I. Model Problems
II. Practice
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**Web Resources**
Sine, Cosine Tangent

You Tube

www.mathwarehouse.com/trigonometry/sine-cosine-tangent.html
Using the inverse sine, cosine, and tangent to find an angle
Right Triangle Calculator
Inverse Sine Calculator

# Cumulative Review: SOHCAHTOA and Angles of Elevation and Depression

## *Part 1: Model Problems*

The purpose of this worksheet is to provide students the opportunity to review the following topics in right triangle trigonometry:

- Identify the opposite leg, adjacent leg, and hypotenuse in a right triangle in reference to an acute angle;

- Calculate the value of the sine, cosine, and tangent ratios of an acute angle in a right triangle;

- Determine the length of any side of a right triangle given one acute angle and one side;

- Determine the measure of any acute angle of a right triangle given any two sides.

- Properly use Angles of Elevation and Depression in the context of solving right triangle problems

Because these topics are all covered individually in other worksheets, the student is expected to review the appropriate worksheets for specific examples.

## *Part 2: Practice*

1. Consider right $\Delta DFG$ pictured at right:

   a) Name the leg opposite $\angle F$.

   b) Name the leg adjacent to $\angle F$.

   c) Name the hypotenuse.

   d) Name the leg opposite $\angle G$.

   e) Name the leg adjacent to $\angle G$.

   f) Express $\cos F$ as a fraction.

   g) Express $\sin F$ as a fraction.

   h) Express $\tan F$ as a fraction.
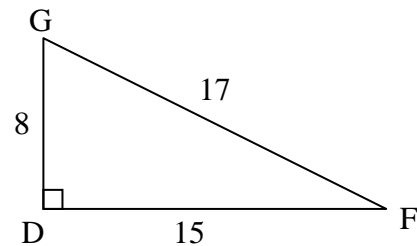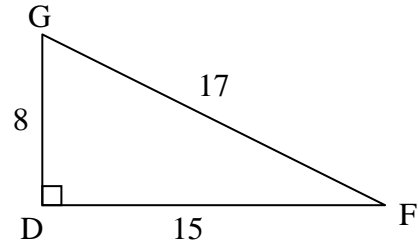
i) Express $\cos G$ as a fraction.

j) Express $\sin G$ as a fraction.



k) Express $\tan G$ as a fraction.

l) Calculate the measure of $\angle F$ to the nearest degree.

m) Calculate the measure of $\angle G$ to the nearest degree.

n) Determine the perimeter of the triangle.

2. Consider right $\Delta GEM$ pictured at right:

a) Name the hypotenuse.

b) Name the leg opposite $\angle M$ .

c) Name the leg adjacent to $\angle M$ .



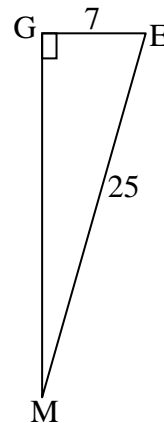d) Name the leg opposite $\angle E$ .

e) Name the leg adjacent to $\angle E$ .

f) Determine the length of $\overline{GM}$ .

g) Express $\sin M$ as a decimal.

h) Express $\tan M$ as a decimal, rounded to the nearest hundredth.
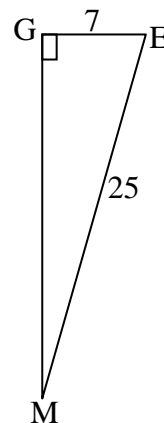
i) Express $\cos E$ as a decimal.

j) Express $\sin E$ as a decimal.

k) Express $\tan E$ as a decimal, rounded to the nearest thousandth.

l) Calculate the measure of $\angle M$ to the nearest hundredth of a degree.

m) Calculate the measure of $\angle E$ to the nearest hundredth of a degree.

n) Express $\cos M$ as a decimal.

3.  Amanda is outside flying her kite.  She knows that the string of her kite is 50 feet long, and she measures its angle of elevation as 32°.  For the following questions, assume that the string is straight and ignore Amanda's height:

a)  Multiple Choice:  Which diagram most accurately depicts the information given in the question: Diagram 1, 2, 3, or 4?

Diagram 1

50'

32°

Diagram 2

50'

32°

Diagram 3

32°

50'

Diagram 4

50'

32°
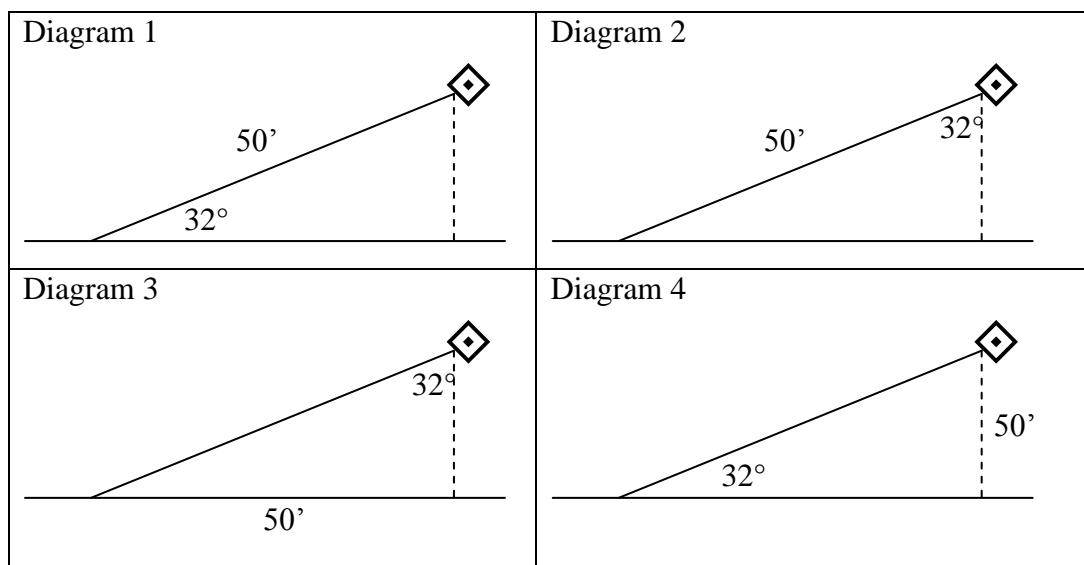
b)  To the nearest foot, how high up above the ground is the kite, if measured vertically?

c) To the nearest foot, how far away is the kite from Amanda, if measured along the ground?

4. An observer at the top of a 30-story building spots a car on the ground at an angle of depression of 64°. Assume each story is 10 feet high, and that the ground is horizontal.

   a) Make a labeled sketch of the given information.

   b) To the nearest foot, determine how far away the car is from the building.

   c) To the nearest foot, determine the direct distance between the observer at the top of the building and the car itself.

5. All of the following information accurately describes a specific right triangle. Create a labeled sketch with all sides and all angles identified.

$$\cos A = \frac{20}{29} \qquad \sin A = \frac{21}{29} \qquad \tan B = \frac{20}{21} \qquad \sin C = 1 \qquad \cos C = 0$$
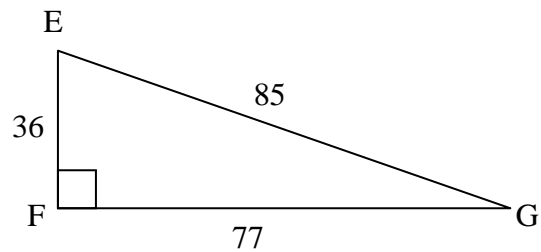
6. Multiple Choice:  Given the triangle as shown, what is the correct value of $\sin Z$ ?

A) $\dfrac{28}{53}$     B) $\dfrac{45}{53}$     C) $\dfrac{45}{28}$     D) $\dfrac{28}{45}$
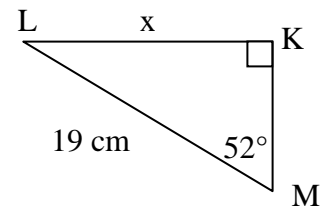
X
45      53
Y   28   Z
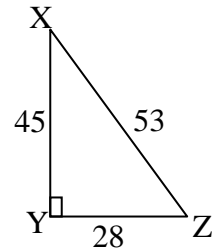
7. Error Analysis:  Alberto, Beth, Clarice, and Duane each make a statement about the following triangle.  Three of them are correct.  Find the error and correct it.
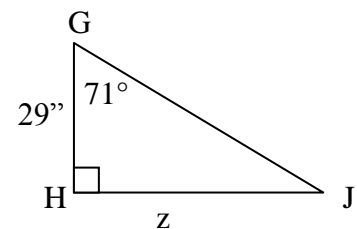
| Alberto | Beth | Clarice | Duane |
|---------|------|---------|-------|
| $\tan G = \frac{?}{?}$ | $\cos E = \frac{?}{?}$ | $\sin G = \frac{?}{?}$ | $\tan E = \frac{?}{?}$ |

E
36      85
F   77   G

8. Determine the length of side x to the nearest hundredth.

L      x      K
19 cm      52°
M

9. Determine the length of side z to the nearest inch.

G
29"   71°
H   z   J

*Part 3: Challenge Problems*

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10. Multiple Choice: Consider the triangle shown at right. Which of the following statements is NOT true?

A) $\cos H = \dfrac{20}{101}$     B) $\sin H = \dfrac{20}{101}$

C) $\tan G = \dfrac{20}{99}$     D) $\cos G = \dfrac{99}{101}$
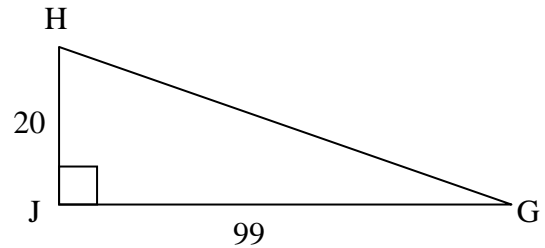


11. A chipmunk on the ground observes a falcon on a tree at an angle of elevation of 57°. The chipmunk is 70 feet from the base of the tree. If the chipmunk gets 100 feet away from the base of the tree, the hawk will see the chipmunk at what angle of depression? Answer to the nearest degree. Assume the hawk does not change position, and the tree is perpendicular to the horizontal ground.



?°

57°

70 ft          100 ft
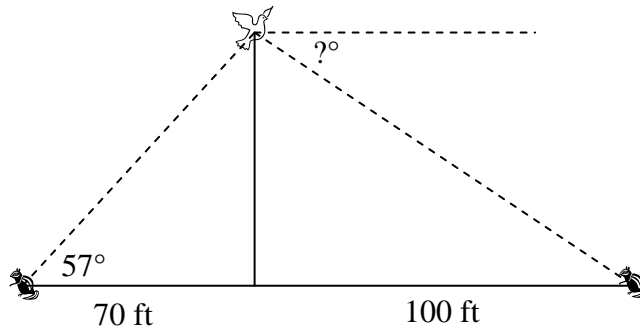
12. In right $\triangle ABC$, we know $\sin A = \dfrac{9}{41}$. If we know the shortest leg is of length 9, what is the length of the other leg?

13. In right $\triangle RTX$, we know $\sin R = \dfrac{5}{13}$. If we know the hypotenuse is 117 units long, what is the perimeter of the triangle?
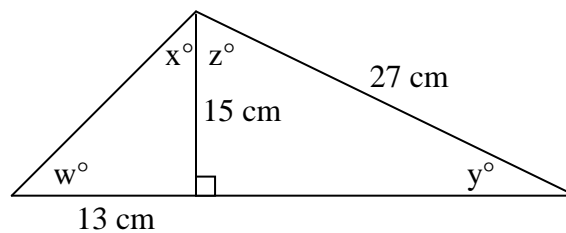
14. Determine all unknown sides in the figure below. Round all figures to three decimal places.

17cm
z
x
47° 25°
w y
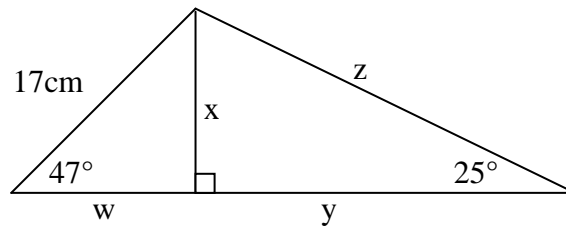
15. Determine the perimeter of the following triangle. Answer to the nearest tenth of an inch.

G
63°
38"
H J
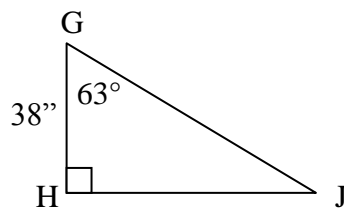
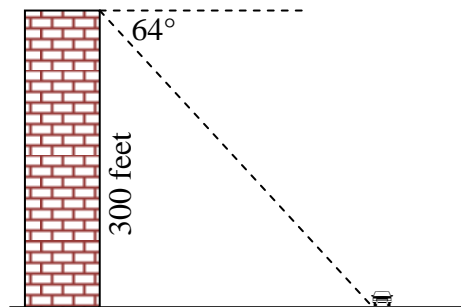16. Determine the measures of angles w, x, y, and z. Round answers to the nearest hundredth:

x° z°
27 cm
15 cm
w° y°
13 cm

## *Part 4: Answer Key*

1.

| a) $\overline{DG}$ | b) $\overline{FD}$ | c) $\overline{FG}$ | d) $\overline{FD}$ | e) $\overline{DG}$ | f) $\dfrac{15}{17}$ | g) $\dfrac{8}{17}$ |
|---|---|---|---|---|---|---|
| h) $\dfrac{8}{15}$ | i) $\dfrac{8}{17}$ | j) $\dfrac{15}{17}$ | k) $\dfrac{15}{8}$ | l) 28° | m) 62° | n) 40 |

2.

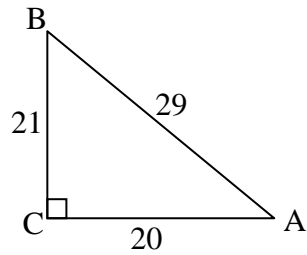| a) $\overline{EM}$ | b) $\overline{GE}$ | c) $\overline{GM}$ | d) $\overline{GM}$ | e) $\overline{GE}$ | f) 24 | g) 0.28 |
|---|---|---|---|---|---|---|
| h) 0.29 | i) 0.28 | j) 0.96 | k) 3.429 | l) 16.26° | m) 73.74° | n) 0.96 |

3.  a) Diagram 1 is correct.

   b) 26 feet

   c) 42 feet

4.  a)



   b) 146 feet
   c) 334 feet

5. Though it could be oriented differently, the triangle must be equivalent to that shown below:



6. B

7. Clarice is incorrect; the correct response should be $\sin G = \dfrac{36}{85}$

8. 14.97 cm

9. 84 in

10. B

11. 47°

12. 40

13. 270 units

14. w = 11.594 cm; x = 12.433 cm; y = 26.663 cm; z = 29.419 cm

15. 196.3 in

16. w = 49.09°;  x = 40.91°;  y = 33.75°;  z = 56.25°