Numeric Response

1. Change the following to decimal degrees. If rounding is necessary, round to the nearest hundredth of a degree.

44° 39’

__________°

2. Use a calculator to find the following. Round your answer to four places past the decimal point.

\( \sin 50° 20’ \)

3. Use a calculator to find the following. Round your answer to four places past the decimal point.

\( \sec 60° 36’ \)

4. Refer to right triangle \( ABC \) with \( C = 90° \).

If \( A = 42° \) and \( c = 84 \text{ cm} \), find \( b \).

Apply the rules regarding the use of significant digits when determining your answer.

\( b = \) ________ \( \text{ cm} \)
5. Refer to right triangle $ABC$ with $C = 90^\circ$.

If $B = 16.2^\circ$ and $c = 7.55$ cm, find $b$.

Apply the rules regarding the use of significant digits when determining your answer.

$b = \underline{\hspace{1cm}}$ cm

6. Suppose each edge of the cube shown in the figure is 5 inches long.

Find the measure of the angle formed by diagonal $CF$ and edge $CD$.

Round your answer to the nearest tenth of a degree.

$_{\text{ }^\circ}$
7. Refer to right triangle $ABC$ with $C = 90^\circ$.

![Diagram of right triangle ABC]

If $B = 55.23^\circ$ and $b = 12.49$ yd, find $a$.

Apply the rules regarding the use of significant digits when determining your answer.

$a = \underline{}$ yd

8. Solve the following problem. Be sure to make a diagram of the situation with all the given information labeled.

How long should an escalator be if it is to make an angle of $29^\circ$ with the floor and carry people a vertical distance of 16 feet between floors? Apply the rules regarding the use of significant digits when determining your answer.

Length of escalator = \underline{} ft

9. Solve the following problem. Be sure to make a diagram of the situation with all the given information labeled.

A person standing on top of a 16-foot high sand pile wishes to estimate the width of the pile. He visually locates two rocks on the ground below at the base of the sand pile. The rocks are on opposite sides of the sand pile, and he and the two rocks are in line with one another. If the angles of depression from the top of the sand pile to each of the rocks are $18^\circ$ and $27^\circ$, how far apart are the rocks?

Apply the rules regarding the use of significant digits when determining your answer.

Distance between rocks = \underline{} ft
10. The magnitude of the horizontal and vertical vector components \( \vec{V}_x \) and \( \vec{V}_y \) of vector \( \vec{V} \) are given. Find the magnitude of \( \vec{V} \). Apply the rules regarding the use of significant digits when determining your answers.

\[
|\vec{V}_x| = 38.0, \quad |\vec{V}_y| = 29.0
\]

\[ |\vec{V}| = \underline{_______} \]

11. For the problem below, the magnitude of the horizontal and vertical vector components \( \vec{V}_x \) and \( \vec{V}_y \) of vector \( \vec{V} \) are given. Find the magnitude of \( \vec{V} \). Apply the rules regarding the use of significant digits when determining your answers.

\[
|\vec{V}_x| = 2.4, \quad |\vec{V}_y| = 5.3
\]

\[ |\vec{V}| = \underline{_______} \]

12. The horizontal and vertical components of the velocity of an arrow shot into the air are 15.0 feet per second and 29.0 feet per second, respectively. Find the velocity of the arrow. Apply the rules regarding the use of significant digits when determining your answer.

Velocity of arrow = \underline{_______} ft/sec

**Short Answer**

13. Find the exact value for \( \csc 60^\circ \).

14. Find the exact value of \( \cot 60^\circ \).

15. Subtract.

\[
(85^\circ 38') - (64^\circ 58')
\]

\[ \underline{____}^\circ \underline{____}' \]
16. Use a calculator to find a value of $\theta$ between $0^\circ$ and $90^\circ$ that satisfies the statement below. Write your answer in degrees and minutes rounded to the nearest minute.

\[ \csc \theta = 4.5862 \]

$\theta = \underline{\underline{\phantom{0}}} ^\circ \underline{\underline{\phantom{0}}} ^\prime$

17. To further justify the Cofunction Theorem, use your calculator to find a value for each pair of trigonometric functions below. In each case, the trigonometric functions are cofunctions of one another, and the angles are complementary angles. Round your answers to four places past the decimal point.

\[ \sin 25^\circ = \underline{\underline{\phantom{0}}} \quad \cos 65^\circ = \underline{\underline{\phantom{0}}} \]

18. Work each of the following problems on your calculator. Do not write down or round off any intermediate answers.

\[ \cos^2 31^\circ + \sin^2 31^\circ = \underline{\underline{\phantom{0}}} \]

\[ \cos^2 81^\circ + \sin^2 81^\circ = \underline{\underline{\phantom{0}}} \]

\[ \cos^2 18^\circ + \sin^2 18^\circ = \underline{\underline{\phantom{0}}} \]

\[ \cos^2 8^\circ + \sin^2 8^\circ = \underline{\underline{\phantom{0}}} \]

19. Complete each of the following tables. Round all answers to the nearest tenth.

<table>
<thead>
<tr>
<th>$X$</th>
<th>$\tan$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$85.8^\circ$</td>
<td>_______</td>
</tr>
<tr>
<td>$86.5^\circ$</td>
<td>_______</td>
</tr>
<tr>
<td>$87.2^\circ$</td>
<td>_______</td>
</tr>
<tr>
<td>$87.9^\circ$</td>
<td>_______</td>
</tr>
<tr>
<td>$88.6^\circ$</td>
<td>_______</td>
</tr>
<tr>
<td>$89.3^\circ$</td>
<td>_______</td>
</tr>
<tr>
<td>$90^\circ$</td>
<td>_______</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>$X$</th>
<th>$\tan$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$89.4^\circ$</td>
<td>_______</td>
</tr>
<tr>
<td>$89.5^\circ$</td>
<td>_______</td>
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<tr>
<td>$89.7^\circ$</td>
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<td>_______</td>
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<tr>
<td>$90^\circ$</td>
<td>_______</td>
</tr>
</tbody>
</table>
20. Refer to right triangle $ABC$ with $C = 90^\circ$. Solve for all the missing parts using the given information.

$B = 44.42^\circ, a = 5.565 \text{ mi}$

Apply the rules regarding the use of significant digits when determining your answer.

$A = \, ^\circ$

$b = \, \text{mi}$

$c = \, \text{mi}$

21. The figure shows two right triangles drawn at $90^\circ$ to each other.

If $\angle ABD = 52^\circ, C = 48^\circ, \text{ and } BC = 42$, find $x$ and then find $h$.

Apply the rules regarding the use of significant digits when determining your answer.

$x = \, \, \, \, \, \,$

$h = \, \, \, \, \, \,$
22. Solve the following problem. Be sure to make a diagram of the situation with all the given information labeled.

The two equal sides of an isosceles triangle are each 36 centimeters. The base measures 30 centimeters.

Apply the rules regarding the use of significant digits when determining your answers.

Find the height: __________ cm

Find the measure of the two equal angles: __________°

23. Solve the following problem. Be sure to make a diagram of the situation with all the given information labeled.

A man wandering in the desert walks 2.7 miles in the direction S 27° W. He then turns 90° and walks 3.7 miles in the direction N 63° W. At that time, how far is he from his starting point?

Apply the rules regarding the use of significant digits when determining your answers.

Distance from starting point = __________ mi

What is the man's bearing from his starting point?

__________  __________ ° __________
24. Suppose the figure below is an exaggerated diagram of a plane flying above the earth. The plane is 5.05 miles above the earth and the radius of the earth is 4,000 miles.

To each of your answers, apply the rules regarding the use of significant digits when determining your answer.

How far is it from the plane to the horizon? _________ mi

What is the measure of angle $A$? _________ $^\circ$

25. A ship travels 185 kilometers on a bearing of $S$ 49° $E$.

Apply the rules regarding the use of significant digits when determining your answers.

How far east has it traveled? _________ km

How far south has it traveled? _________ km
Answer Section

NUMERIC RESPONSE

1. 44.65
2. 0.7698
3. 2.0371
4. 62
5. 2.11
6. 54.7
7. 8.671
8. 33
9. 81
10. 47.8
11. 5.8
12. 32.6

SHORT ANSWER

13. \( \frac{2}{\sqrt{3}} \)
14. \( \frac{1}{\sqrt{3}} \)
15. 20; 40
16. 12; 36
17. 0.4226; 0.4226
18. 1; 1; 1; 1
19. 13.6; 16.3; 20.4; 27.3; 40.9; 81.8; undefined; 95.5; 114.6; 143.2; 191; 286.5; 573; undefined
20. 45.58; 5.453; 7.792
21. 47; 60
22. 33; 65
23. 4.6; S; 81; W
24. 201; 87.1
25. 140; 120