Unit 7

Lesson 4

Solving for an Angle in a Right Δ

Lesson 4 → Solving for an Angle of a Right Triangle

❖ Recall: **SOH CAH TOA** will help to find the missing sides of a right triangle.

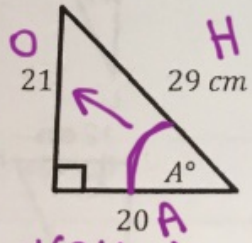
SOH → $\text{Sine}\measuredangle = \frac{\text{opposite}}{\text{hypotenuse}}$ **CAH** → $\text{Cosine}\measuredangle = \frac{\text{adjacent}}{\text{hypotenuse}}$ **TOA** → $\text{Tangent}\measuredangle = \frac{\text{opposite}}{\text{adjacent}}$

❖ We can also use **SOH CAH TOA** to help us find the missing angles of a right triangle.

❖ We will need to use **INVERSES:** (sin^{-1}, cos^{-1} ***and*** tan^{-1}) since we are looking for an angle measure.

➢ Examples: Use **SOH CAH TOA** to solve for *Angle A* in the following right triangles.

1.



$\tan^{-1}(\frac{21}{20})$

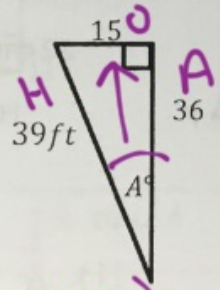
$= 46.3972°$

$\sin^{-1}(21/29) = 46.3972°$

$\cos^{-1}(20/29) = 46.3972°$

$m\angle A =$ 46.3972°

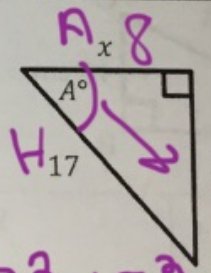
2.



$\sin^{-1}(15/39)$

$m\angle A =$ 22.6199°

3.

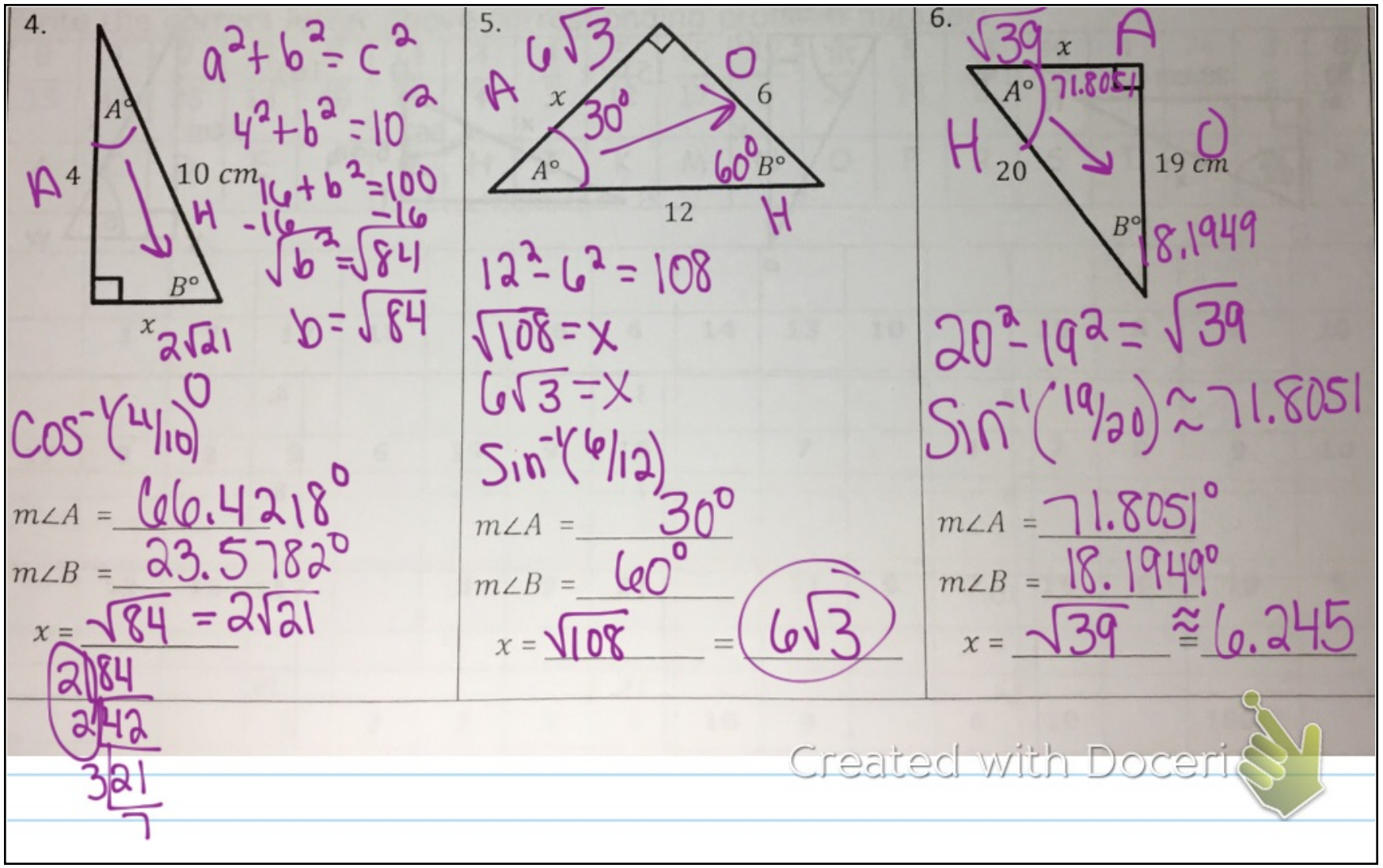


$17^2 - 15^2 = \sqrt{64}$

$= 8$

$\sin^{-1}(15/17)$

$m\angle A =$ 61.9275


4.
A°
4
10 cm
B°
x
2√21
a²+b²=c²
4²+b²=10²
16+b²=100
-16 -16
√b²=√84
b=√84
Cos⁻¹(4/10)
66.4218°
m∠A = 66.4218°
m∠B = 23.5782°
x = √84 = 2√21
2|84
2|42
3|21
7
5.
6√3
A
x
30°
A°
60°
B°
6
12
H
O
H
12²-6²=108
√108=x
6√3=x
Sin⁻¹(6/12)
m∠A = 30°
m∠B = 60°
x = √108 = 6√3
6.
√39
x
A
A°
71.8051
H
20
19 cm
O
B°
18.1949
20²-19²=√39
Sin⁻¹(19/20)≈71.8051
m∠A = 71.8051°
m∠B = 18.1949°
x = √39 ≈ 6.245
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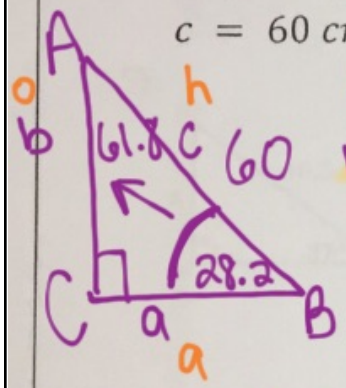
In each triangle ABC, $\angle C$ is the right angle. ***Round sides and angles to the nearest tenth.***

7. $m\angle B = 28.2°$, $c = 60\ cm$



$180-90-28.2$

$m\angle A = 61.8$

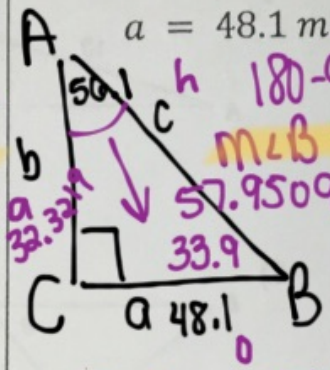
$\sin(28.2) = \frac{b}{60}$

$60\sin(28.2) = b \approx 28.3530$

$\cos(28.2) = \frac{a}{60}$

$60\cos(28.2) = a \approx 52.8782$

8. $m\angle A = 56.1°$, $a = 48.1\ m$



$180-90-56.1$

$m\angle B = 33.9$

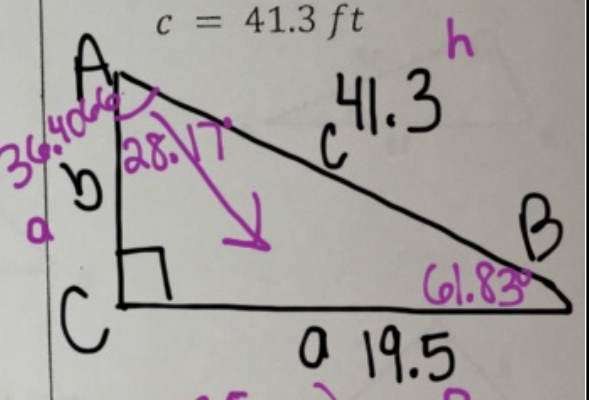
$\tan(56.1) = \frac{48.1}{b}$

$b = \frac{48.1}{\tan(56.1)} \approx 32.3219$

$\sin(56.1) = \frac{48.1}{c}$

$c = \frac{48.1}{\sin(56.1)} \approx 57.9509$

9. $a = 19.5\ ft$, $c = 41.3\ ft$



$\sin^{-1}(19.5/41.3)$ $m\angle A = 28.17$

$\angle B = 180-90-28.17 = 61.83$

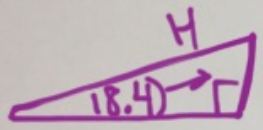
$19.5^2 + b^2 = 41.3^2$

$b^2 = 1325.44$

$b = \sqrt{1325.44}$

≈ 36.4066

10. Find the length of a skateboard ramp when the height of the ramp is 4 $feet$ and the angle formed where the ramp touches the ground is 18.4°.

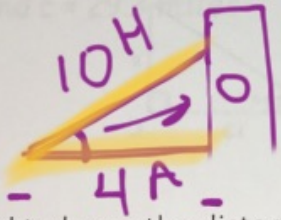


$\sin(18.4) = \frac{4}{x}$

$x = \frac{4}{\sin(18.4)}$

$\approx 12.6723 ft$

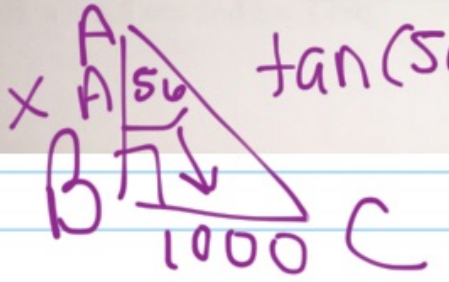
11. A ladder is leaning against a building. The ladder is $10m$ long and it is sitting on the ground $4m$ out from the building. What is the angle that the ladder makes with the ground?



$\cos^{-1}(4/10)$

$66.4218°$

12. Surveyors wished to know the distance across a lake between A and B. They measured the distance from B to C as $100m$ and the measure of angle A is 56°. Knowing that the angle between $\overline{CB}$ and $\overline{BA}$ is 90°, what is the distance between A and B?



$\tan(56) = \frac{100}{x}$

$x = \frac{100}{\tan(56)}$

$\approx 67.45m$

HW: