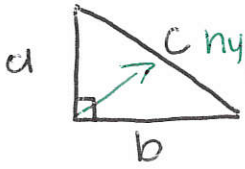
Unit 11 Review Name answer key Period _____

1. What is the Pythagorean Theorem?

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

c is always the hyp.



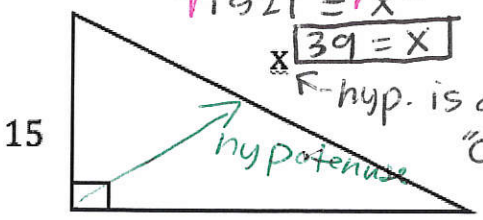
2. Solve for x: $15^2 + 36^2 = x^2$

$225 + 1296 = x^2$

$\sqrt{1521} = \sqrt{x^2}$

$39 = x$

x F-hyp. is always "c"



3. Solve For x:

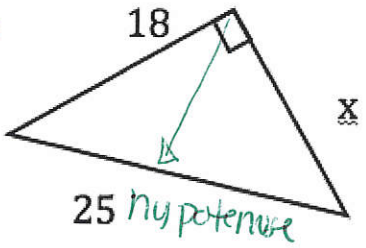
$18^2 + x^2 = 25^2$

$324 + x^2 = 625$

$-324 \quad -324$

$\sqrt{x^2} = \sqrt{301}$

$x = \sqrt{301}$ or $x = 17.35$



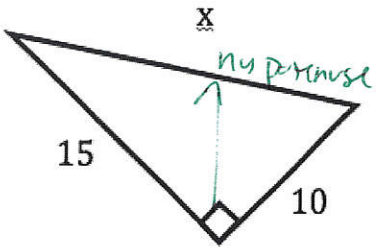
4. Solve for x:

$15^2 + 10^2 = x^2$

$225 + 100 = x^2$

$\sqrt{325} = \sqrt{x^2}$

$5\sqrt{13} = x$ or $18.03 = x$



5. Solve for x:

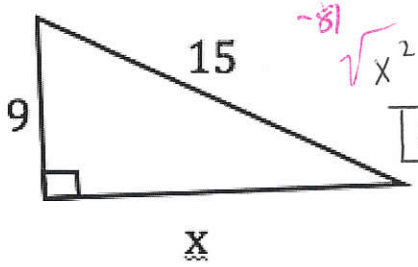
$9^2 + x^2 = 15^2$

$81 + x^2 = 225$

$-81 \quad -81$

$\sqrt{x^2} = \sqrt{144}$

$x = 12$



6. Decide whether the numbers can represent the side lengths of a triangle. If they can, is the triangle right? * 11.1 Notes

26, 35, 62 $26 + 35 \stackrel{?}{>} 62$ $61 > 62$ False

*Not a triangle

14, 18, 29 $14+18>29$ ✓ $18+29>14$ ✓ $14+29>18$ ✓ } yes triangle.

$14^2 + 18^2 \stackrel{?}{=} 29^2$

$196 + 324 = 841$

$520 = 841$ False,

* Not a Right Δ Obtuse

15, 17, 8

$15+17>8$ ✓ $15+8>17$ ✓ $17+8>15$ ✓ yes Δ.

$8^2 + 15^2 = 17^2$

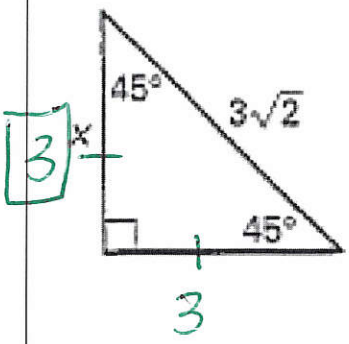
$64 + 225 = 289$

$289 = 289$ ✓

Right Δ

"Special Right △"

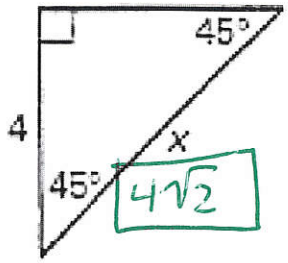
7. Solve for x: 45-45-90



* To go from hyp to leg we divide by $\sqrt{2}$

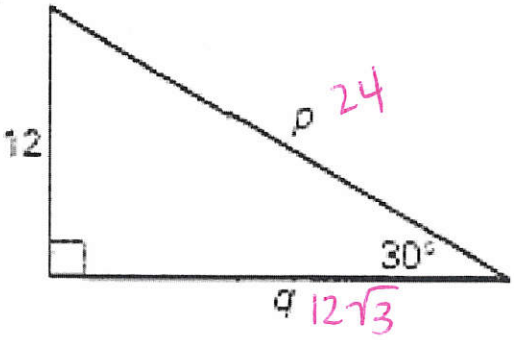
$$X = \frac{3\sqrt{2}}{\sqrt{2}} = 3$$

8. Solve for x: 45-45-90



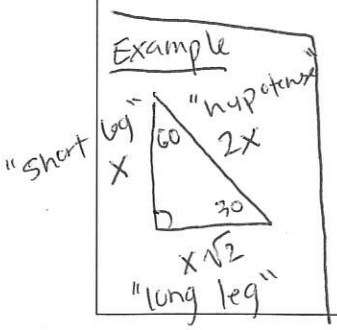
* Leg to hyp. mult. by $\sqrt{2}$

9. Solve for p and q: 30-60-90 △



p: Short leg → hyp. multiply short by 2

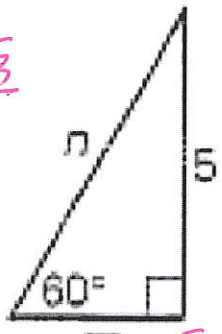
$12 \cdot 2 = \boxed{24}$



q: Short → long multiply by $\sqrt{3}$

$\boxed{12\sqrt{3}}$

10. Solve for m and n: 30-60-90



m: Long leg → short divide long leg by $\sqrt{3}$

$\boxed{\frac{5}{\sqrt{3}}}$ Rationalize: $\frac{5}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{5\sqrt{3}}{9} = \boxed{\frac{5\sqrt{3}}{3}}$

n: short to hyp. multiply short by 2

$\left(\frac{5\sqrt{3}}{3}\right)(2) = \boxed{\frac{10\sqrt{3}}{3}}$

11. Find the value of each. Round your answer to the nearest hundredth.

* Type in calculator.

$\sin 60° = \frac{\sqrt{3}}{2} =$ .87

$\cos 10° =$ .98

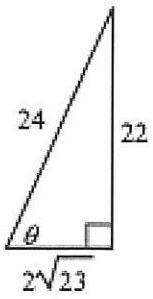
$\cos 60° = \frac{1}{2} =$ .5

$\tan 40° =$ .84

$\tan 10° =$ .18

12. Find the value $\tan\theta$

SOH - CAH - TOA Tanθ = opposite / adjacent



opp.

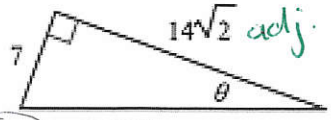
adj.

$\tan\theta = \frac{22}{2\sqrt{23}} = \frac{11\sqrt{23}}{23}$

or 2.29

13. Find $\cos\theta$ SOH - CAH - TOA

$\cos\theta = \frac{\text{Adjacent}}{\text{hypotenuse}}$



adj.

21 hyp.

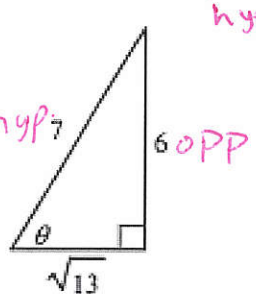
$\cos\theta = \frac{14\sqrt{2}}{21} = \frac{2\sqrt{2}}{3}$

or .94

14. Find $\sin\theta$ SOH - CAH - TOA

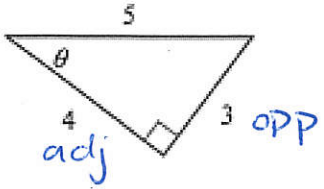
$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$.

$\sin\theta = \frac{6}{7}$



15. Find $\tan\theta$ TOA

$\tan\theta = \frac{3}{4}$



16. Find $\cos\theta$ if $\sin\theta = \frac{12}{13}$ opp / hyp

CAH

$\cos\theta = \frac{5}{13}$

$12^2 + x^2 = 13^2$

$144 + x^2 = 169$

$-144 \quad -144$

$\sqrt{x^2} = \sqrt{25}$

$x = 5$

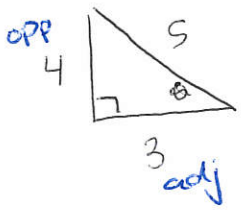
SOH-CAH-TOA.

3-4-5 △

17. Find $\tan\theta$ if $\sin\theta = \frac{4}{5}$ opp / hyp

TOA

$\tan\theta = \frac{4}{3}$



18. $\sin\theta = \frac{\sqrt{6}}{8}$ find $\cos\theta$ and $\tan\theta$

opp / hyp

Pythag. Thm.

$(\sqrt{6})^2 + x^2 = 8^2$

$6 + x^2 = 64$

$-6 \quad -6$

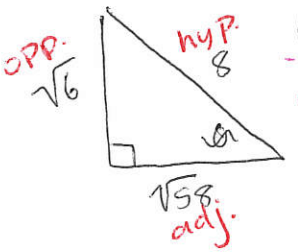
$\sqrt{x^2} = \sqrt{58}$

$x = \sqrt{58}$

$\cos\theta = \frac{\sqrt{58}}{8}$

$\tan\theta = \frac{\sqrt{6}}{\sqrt{58}}$

Rationalize $= \frac{\sqrt{87}}{29}$ decimal $= .32$



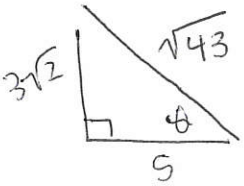
19. $\tan\theta = \frac{3\sqrt{2}}{5}$ find $\sin\theta$ and $\cos\theta$

$\sin\theta = \frac{3\sqrt{2}}{\sqrt{43}}$

Rationalize $= \frac{3\sqrt{86}}{43}$ OR $= .65$

$\cos\theta = \frac{5}{\sqrt{43}}$

Rationalize $= \frac{5\sqrt{43}}{43}$ OR $= .76$



$(3\sqrt{2})^2 + 5^2 = c^2$

$18 + 25 = c^2$

$\sqrt{43} = \sqrt{c^2}$

$\sqrt{43} = c$

20. Find the value of the angle.

* Type 2nd button, Then Trig function.

$\sin C = 0.2756 = 15.99° = 16°$

2nd Sin looks like $\sin^{-1}(.2756)$

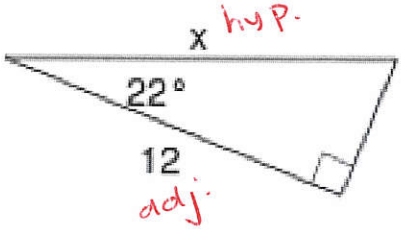
$\sin U = 0.8746 = 60.99° \Rightarrow 70°$

$\cos V = 0.6820 = 46.99 = 47°$

$\tan A = 2.0503 = 63.99 = 64°$

* don't forget the degree symbol.

19. Find the missing side. SOH-CAH-TOA

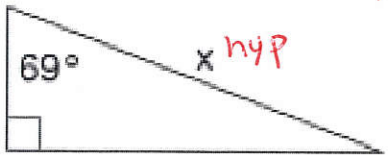


$x \cdot \cos 22° = \frac{12}{x}$ ·x

$\frac{x \cdot \cos 22°}{\cos 22} = \frac{12}{\cos 22}$

$x = \frac{12}{\cos 22} = 12.94$

20. Find the missing side. SOH-CAH-TOA



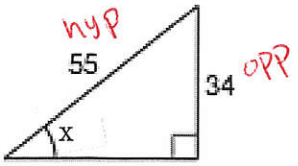
$x \sin 69° = \frac{11}{x}$ ·x

$\frac{x \cdot \sin 69}{\sin 69} = \frac{11}{\sin 69}$

$x = \frac{11}{\sin 69°}$

$x = 11.78$

21. Solve for x, y, and z.

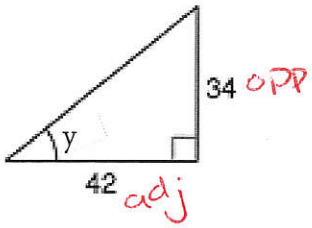


$\sin X = \frac{34}{55}$

2nd sin → $\sin^{-1}(\frac{34}{55}) =$

$X = 38.18°$

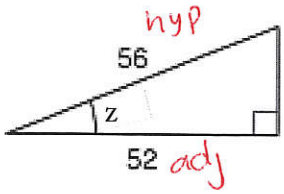
dont forget the degree symbol; so we know it's an angle.



$\tan y = \frac{34}{42}$

$y = 38.99°$

$39°$

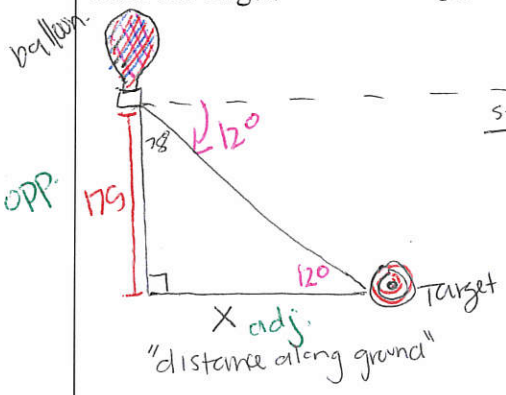


$\cos z = \frac{52}{56}$

$z = 21.79°$

22. The angle of depression from a hot air balloon to its landing target is 12°. If the balloon is 175 feet high, find its distance measured along the ground from the target.

SOH - CAH - TOA



set up

$\frac{\text{opp}}{\text{adj}}$ $\tan 12° = \frac{175}{X}$

solve

$X \cdot \tan 12° = \frac{175}{X} \cdot X$

$\frac{X \cdot \tan 12°}{\tan 12} = \frac{175}{\tan 12}$

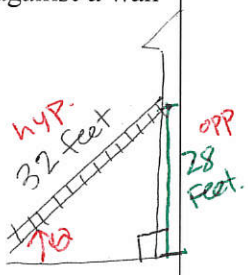
$X = \frac{175}{\tan 12} = 823.3$

23. To the nearest degree what is the angle formed with the ground by a 32 ft. ladder if it is leaning against a wall a height of 28 ft.?

SOH - CAH - TOA

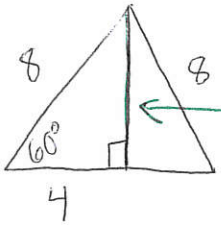
$\sin\theta = \frac{28}{32}$

$\theta = 61.05°$



24. An equilateral triangle has side length 8. What is the length of the altitude?

30 - 60 - 90



$4\sqrt{3}$

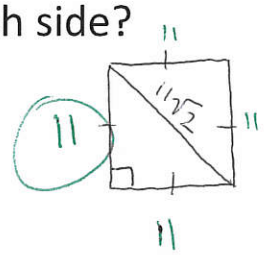
short leg → long leg

*multiply by $\sqrt{3}$

$4 \cdot \sqrt{3}$

25. The length of the diagonal of a square is $11\sqrt{2}$. What is the length of each side?

45 - 45 - 90



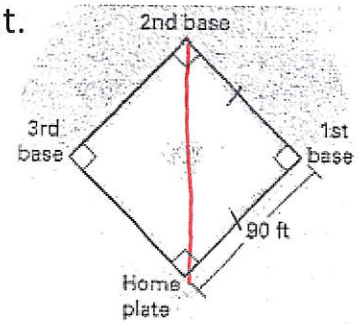
hyp → leg.

divide by $\sqrt{2}$

$\frac{11\sqrt{2}}{\sqrt{2}} = 11$

26. Baseball: The baselines of a baseball field form a square. The distance from home plate ~~to first base is 90~~ feet. Use the diagram at the right.

45-45-90



a. What is the distance from home plate to second base?

$90\sqrt{2}$

b. What is the distance from third base to first base?

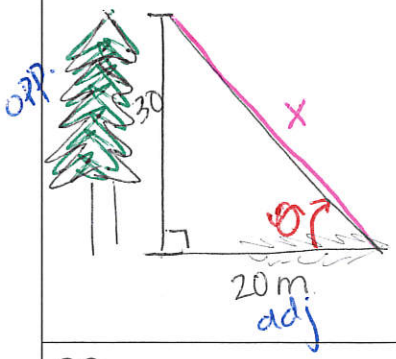
$90\sqrt{2}$

c. The pitcher's mound is 60 feet and 6 inches from home plate. Is it the midpoint of the diagonal from home plate to second base? If not, what is the midpoint?

$\frac{90\sqrt{2}}{2} = 45\sqrt{2} = 63.64$ feet. midpoint.

60 feet 6 inches is not the midpoint.

28. A tree casts a shadow 20 meters from its base. The height of the tree is 30 meters. Find the angle of elevation formed by the end of the shadow and ground, rounding to the nearest degree. What is the distance from the top of the tree to the end of the shadow? Round to the nearest hundredth.



$\tan\theta = \frac{30}{20}$

$\theta = 56.31°$

$20^2 + 30^2 = x^2$

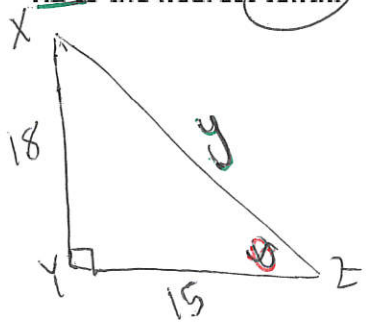
$\sqrt{1300} = \sqrt{x^2}$

$10\sqrt{13} = x$

or

$36.06 = x$

29. **In ΔXYZ, $m\angle Y = 90°$, $XY = 18$ and $YZ = 15$. Find $m\angle Z$ to the nearest degree and the length of side XZ to the nearest tenth.**



$\tan\theta = \frac{18}{15}$

$\theta = 50.2°$

$18^2 + 15^2 = y^2$

$549 = y^2$

$3\sqrt{61} = y$

$23.4 = y$