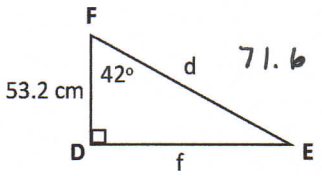
WARM UP

△ DEF given <D = 90°, e = 53.2 cm, <F = 42°, sketch △ DEF, label and solve.



$\measuredangle E = 180° - 42° - 90° = \boxed{48°}$

$\cos 42° = \frac{53.2}{d}$

$\frac{d\cos 42°}{\cos 42°} = \frac{53.2}{\cos 42°}$

$\boxed{d = 71.6 \text{ cm}}$

$(71.6)^2 = (53.2)^2 + f^2$

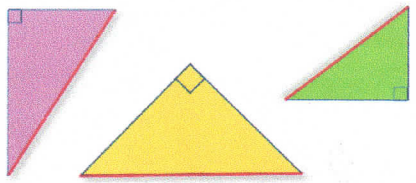
$\boxed{47.9 = f}$

$d = 71.6$ cm
$f = 47.9$ cm
$e = 53.2$ cm

$\measuredangle D = 90°$
$\measuredangle F = 42°$
$\measuredangle E = 48°$

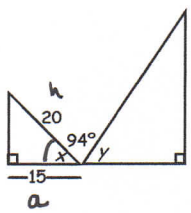
UNIT #5: Trigonometry
Double Triangles

Learning Goal:
I will learn how to solve a problem involving two right triangles.



Lesson: Double Triangles

Example 1: Solve for x, y



Plan:
- Calculate < x using cos
- Calculate < y by subtracting 94° and < x from 180°

$\cos x = \frac{15}{20}$

$\measuredangle x = \cos^{-1}\left(\frac{15}{20}\right)$

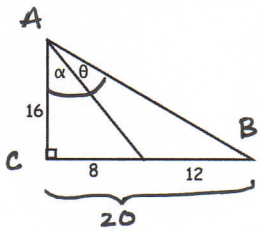
$\boxed{\measuredangle x = 41°}$

$\measuredangle y = 180° - 94° - 41°$

$\boxed{\measuredangle y = 45°}$

$\measuredangle x = 41°$
$\measuredangle y = 45°$

Example 2: Solve for θ



Plan:
- Calculate the sum of the angles α and θ using tan
- Calculate α using tan and subtract this from the sum of both angles to find θ

$\tan A = \frac{20}{16}$

$\measuredangle A = \tan^{-1}\left(\frac{20}{16}\right)$

$\boxed{\measuredangle A = 51°}$

$\tan \alpha = \frac{8}{16}$

$\alpha = \tan^{-1}\left(\frac{8}{16}\right)$

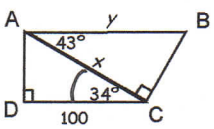
$\boxed{\alpha = 27°}$

$\theta = 51° - 27°$

$\boxed{\theta = 24°}$

$\therefore \theta$ is 24°.

Example 3: Find x and y.



Plan:
- Calculate x using cos in $\triangle ACD$
- Calculate y using cos

$\cos 34° = \frac{100}{x}$

$\frac{x \cos 34°}{\cos 34°} = \frac{100}{\cos 34°}$

$\boxed{x = 120.6}$

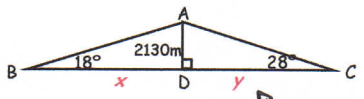
$\cos 43° = \frac{120.6}{y}$

$\frac{y \cos 43°}{\cos 43°} = \frac{120.6}{\cos 43°}$

$\boxed{y = 164.1}$

$\therefore$ x is 120.6 and y is 164.1.

Example 4: Find length BC.



Label x and y.

Plan:
- Calculate x using tan
- Calculate y using tan
- Add x and y to find BC

$\tan 18° = \frac{2130}{x}$ $\quad \tan 28° = \frac{2130}{y}$

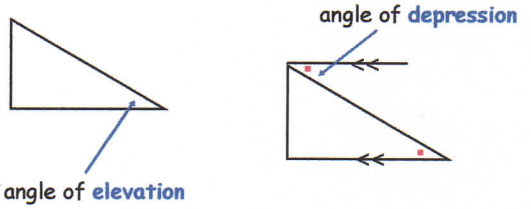
$x = \frac{2130}{\tan 18°}$ $\quad y = \frac{2130}{\tan 28°}$

$\boxed{x = 6555.5}$ $\quad \boxed{y = 4005.9}$

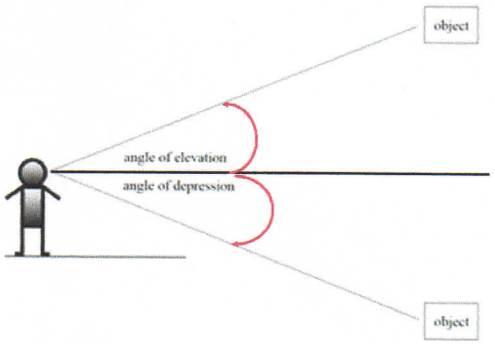
$BC = x + y$
$= 6555.5 + 4005.9$
$= \boxed{10561.4 \text{ m}}$

$\therefore$ BC is 10561.4 m.

Two Important Concepts:



Angle of depression =
angle of elevation because of the **Z - pattern**



UNIT 5: Trignometry

Double Triangles

Learning Goal:

I will learn how to solve a problem involving two right triangles.

Success Criteria:

To be successful, I must be able to...

- analyze a diagram showing the given information
- identify the two triangles that can be used to solve the problem and plan how to use each triangle
- carry out the plan by solving for the unknown side or angle

Practice Work

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