Pythagorean Theorem and Right Triangles

Practice

Pythagorean Theorem

Distance Formula

Pythagorean Triples

45-45-90 Degree Triangle

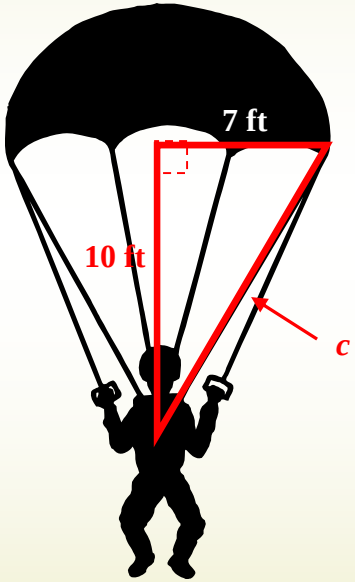
30-60-90 Degree Triangle

Graphing Irrational Numbers

Mixed Review

Pythagorean Theorem

Problem #1: How long is the suspension line in a parachute with the dimensions shown below?



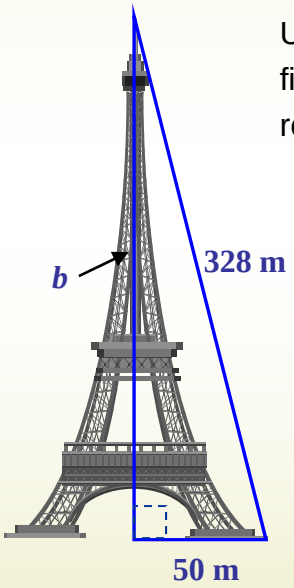
Hint for Problem #1:

Use the Pythagorean Theorem to find the hypotenuse of the right triangle that represents the suspension line.

$$c^2 = a^2 + b^2$$
$$c^2 = 10^2 + 7^2$$
$$c^2 = ?$$
$$c^2 = \sqrt{?}$$
$$c = \_\_\_\_\_ \text{ ft}$$

Round answer to the nearest tenth.

Problem #2: How high is the Eiffel Tower given the dimensions shown below?



Hint for Problem #2:

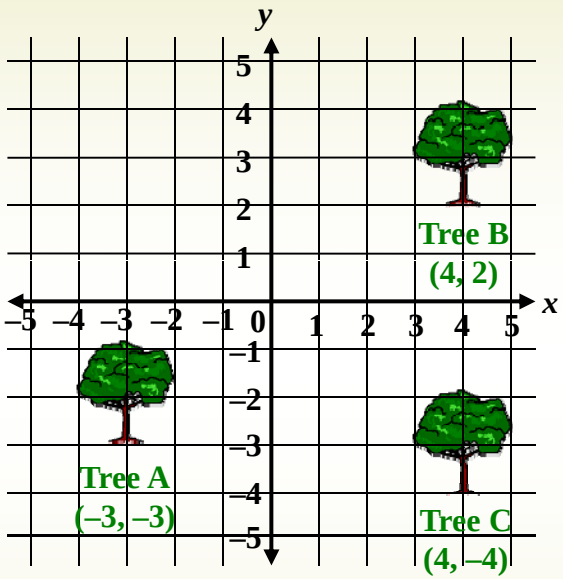
Use the Pythagorean Theorem to find the leg of the right triangle that represents the height of the tower.

$$c^2 = a^2 + b^2$$
$$328^2 = a^2 + 50^2$$
$$328^2 - 50^2 = a^2$$
$$a^2 = \sqrt{?}$$
$$a \approx \_\_\_\_\_ \text{ m}$$

Round answer to the nearest meter.

Pythagorean Theorem and Distance Formula

Problem #3: For the questions shown below, round the answers to the nearest tenth, if necessary.



(a) What is the distance between Tree A and Tree B?
(b) What is the distance between Tree A and Tree C?
(c) What is the distance between Tree B and Tree C?
(d) Which two trees have the greatest distance between them? State the letter of the correct answer.
a.) Tree A and Tree B
b.) Tree A and Tree C
c.) Tree B and Tree C

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

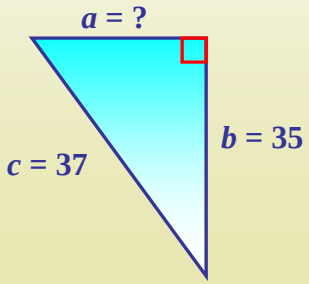
Hint for Problem #3: Use the Distance Formula to find each distance.

Tree A$(-3,-3)$ and Tree B$(4,2)$: $d = \sqrt{(4--3)^2 + (2--3)^2}$ $d \approx ?$

Tree A$(-3,-3)$ and Tree C$(4,-4)$: $d = \sqrt{?^2 + ?^2}$ $d \approx ?$

Tree B$(?,?)$ and Tree C$(?,?)$: $d = \sqrt{?^2 + ?^2}$ $d = ?$

Problem #4: (a) What is the length of the third side of the right triangle? (b) The three numbers in this triangle form a Pythagorean triple. What is a Pythagorean triple?



Hint for Problem #4: Use the Pythagorean Theorem to find the length of the third side *(a).*

$$c^2 = a^2 + b^2$$
$$37^2 = a^2 + 35^2$$

Pythagorean Triples

Problem #5: Do the lengths of 10, 24, and 26 form a right triangle? State the letter of the correct answer.

a.) yes
b.) no

Hint for Problem #5: Substitute the lengths into the Pythagorean Theorem to see if they make a true statement.

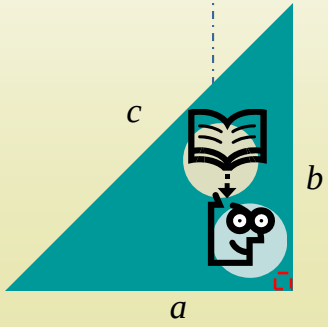
$$a^2 + b^2 = c^2$$
$$10^2 + 24^2 \ ? \ 26^2$$

Problem #6: Do the whole numbers, 16, 63, and 65, form a Pythagorean triple? State the letter of the correct answer.

a.) yes
b.) no

Hint for Problem #6: Substitute the whole numbers into the Pythagorean Theorem to see if they make a true statement.

$$a^2 + b^2 = c^2$$
$$16^2 + 63^2 \ ? \ 65^2$$



45-45-90 Degree Triangle

Problem #7: In a 45-45-90 degree triangle, if "x" represents the leg, what expression represents the hypotenuse? State the letter of the correct answer.

A. $x\sqrt{5}$ B. $x\sqrt{2}$ C. $x\sqrt{3}$ D. $2x$

Hint for Problem #7: Solve the equation for "d".

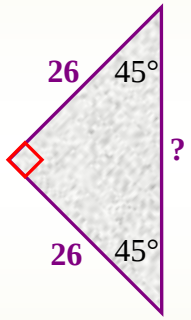
$$x^2 + x^2 = d^2$$

$$2x^2 = d^2$$

$$\sqrt{2x^2} = \sqrt{d^2}$$

$$?\sqrt{?} = d$$

Problem #8: For the questions shown below, round the answers to the nearest tenth, if necessary.



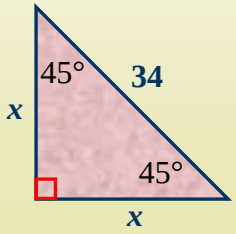
(a) To determine the hypotenuse of this 45-45-90 degree triangle, multiply 26 by what irrational number?

(b) What is the length of the hypotenuse?

Hint for Problem #8:

hypotenuse = leg $\times$?

Problem #9: For the questions shown below, round the answers to the nearest tenth, if necessary.



(a) What expression represents the leg? State the letter of the correct answer.

A. $\frac{34}{\sqrt{2}}$ B. $34\sqrt{2}$ C. 1156 D. 68

(b) What is the length of either leg "x" ?

Hint for Problem #9:

$$\frac{\text{hypotenuse}}{?} = \text{leg}$$

30-60-90 Degree Triangle

Problem #10: The questions below refer to a 30-60-90 degree right triangle with the shorter leg represented by "x".

a.) What expression represents the hypotenuse? State the letter of the correct answer.

A. $x\sqrt{2}$ B. $2x$ C. $x\sqrt{3}$ D. $3x$

b.) What expression represents the longer leg? State the letter of the correct answer.

A. $x\sqrt{2}$ B. $2x$ C. $x\sqrt{3}$ D. $3x$

Hints for Problem #10:

a.) In a 30-60-90 degree triangle, the length of the hypotenuse is twice the length of the shorter leg.

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

$x^2 + b^2 = (2x)^2$

$x^2 + b^2 = 4x^2$

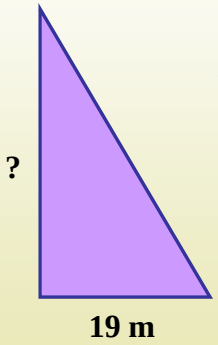
$b^2 = 4x^2 - x^2$

$b^2 = 3x^2$

$b = \sqrt{3x^2}$

$b = ?\sqrt{?}$

Problem #11: In the 30-60-90-degree triangle, what is length of the hypotenuse and the length of the longer leg? Round the answers to the nearest tenth, if necessary.



Hints for Problem #11:

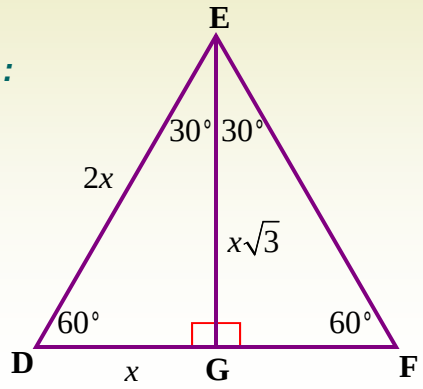
hypotenuse = shorter leg × ?

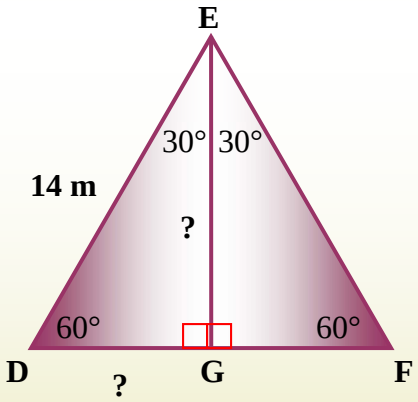
longer leg = shorter leg × ?

30-60-90 Degree Triangle

Problem #12: Segment EG divides equilateral triangle DEF into two congruent 30-60-90 degree triangles DEG and FEG. The length of one side of the equilateral triangle is 14 meters. Answer the questions below, rounding to the nearest tenth, if necessary.

Hint :



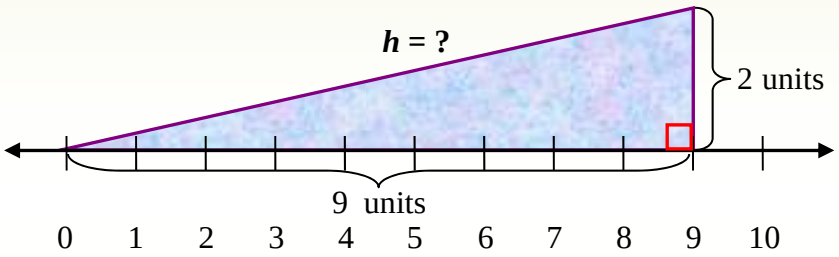


(a) What is the length of segment DG?

(b) What is the length of segment EG?

Graphing Irrational Numbers

Problem #13: What expression could be used to determine the length of the hypotenuse? State the letter of the correct answer.



A. $2^2 + 9^2$

B. $\sqrt{9^2 + 2^2}$

C. $9 + 2$

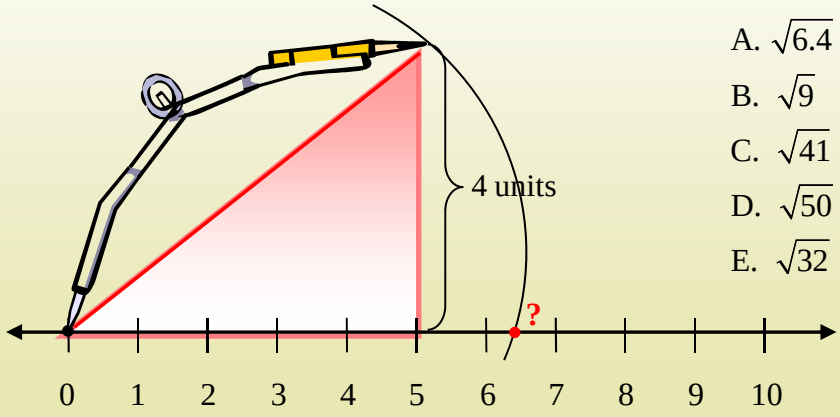
D. $\sqrt{9 + 2}$

Hint for Problem #13:

Use the Pythagorean Theorem

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

Problem #14: The drawing below indicates the location of what irrational number on the number line? State the letter of the correct answer.



A. $\sqrt{6.4}$

B. $\sqrt{9}$

C. $\sqrt{41}$

D. $\sqrt{50}$

E. $\sqrt{32}$

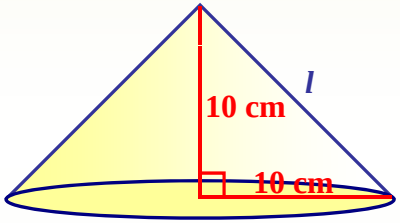
Hint for Problem #14:

Use the Pythagorean Theorem

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

Mixed Review

Problem #15: For the questions shown below, round the answers to the nearest tenth. Label the answers correctly.



(a) What is the lateral height *(l)* of the cone?

(b) What is the cone's surface area?

Hints for Problem #15:

a.) $l = 10\sqrt{?}$

b.) $SA = \pi rl + \pi r^2$

Answers

Problem #1: 12.2 ft

Problem #2: 324 m

Problem #3: (a) 8.6 (b) 7.1 (c) 6 (d) Choice “a”

Problem #4: 12; In a Pythagorean triple, all three numbers are whole numbers, and when substituted into the Pythagorean Theorem, make a true statement.

Problem #5: Choice “a”

Problem #6: Choice “a”

Problem #7: Choice “B”

Problem #8: (a) square root (2) (b) 36.8

Problem #9: (a) Choice “A” (b) 24.0

Problem #10: (a) Choice “B” (b) Choice “C”

Problem #11: 38 m, 32.9 m

Problem #12: DG = 7 m; EG = 12.1 m

Problem #13: Choice “B”

Problem #14: Choice “C”

Problem #15: (a) 14.1 cm (b) 756.7 sq cm