Pythagorean Triples

Ex: 3, 7, 9

- largest side is hypotenuse replace "c" with hyp.

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

$(3)^2 + (7)^2 = (9)^2$

$9 + 49 = 81$

$58 \neq 81$

Since the LHS ≠ RHS this is not a pythagorean triple

Ex. 2 5, 12, 13

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

$(5)^2 + (12)^2 = (13)^2$

$25 + 144 = 169$

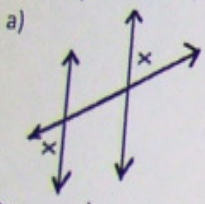
$169 = 169$

Since the LHS = RHS this is a pythagorean triple

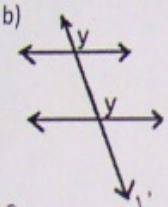
GMF 10 TRIGONOMETRY REVIEW FOR TEST Sept. 2019

Parallel Line Angle Theorems

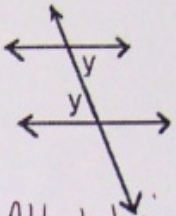
1. State the relationship between the given angles (alternate interior, alternate exterior, corresponding, co-interior, or vertically opposite).

a) 

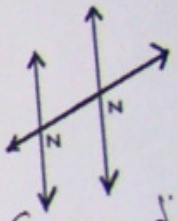
Alt-Exterior

b) 

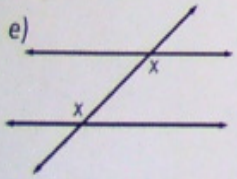
Corresponding

c) 

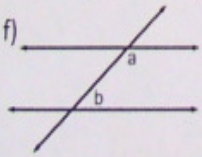
Alt-Interior

d) 

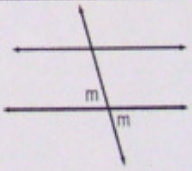
Corresponding

e) 

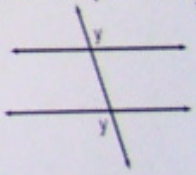
Alt-Interior

f) 

Co-Interior

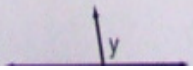
g) 

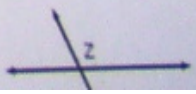
Vertically opposite

h) 

Alt-Exterior

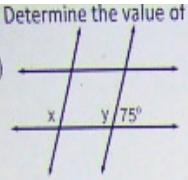
2. Determine the value of each variable:



c) 

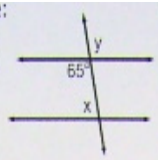
2. Determine the value of each variable:

a)



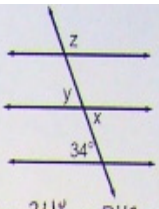
x = 105° y = 105°

b)



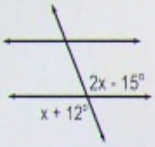
x = 115° y = 65°

c)



x = 34° y = 34° z = 146°

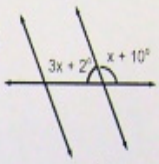
d)



$2x - 15 = x + 12$
$2x - x = 12 + 15$
$x = 27°$

x = 27°

e)



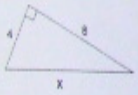
$3x + 2 + x + 10 = 180°$
$4x + 12 = 180°$
$4x = 180° - 12°$
$4x = 168°$
$x = 42°$

x = 42°

Pythagorean Theorem and Trigonometry

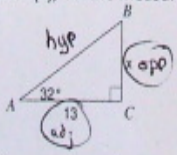
3. Determine the length of the missing side (x), OR the measure of the missing angle (θ), as indicated:

a)



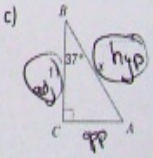
$a^2 + b^2 = c^2$
$(4)^2 + (8)^2 = x^2$
$16 + 64 = x^2$
$80 = x^2$
$8.9 = x$

b)



$\tan 32° = \frac{x}{13}$
$0.6249 = \frac{x}{13}$
$8.1 = x$

c)



$\cos 37° = \frac{11}{x}$
$0.7986 = \frac{11}{x}$
$0.7986x = 11$
$x = 13.8$

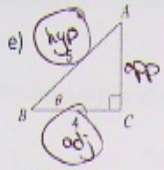
d)

$\tan\theta = \frac{7.7}{14}$

$\tan\theta = 0.55$

$\theta = 29°$

e)

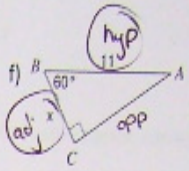


$\cos\theta = \frac{4}{5}$

$\cos\theta = 0.8$

$\theta = 37°$

f)

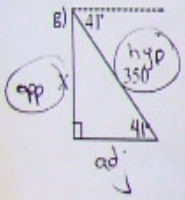


$\cos 60° = \frac{x}{11}$

$0.5 = \frac{x}{11}$

$5.5 = x$

g)

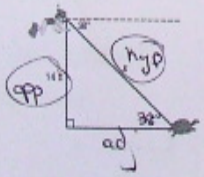


$\sin 41° = \frac{x}{350}$

$0.6561 = \frac{x}{350}$

$229.6 = x$

h) A person snorkeling sees a turtle on the ocean floor at an angle of depression of 38°. She is 14 feet above the ocean floor. How far from the turtle is she? Round to the nearest foot.



$\sin 38° = \frac{14}{x}$

$0.6157 = \frac{14}{x}$

$0.6157x = 14$

$x = 22.7$ ft

i) When the angle of elevation to the sun is 52°, a tree casts a shadow that is 9 meters long. What is the height of the tree? Round to the nearest tenth of a meter.

$\tan 52° = \frac{x}{9}$

$1.2799 = \frac{x}{9}$

$11.5_{\text{m}} = x$

$0.6561 = \frac{x}{350}$

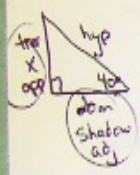
$229.6 = x$

$0.6157 = \frac{14}{x}$

$0.6157x = 14$

$x = 22.7\text{ft}$

j) The length of a tree's shadow is 20 feet when the angle of elevation to the sun is 40°. How tall is the tree?

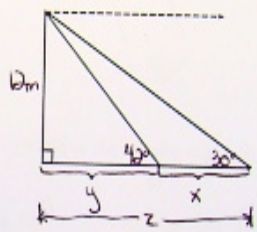


$\tan 40° = \frac{x}{20}$

$0.8391 = \frac{x}{20}$

$16.8\text{ft} = x$

k) An owl is sitting in a tree 12 m above the ground. He spots two mice, at angles of ~~depression~~ elevation of 42° and 30° respectively. How far apart are the mice?



(i) Find z:

$\tan 30° = \frac{12}{z}$

$0.5774 = \frac{12}{z}$

$0.5774z = 12$

$z = 20.8\text{m}$

(ii) Find y:

$\tan 42° = \frac{12}{y}$

$0.9004 = \frac{12}{y}$

$0.9004y = 12$

$y = 13.3\text{m}$

(iii) Find x:

$x = z - y$

$x = 20.8 - 13.3$

$\boxed{x = 7.5\text{m}}$

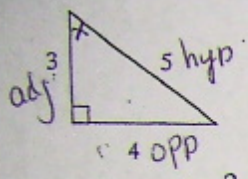
l) A 16 foot ladder rests against a wall. Its base is 6 feet from the wall. What angles does the ladder make with the ground?

$\cos\theta = \frac{6}{16}$

$\cos\theta = 0.375$

$\theta = 68°$

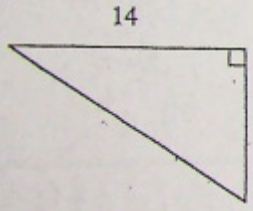
1. Use the diagram to find Cos x as a fraction in lowest terms.



$\cos\theta = \frac{a}{h} = \frac{3}{5}$

a) $\frac{3}{4}$ b) $\frac{4}{5}$ c) $\frac{3}{5}$ d) 1 $\frac{1}{3}$

2. Find the length of the hypotenuse.



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

$6^2 + 14^2 = c^2$

$36 + 196 = c^2$

$\sqrt{232} = \sqrt{c^2}$

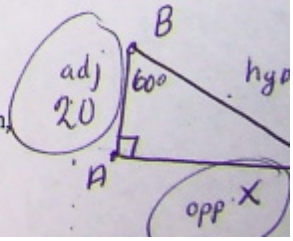
$c = 15.2$

a) 15 b) 13 c) 20 d) 4

3. If Cos T = 0.4226, what is the value of angle T?

a) 25 b) 23 c) 56 d) 65

4. In triangle ABC, angle A is the right angle and angle B=60°. If the side AB=20m, find the length of side BC.



a) 10 b) 40 c) 17.3 d) 34.6

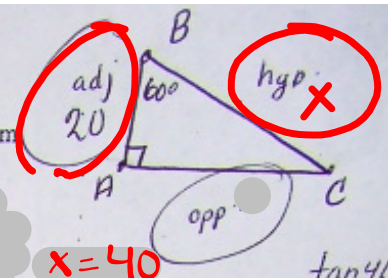
$\tan\theta = \frac{o}{a}$

$\frac{\tan 60°}{1} = \frac{x}{20}$

a) 25 b) 23 c) 56 d)65

4. In triangle ABC, angle A is the right angle and angle B=60°. If the side AB=20m, find the length of side BC.

a) 10 b) 40 c) 17.3 d) 34.6



$\cos 60° = \frac{20}{x}$

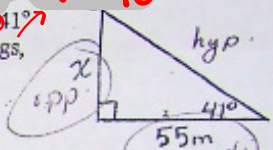
$0.5 = \frac{20}{x}$

$0.5x = 20$

$x = 40$

5. A photographer shines a camera light at a particular painting forming an angle of 41° with the camera platform. If the light is 55m from the wall where the paining hangs, how high above the platform is the painting?

a) 1.15m b) 47.81m c) 0.87m d) 63.27m



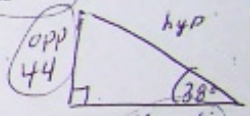
$\frac{\tan 41°}{1} = \frac{x}{55}$

$\frac{0.8693}{1} = \frac{x}{55}$

$x = 47.8$

6. From the top of a lighthouse, a sailboat is sighted at an angle of depression of 38°. If the lighthouse is 44.0 m high, how far is the vessel from the base of the lighthouse?

a) 47.0 m b) 56.0 m c) 67.0 m d) 71.0 m



7. A forest ranger in a tower 128.0 m high sights two fires in the same line of sight with the angles of depression 61° and 25°. How far apart are the fires?

a) 203.5 m b) 71.0 m c) 274.5 m d) 110.3 m

$\tan\theta = \frac{o}{a}$

$\frac{\tan 38°}{1} = \frac{44}{x}$

$\frac{0.7813}{1} = \frac{44}{x}$

$x = 56.3$

8. The face of a cliff rises vertically to a height of 112.0 m. A sighting is made from a boat to the top of the cliff. The angle of elevation is read as 22°. How far is the boat from the base of the cliff?

a) 299.0 m b) 45.3 m c) 277.2 m d) 120.8 m

$\tan 22° = \frac{112}{x}$

$0.4040 = \frac{112}{x}$

$x = 277.2$

9. Using the measurements given, calculate the height of the other tree.

a) 1.15m b) 47.81m c) 0.87m d) 63.27m

6. From the top of a lighthouse, a sailboat is sighted at an angle of depression of 38°. If the lighthouse is 44.0 m high, how far is the vessel from the base of the lighthouse?

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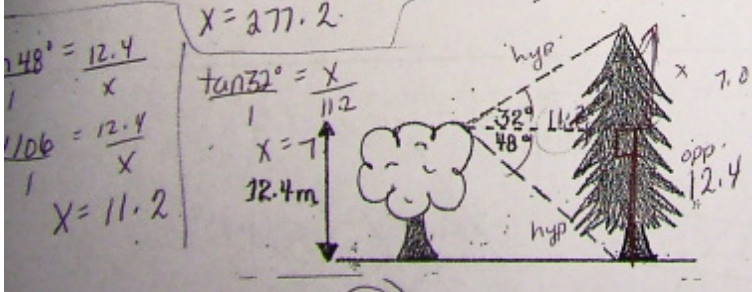
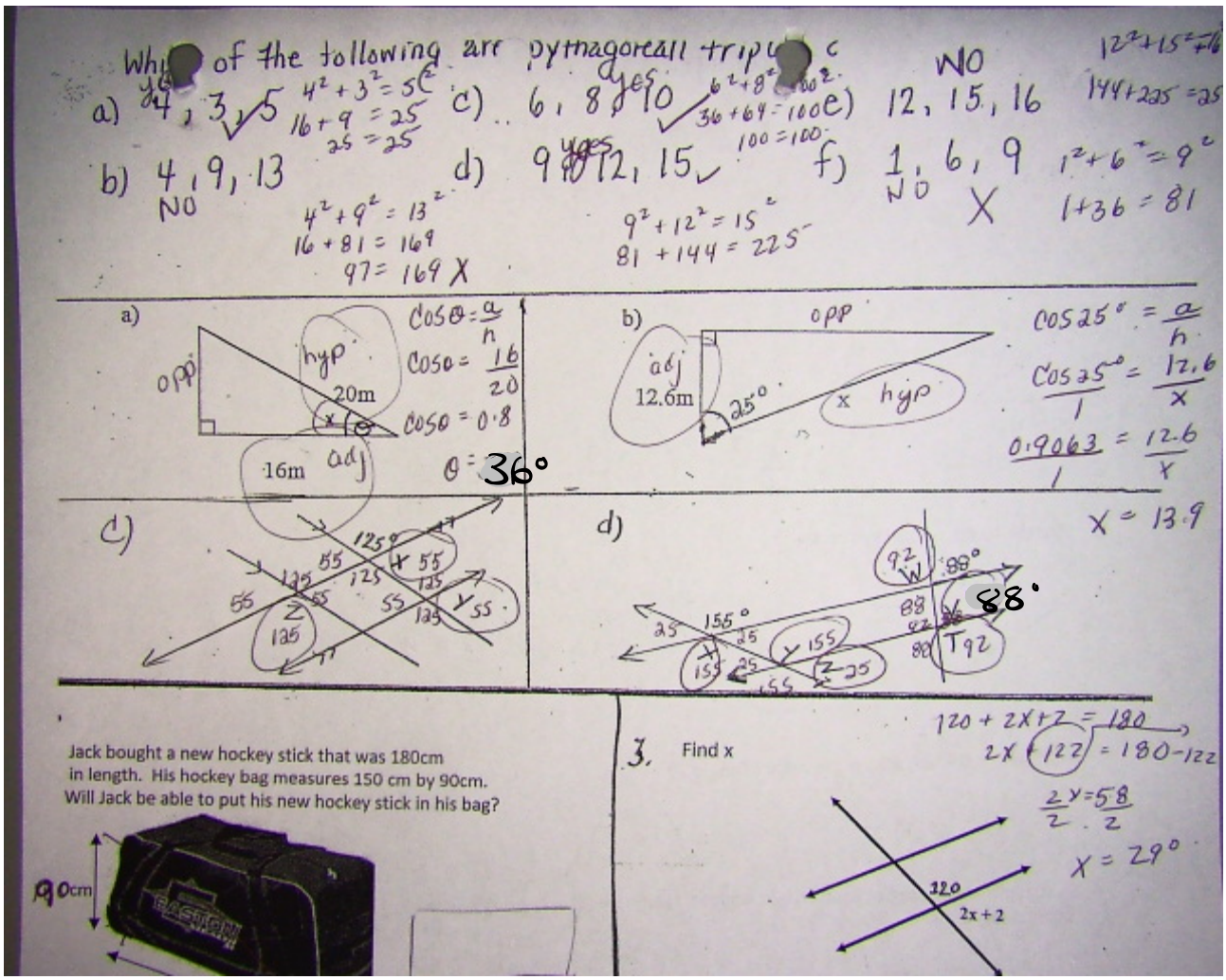
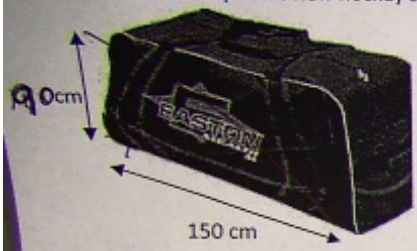


a) 7.3 m b) 19.7 m c) 36.9 m d) 27.2 m


Why of the following are pythagoreall triple c
a) 4, 3, 5
yes
4² + 3² = 5²
16 + 9 = 25
25 = 25
b) 4, 9, 13
NO
4² + 9² = 13²
16 + 81 = 169
97 = 169 X
c) 6, 8, 10
yes
6² + 8² = 100²
36 + 64 = 100
100 = 100
d) 9, 12, 15
yes
9² + 12² = 15²
81 + 144 = 225
e) 12, 15, 16
NO
12² + 15² = 16
144 + 225 = 25
f) 1, 6, 9
NO
X
1² + 6² = 9²
1 + 36 = 81
a)
opp
hyp
20m
16m
adj
cos θ = a/h
cos θ = 16/20
cos θ = 0.8
θ = 36°
b)
opp
adj
12.6m
25°
x
hyp
cos 25° = a/h
cos 25°/1 = 12.6/x
0.9063/1 = 12.6/x
x = 13.9
c)
125°
55
125
x 55
y 55
z 125
d)
92
W
88°
88°
155°
25
x 155
y 155
z 25
T 92
Jack bought a new hockey stick that was 180cm in length. His hockey bag measures 150 cm by 90cm. Will Jack be able to put his new hockey stick in his bag?
90cm
3. Find x
120 + 2x + 2 = 180
2x + 122 = 180 − 122
2x/2 = 58/2
x = 29°
120
2x + 2

Jack bought a new hockey stick that was 180cm in length. His hockey bag measures 150 cm by 90cm. Will Jack be able to put his new hockey stick in his bag?



$90^2 + 150^2 = c^2$

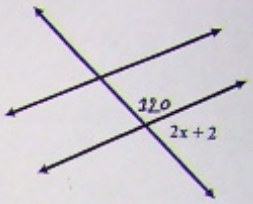
$8100 + 22500 = c^2$

$\sqrt{30600} = \sqrt{c^2}$

$c = 174.9$

No too long

3. Find x

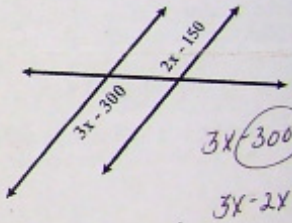


$120 + 2x + 2 = 180$

$2x + 122 = 180$

$\frac{2x}{2} = \frac{58}{2}$

$x = 29°$

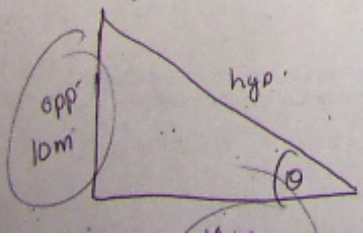


$3x - 300 = 2x - 150$

$3x - 2x = -1500 + 30$

$x = 150$

Ryan and Eldon are having a shouting match. Ryan is on top of the school, which is 10m tall. Eldon is 10m away from the school. Calculate the angle of elevation from Eldon to Ryan.



$\tan\theta = \frac{10}{10}$

$\tan\theta = 1$

$\theta = 45°$

$8100 + 22500 = c$

$\sqrt{30\,600} = \sqrt{c^2}$

$c = 174.9$

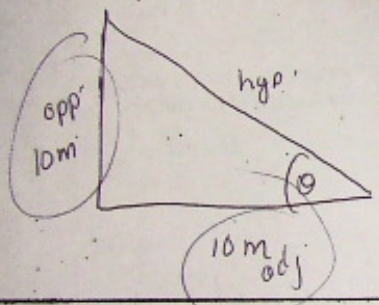
No Tong

$3x + 300 = 2x$

$3x - 2x = -15$

$x = 150$

Ryan and Eldon are having a shouting match. Ryan is on top of the school, which is 10m tall. Eldon is 10m away from the school. Calculate the angle of elevation from Eldon to Ryan.

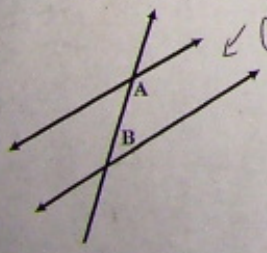


$\tan\theta = \frac{10}{10}$

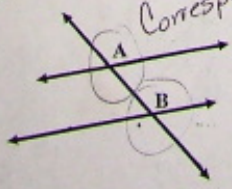
$\tan\theta = 1$

$\theta = 45°$

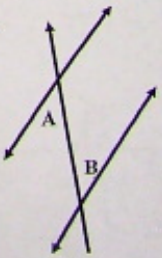
State Alternate Interior, Alternate Exterior, Corresponding, or Co-Interior



Co-Interior



Corresponding



Alt Interior