac{\sqrt{3}}{2}\right)=$ |
| $28 . \quad \tan ^{-1}(-\sqrt{3})=$ | $29 . \quad \sin ^{-1} 1=$ |

## Write an algebraic expression that is equivalent to the expression.

| $30 . \tan \left[\arccos \left(\frac{x}{2}\right)\right]$ | 31. | $\sec [\arcsin (x-1)]$ |
| :--- | :--- | :--- |

Find the exact value of the expression.

| 32. | $\cos \left(\arctan \frac{3}{4}\right)$ | 33. | $\tan \left(\arccos \frac{3}{5}\right)$ |
| :--- | :--- | :--- | :--- |
| 34. | $\sec \left(\tan ^{-1} \frac{12}{5}\right)$ | 35. | $\sec \left[\sin ^{-1}\left(-\frac{1}{4}\right)\right]$ |
| 36. | $\cot \left(\arctan \frac{7}{10}\right)$ | 37. |  |

