Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Trigonometry Review Package

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. What is the cosine of 55°?

a. 0.574
b. 0.819
c. 1.428
d. 0.853

____ 2. What is the tangent of 40°?

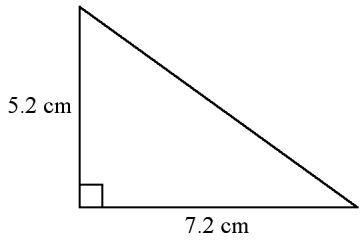
a. 0.766
b. 0.839
c. 0.643
d. 0.677

____ 3. What is $\sin^{-1}(0.21)$?

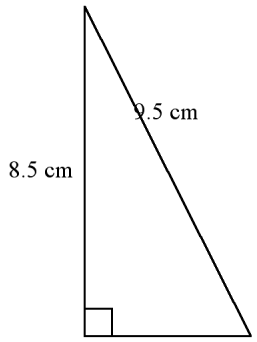
a. 12.12°
b. 11.86°
c. 43.32°
d. 77.88°

Short Answer

1. Solve for the unknown side length.



2. Solve for the unknown side length.



3. A road worker measures the incline of a ramp that rises 11.5 m to be 25.1°. What is the length of the ramp?

-

4. A right triangle has a hypotenuse of 29 m. If one of the angles is 41°, what is the length of the adjacent side?

-

5. If one of the angles of a right triangle is 80° and the adjacent side is 30.6 m, what is the length of the opposite side?

6. In order to use the Pythagorean theorem, what must be true about a given triangle?

   _____

7. What is an angle of depression?

   _____

   or draw a picture:

8. The sine ratio relates to which two sides of a right triangle?

   _____ and _____

9. The cosine ratio relates to which two sides of a right triangle?

   _____ and _____

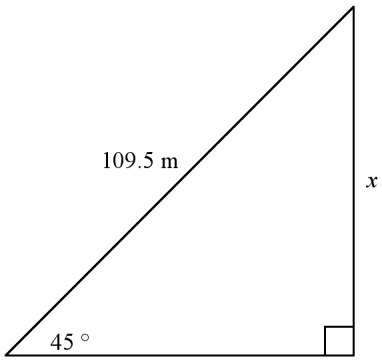
10. The tangent ratio relates to which two sides of a right triangle?

    _____ and _____

Name: _____ **ID: A**

Problem

1. Find x to one decimal place.



2. A new ramp is being built with an angle of elevation of 10°. If the height of the ramp is 2.5 m, what is the length of the base of the ramp?

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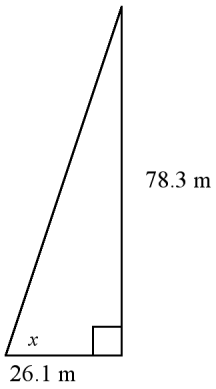
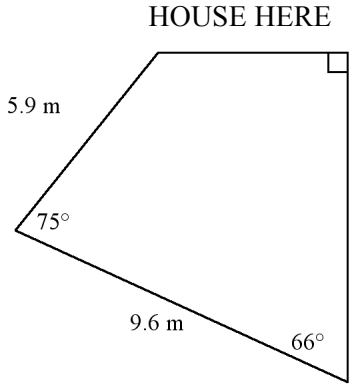
3. Find x in the diagram below.



4. A landscape designer is building a fence around a garden. The side that has the house on it does not require fencing. How many metres of fence will she need?



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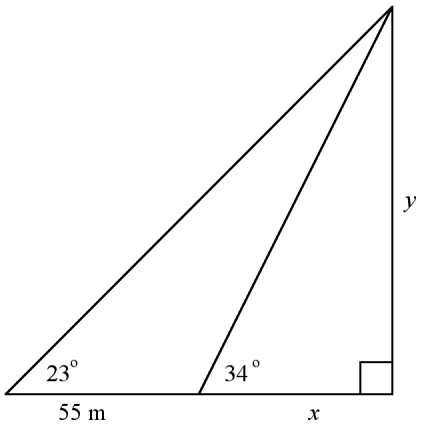
5. Stella is calculating the height of a Douglas fir tree that she can see from her campsite. From her tent, she measures the angle of elevation to the top of the tree to be 23°. Her tent is 148.4 m from the base of the tree. She then walks 55 m closer to the tree and measures the angle of elevation to be 34°.



----------148.4 m----------

a) How far is Stella from the tree?

b) What is the height of the tree?

Trigonometry Review Package
Answer Section

MULTIPLE CHOICE

1. ANS: A PTS: 1 DIF: Easy REF: 7.3
   OBJ: Geometry LOC: G-SO4 TOP: The Cosine Ratio
   KEY: Cosine ratio
2. ANS: B PTS: 1 DIF: Easy REF: 7.4
   OBJ: Geometry LOC: G-SO4 TOP: The Tangent Ratio
   KEY: Tangent ratio
3. ANS: A PTS: 1 DIF: Easy REF: 7.5
   OBJ: Algebra LOC: A-SO1 TOP: Finding Angles and Solving Right Triangles
   KEY: Inverse trigonometric function

SHORT ANSWER

1. ANS:

$c^2 = a^2 + b^2$

$c^2 = 7.2^2 + 5.2^2$

$c^2 = 51.84 + 27.04$

$c^2 = 78.88$

$c = \sqrt{78.88}$

$c = 8.9 \text{ cm}$

The hypotenuse is 8.9 cm long.

PTS: 1 DIF: Easy REF: 7.1 OBJ: Algebra | Geometry
LOC: A-SO1 | G-SO2 TOP: The Pythagorean Theorem
KEY: Pythagorean Theorem

2. ANS:

$$a^2 + b^2 = c^2$$

$$a^2 + 8.5^2 = 9.5^2$$

$$a^2 = 9.5^2 - 8.5^2$$

$$a^2 = 90.25 - 72.25$$

$$a^2 = 18$$

$$a = \sqrt{18}$$

$$a = 4.3 \text{ cm}$$

The side is 4.3 cm long.

PTS: 1 DIF: Easy REF: 7.1 OBJ: Algebra | Geometry
LOC: A-SO1 | G-SO2 TOP: The Pythagorean Theorem
KEY: Pythagorean Theorem

3. ANS:

$$\sin A = \frac{\text{opp}}{\text{hyp}}$$

$$\sin 25.1° = \frac{11.5}{\text{hyp}}$$

$$\text{hyp} = \frac{11.5}{\sin 25.1°}$$

$$\text{hyp} = 27.1 \text{ m}$$

The ramp is 27.1 m long.

PTS: 1 DIF: Moderate REF: 7.2 OBJ: Algebra | Geometry
LOC: A-SO1 | G-SO4 TOP: The Sine Ratio
KEY: Sine ratio

4. ANS:

$$\cos A = \frac{\text{adj}}{\text{hyp}}$$

$$\cos 41° = \frac{\text{adj}}{29}$$

$$29 \cos 41° = \text{adj}$$

$$21.89 \text{ m} = \text{adj}$$

The adjacent side is 21.89 m long.

PTS: 1 DIF: Easy REF: 7.3 OBJ: Algebra | Geometry
LOC: A-SO1 | G-SO4 TOP: The Cosine Ratio
KEY: Cosine ratio

5. ANS:

$$\tan A = \frac{\text{opp}}{\text{adj}}$$

$$\tan 80° = \frac{\text{opp}}{30.6}$$

$$30.6 \tan 80° = \text{opp}$$

$$173.5 \text{ m} = \text{opp}$$

The length of the opposite side is 173.5 m.

PTS: 1 DIF: Easy REF: 7.4 OBJ: Algebra | Geometry
LOC: A-SO1 | G-SO4 TOP: The Tangent Ratio
KEY: Tangent ratio

6. ANS:
It must be a right triangle which means one angle is 90 degrees.

PTS: 1

7. ANS:
The angle between the horizon and the line of sight when looking down.

PTS: 1

8. ANS:
The opposite and the hypotenuse.

PTS: 1

9. ANS:
The adjacent and hypotenuse.

PTS: 1

10. ANS:
The opposite and adjacent sides.

PTS: 1

PROBLEM

1. ANS:

$$\sin A = \frac{\text{opp}}{\text{hyp}}$$

$$\sin 45.0° = \frac{x}{109.5}$$

$$109.5 \sin 45.0° = x$$

$$77.4 \text{ m} = x$$

The measure of x is 77.4 m.

PTS: 1 DIF: Easy REF: 7.2 OBJ: Algebra | Geometry
LOC: A-SO1 | G-SO4 TOP: The Sine Ratio
KEY: Sine ratio

2. ANS:

$$\tan A = \frac{\text{opp}}{\text{adj}}$$

$$\tan 10° = \frac{2.5}{\text{adj}}$$

$$\text{adj} = \frac{2.5}{\tan 10°}$$

$$\text{adj} = 14.2 \text{ m}$$

The ramp's base is 14.2 m long.

PTS: 1 DIF: Easy REF: 7.4 OBJ: Algebra | Geometry
LOC: A-SO1 | G-SO4 TOP: The Tangent Ratio
KEY: Tangent ratio

3. ANS:

$$\tan A = \frac{\text{opp}}{\text{adj}}$$

$$\tan x = \frac{78.3}{26.1}$$

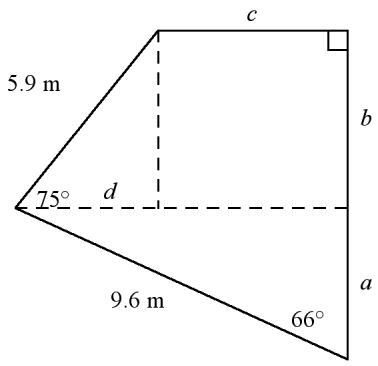
$$x = \tan^{-1}\left(\frac{78.3}{26.1}\right)$$

$$x = 71.6\,^\circ$$

The measure of x is 71.6 °.

PTS: 1 DIF: Easy REF: 7.5 OBJ: Algebra | Geometry
LOC: A-SO1 | G-SO4 TOP: Finding Angles and Solving Right Triangles
KEY: Inverse trigonometric function

4. ANS:
The patio can be divided into two right triangles and a rectangle.



Solve for a.

$$\cos\theta = \frac{\text{adj}}{\text{hyp}}$$

$$\cos 66° = \frac{a}{9.6}$$

$$9.6\cos 66° = a$$

$$3.9 \text{ m} \approx a$$

Solve for $(c + d)$.

$$\sin\theta = \frac{\text{opp}}{\text{hyp}}$$

$$\sin 66° = \frac{(c+d)}{9.6}$$

$$9.6\sin 66° = (c+d)$$

$$8.8 \approx (c+d)$$

The angle of 75° can be divided into two angles: one between sides $(c + d)$ and 9.6 m, and one between sides $(c + d)$ and 5.9 m.

Angle between sides $(c + d)$ and 9.6 m:
$180° - 90° - 66° = 24°$

Angle between sides $(c + d)$ and 5.9 m:
$75° - 24° = 51°$

Solve for d.

$$\cos\theta = \frac{\text{adj}}{\text{hyp}}$$

$$\cos 51° = \frac{d}{5.9}$$

$$5.9\cos 51° = d$$

$$3.7 \text{ m} \approx d$$

Solve for c.

$$c + d \approx 8.8$$

$$c + 3.7 \approx 8.8$$

$$c \approx 8.8 - 3.7$$

$$c \approx 5.1 \text{ m}$$

Solve for b.

$$\sin\theta = \frac{\text{opp}}{\text{hyp}}$$

$$\sin 51° = \frac{b}{5.9}$$

$$5.9\sin 51° = b$$

$$4.6 \text{ m} \approx b$$

Calculate the area of the larger triangle.

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(c+d)(a)$$

$$A = \frac{1}{2}(8.8)(3.9)$$

$$A = 17.16 \text{ m}^2$$

Calculate the area of the smaller triangle.

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}db$$

$$A = \frac{1}{2}(3.7)(4.6)$$

$$A = 8.51 \text{ m}^2$$

Calculate the area of the rectangle.
$A = lw$

$A = cb$

$A = 5.1 \times 4.6$

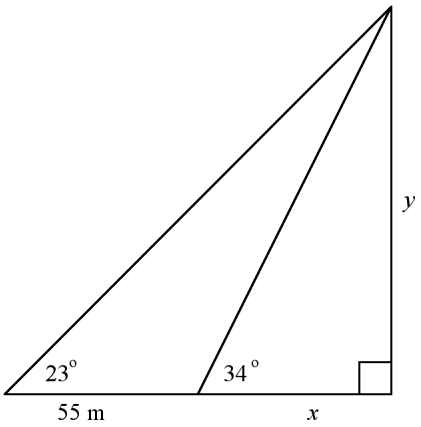
$A = 23.46 \text{ m}^2$

Calculate the total area.
$A = 17.16 + 8.51 + 23.46$
$A = 49.13 \text{ m}^2$

The landscape designer will need a total of about 49.13 m^2 of patio tiles.

PTS: 1 DIF: Moderate REF: 4.1 OBJ: Geometry
LOC: G-SO1 TOP: Solving for Angles, Lengths, and Distances
KEY: sine ratio|cosine ratio|area

5. ANS:
a)



b) Write two tangent ratios representing the two triangles shown in the diagram.

$$\tan\theta = \frac{\text{opp}}{\text{adj}}$$

$$\tan 23° = \frac{y}{(55+x)}$$

$$\tan\theta = \frac{\text{opp}}{\text{adj}}$$

$$\tan 34° = \frac{y}{x}$$

Rearrange the second equation to solve for y.

$$\tan 34° = \frac{y}{x}$$

$$x\tan 34° = y$$

Substitute this into the first equation.

$$\tan 23° = \frac{y}{(55+x)}$$

$$\tan 23° = \frac{x\tan 34°}{(55+x)}$$

$$(55+x)\tan 23° = x\tan 34°$$

$$55\tan 23° + x\tan 23° = x\tan 34°$$

$$55\tan 23° = x\tan 34° - x\tan 23°$$

$$55\tan 23° = x(\tan 34° - \tan 23°)$$

$$\frac{55\tan 23°}{(\tan 34° - \tan 23°)} = x$$

$$93.37 \text{ m} \approx x$$

Calculate how far from the tree Stella took the measurement.
55 + 93.37 = 148.37 m

She was about 148.37 m from the tree.

c) Substitute the value of x into the second equation written in part b).

$$x\tan 34° = y$$

$$93.37\tan 34° = y$$

$$62.98 \text{ m} \approx \text{y}$$

The tree is about 62.98 m tall.

PTS: 1 DIF: Difficult REF: 4.2 OBJ: Geometry
LOC: G-SO1 TOP: Solving Complex Problems in the Real World
KEY: tangent ratio