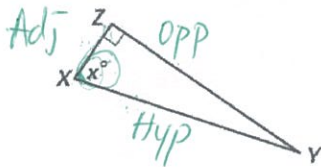


Lesson 2 Worksheet 1 Identifying Opposite and Adjacent Legs

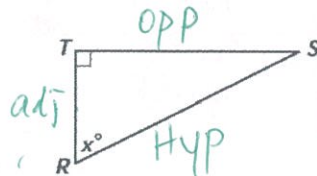
Trigonometry
Right-angle \triangle

Label the sides of each right triangle below as the "adjacent" meaning the leg adjacent to the angle marked with an "x", "opposite" (opposite leg), or "Hypotenuse". (You may want to abbreviate using opp, adj, hyp.)

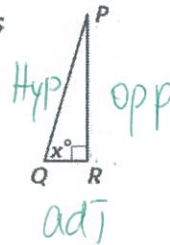
1.



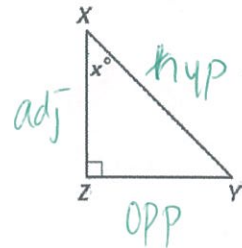
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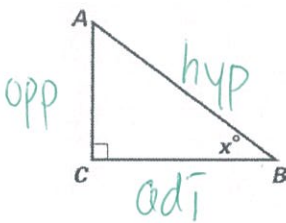
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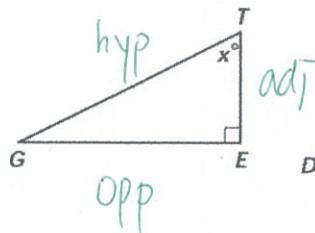
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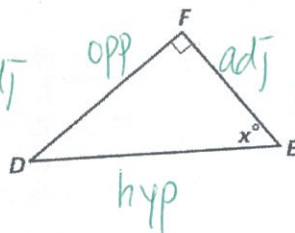
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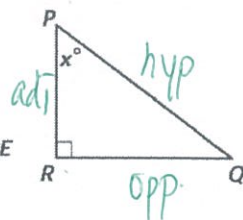
6.



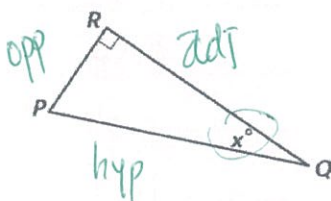
7.



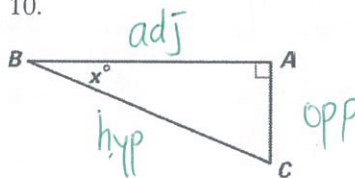
8.



9.



10.



angle sides
 $\sin X = \frac{\text{opp}}{\text{hyp}}$
 $\sin \theta$
 Sine

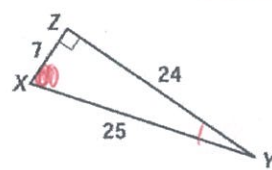
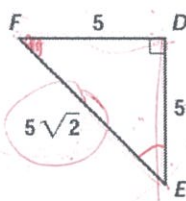
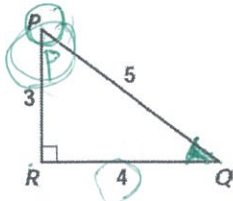
angle
 $\cos X = \frac{\text{adj}}{\text{hyp}}$
 $\cos \theta$
 Cosine

angle
 $\tan X = \frac{\text{opp}}{\text{adj}}$
 $\tan \theta$
 Tangent

Lesson 2 Worksheet 2 Trigonometric Ratios

$\sin x = \frac{O}{H}$ $\cos x = \frac{A}{H}$ $\tan x = \frac{O}{A}$

Part I: Find the value of the sine, cosine, and tangent ratios for each triangle below. Be sure to show your work and give both a fraction and a decimal answer for each one. Simplify fractions and radicals and round decimals to 2 places.



hyp = PQ = 5
opp = RQ = 4
adj = PR = 3

hyp = PQ = 5
opp = PR = 3
adj = RQ = 4

	Fraction	Decimal
1. $\sin P =$	$\frac{4}{5}$	0.8
2. $\cos P =$	$\frac{3}{5}$	0.6
3. $\tan P =$	$\frac{4}{3}$	1.33
4. $\sin Q =$	$\frac{3}{5}$	0.6
5. $\cos Q =$	$\frac{4}{5}$	0.8
6. $\tan Q =$	$\frac{3}{4}$	0.75

Angle F:
Adj = FD = 5
Opp = DE = 5
Hyp = EF = $5\sqrt{2}$

	Fraction	Decimal
7. $\sin E =$	$\frac{5}{5\sqrt{2}} = \frac{1}{\sqrt{2}}$	0.707
8. $\cos F =$	$\frac{5}{5\sqrt{2}} = \frac{1}{\sqrt{2}}$	0.707
9. $\tan F =$	$\frac{5}{5} = 1$	1
10. $\sin D =$	$\frac{5}{5\sqrt{2}} = \frac{1}{\sqrt{2}}$	0.707
11. $\cos D =$	$\frac{5}{5\sqrt{2}} = \frac{1}{\sqrt{2}}$	0.707
12. $\tan D =$	$\frac{5}{5} = 1$	1

Angle X Angle Y

	Fraction	Decimal
13. $\sin X =$	$\frac{24}{25}$	0.96
14. $\cos X =$	$\frac{7}{25}$	0.28
15. $\tan X =$	$\frac{24}{7}$	3.43
16. $\sin Y =$	$\frac{7}{25}$	0.28
17. $\cos Y =$	$\frac{24}{25}$	0.96
18. $\tan Y =$	$\frac{7}{24}$	0.29

$\frac{1}{\sqrt{2}}$
 $1 \div \sqrt{2}$

Part II: Find the following ratios (decimal answers rounded to 2 decimal places) ratio for each of the following using a calculator. Make sure that the calculator is set to degree mode.

- | | | |
|----------------------------|----------------------------|----------------------------|
| 19. $\sin 10^\circ = 0.17$ | 27. $\cos 10^\circ = 0.98$ | 35. $\tan 10^\circ = 0.18$ |
| 20. $\sin 20^\circ = 0.34$ | 28. $\cos 20^\circ = 0.94$ | 36. $\tan 20^\circ = 0.36$ |
| 21. $\sin 30^\circ = 0.5$ | 29. $\cos 30^\circ = 0.87$ | 37. $\tan 30^\circ = 0.58$ |
| 22. $\sin 40^\circ = 0.64$ | 30. $\cos 40^\circ = 0.77$ | 38. $\tan 40^\circ = 0.84$ |
| 23. $\sin 50^\circ = 0.77$ | 31. $\cos 50^\circ = 0.64$ | 39. $\tan 50^\circ = 1.19$ |
| 24. $\sin 60^\circ = 0.87$ | 32. $\cos 60^\circ = 0.5$ | 40. $\tan 60^\circ = 1.73$ |
| 25. $\sin 70^\circ = 0.94$ | 33. $\cos 70^\circ = 0.34$ | 41. $\tan 70^\circ = 2.75$ |
| 26. $\sin 80^\circ = 0.98$ | 34. $\cos 80^\circ = 0.17$ | 42. $\tan 80^\circ = 5.67$ |

43. **Think about it!** Why are sine and cosine ratios always less than 1, but tangents are not? $\tan 90^\circ = \text{undefined}$

$\cos 110^\circ =$ $\tan x = \frac{\sin x}{\cos x}$

$$\sin \theta = \frac{\text{opp}}{\text{hyp}} \quad \cos \theta = \frac{\text{adj}}{\text{hyp}} \quad \tan \theta = \frac{\text{opp}}{\text{adj}}$$

Name _____ Date _____ Class _____

Lesson 3 Worksheet 1

Identifying the trig ratio and setting up the equation

Part I: Look at the given information and the variable in each triangle below. Determine which trig ratio applies to the given information.

Part II: After completing part I, go back to every triangle and write an equation with the given information.

1.

use cosine

$$\cos 32^\circ = \frac{x}{13}$$

$$x = 13(\cos 32^\circ)$$

$$x = 11.02''$$

2.

use tan

$$\tan 55^\circ = \frac{x}{4}$$

$$x = 4(\tan 55^\circ)$$

$$x = 5.71$$

3.

use cosine

$$\cos 55^\circ = \frac{x}{20}$$

$$x = 20(\cos 55^\circ)$$

$$x = 11.47''$$

4.

use sine

$$\sin 28^\circ = \frac{x}{15}$$

$$x = 15(\sin 28^\circ)$$

$$x = 7.04''$$

5.

use tangent

$$\tan 32^\circ = \frac{15}{x}$$

$$x = \frac{15}{\tan 32^\circ}$$

$$x = 24.01''$$

6.

use sine

$$\sin 65^\circ = \frac{10}{x}$$

$$x = \frac{10}{\sin 65^\circ}$$

$$x = 11.03''$$

7.

use cosine

$$\cos 63^\circ = \frac{5}{x}$$

$$x = \frac{5}{\cos 63^\circ}$$

$$x = 11.01''$$

8.

use sine

$$\sin 54^\circ = \frac{9}{x}$$

$$x = \frac{9}{\sin 54^\circ}$$

$$x = 11.12''$$

9.

~~use cosine~~

use cosine

$$\cos X = \frac{11.3}{15}$$

inverse

$$X = \cos^{-1}\left(\frac{11.3}{15}\right)$$

$$X = 41.2^\circ$$

10.

use cosine

$$\cos X = \frac{7}{9}$$

$$X = \cos^{-1}\left(\frac{7}{9}\right)$$

$$X = 38.94^\circ$$

11.

use sine

$$\sin X = \frac{12}{24}$$

$$X = \sin^{-1}\left(\frac{12}{24}\right)$$

$$X = 30^\circ$$

12.

use sine

$$\sin X = \frac{4}{5}$$

$$X = \sin^{-1}\left(\frac{4}{5}\right)$$

$$X = 53.13^\circ$$

SOH CAH TOA

$$\text{S} = \frac{\text{O}}{\text{H}} \quad \text{C} = \frac{\text{A}}{\text{H}} \quad \text{T} = \frac{\text{O}}{\text{A}}$$

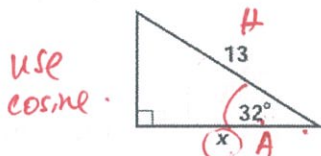
Name _____ Date _____ Class _____

Lesson 4 Worksheet 1

Using trig ratios to solve for a side in a right triangle

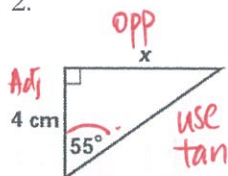
Solve for x in each triangle below. Use what you learned in lesson 3 to first identify the ratio, then write the equation, and then solve the equation. Make sure your calculator is in degree mode. Round your answers to 2 decimal places.

1.



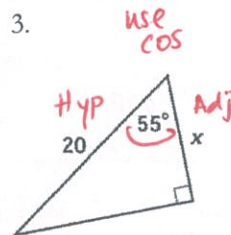
$$\begin{aligned} \cos 32^\circ &= \frac{x}{13} \\ x &= 13(\cos 32^\circ) \\ &= 11.02 \end{aligned}$$

2.



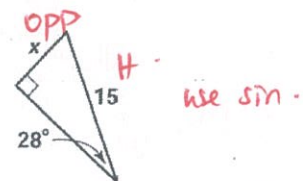
$$\begin{aligned} \tan 55^\circ &= \frac{x}{4} \\ x &= 4(\tan 55^\circ) \\ &= 5.71 \end{aligned}$$

3.



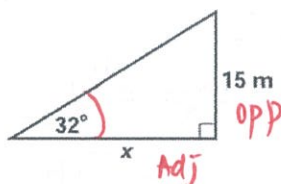
$$\begin{aligned} \cos 55^\circ &= \frac{x}{20} \\ x &= 20(\cos 55^\circ) \\ &= 11.47 \end{aligned}$$

4.



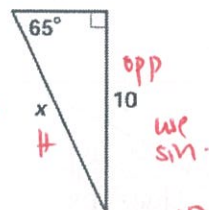
$$\begin{aligned} \sin 28^\circ &= \frac{x}{15} \\ x &= 15(\sin 28^\circ) \\ &= 7.04 \end{aligned}$$

5.



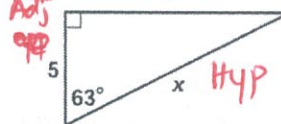
$$\begin{aligned} \tan 32^\circ &= \frac{15}{x} \\ x &= \frac{15}{\tan 32^\circ} = 24.04 \text{ m} \end{aligned}$$

6.



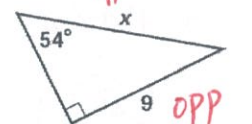
$$\begin{aligned} \sin 65^\circ &= \frac{10}{x} \\ x &= \frac{10}{\sin 65^\circ} \\ &= 11.03 \end{aligned}$$

7.



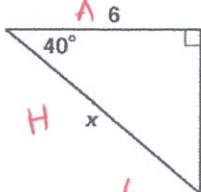
$$\begin{aligned} \cos 63^\circ &= \frac{5}{x} \\ x &= \frac{5}{\cos 63^\circ} \\ &= 11.01 \end{aligned}$$

8.



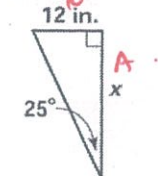
$$\begin{aligned} \sin 54^\circ &= \frac{9}{x} \\ x &= \frac{9}{\sin 54^\circ} \\ &= 11.12 \end{aligned}$$

9.



$$\begin{aligned} \cos 40^\circ &= \frac{6}{x} \\ x &= \frac{6}{\cos 40^\circ} \\ &= 7.83 \end{aligned}$$

10.



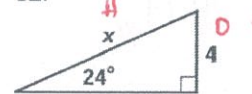
$$\begin{aligned} \tan 25^\circ &= \frac{x}{12} \\ x &= \frac{12}{\tan 25^\circ} \\ &= 25.73 \text{ km in.} \end{aligned}$$

11.



$$\begin{aligned} \tan 65^\circ &= \frac{x}{3} \\ x &= 3(\tan 65^\circ) \\ &= 6.43 \text{ km} \end{aligned}$$

12.



$$\begin{aligned} \sin 24^\circ &= \frac{4}{x} \\ x &= \frac{4}{\sin 24^\circ} \\ &= 9.83 \end{aligned}$$

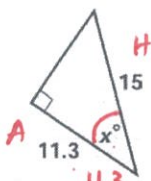
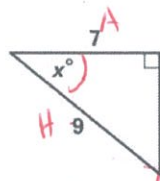
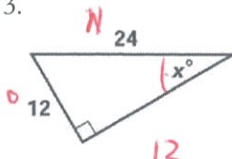
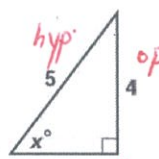
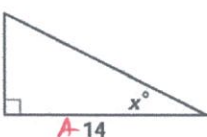
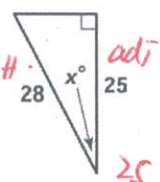
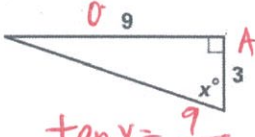

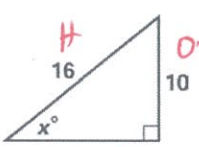

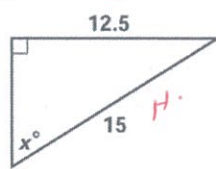
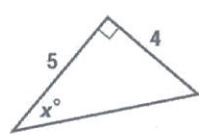
Lesson 4 Worksheet 2

Using inverse trig ratios to solve for an angle in a right triangle

Part I: Use your calculator and inverse trig functions to find the angle for each ratio below to the nearest tenth (round to 1 decimal place).

- | | | |
|---|---|--|
| 1. $\sin^{-1} .86 = \underline{59.3^\circ}$ | 5. $\cos^{-1} .72 = \underline{43.9^\circ}$ | 9. $\tan^{-1} .53 = \underline{27.9^\circ}$ |
| 2. $\sin^{-1} \frac{5}{8} = \underline{38.6^\circ}$ | 6. $\cos^{-1} \frac{1}{8} = \underline{82.8^\circ}$ | 10. $\tan^{-1} 2 = \underline{63.4^\circ}$ |
| 3. $\sin^{-1} .5 = \underline{30^\circ}$ | 7. $\cos^{-1} .3 = \underline{72.5^\circ}$ | 11. $\tan^{-1} 4.6 = \underline{77.7^\circ}$ |
| 4. $\sin x = \frac{3}{4}, x = \underline{48.6^\circ}$ | 8. $\cos x = \frac{1}{2}, x = \underline{60^\circ}$ | 12. $\tan x = \frac{7}{8}, x = \underline{41.2^\circ}$ |

Part II: Solve for x in each triangle below. Use what you learned in lesson 3 to first identify the ratio, then write the equation, and then solve the equation. Make sure your calculator is in degree mode. Round your answers to the nearest tenth.

- | | | | |
|---|--|---|--|
| 1. 
$\cos x = \frac{11.3}{15}$
$x = \cos^{-1}(\frac{11.3}{15}) = 41.12^\circ$ | 2. 
$\cos x = \frac{7}{9}$
$x = \cos^{-1}(\frac{7}{9}) = 38.9^\circ$ | 3. 
$\sin x = \frac{12}{24}$
$x = \sin^{-1}(\frac{1}{2}) = 30^\circ$ | 4. 
$\sin x = \frac{4}{5}$
$x = \sin^{-1}(\frac{4}{5}) = 53.1^\circ$ |
| 5. 
$\tan x = \frac{7}{14}$
$x = 26.6^\circ$ | 6. 
$\cos x = \frac{25}{28}$
$x = 26.77^\circ$ | 7. 
$\tan x = \frac{9}{3}$
$x = 71.57^\circ$ | 8. 
$\sin x = \frac{15}{20}$
$x = 48.59^\circ$ |
| 9. 
$\sin x = \frac{10}{16}$
$x = 38.68^\circ$ | 10. 
$\cos x = \frac{8}{18}$
$x = 63.61^\circ$ | 11. 
$\sin x = \frac{12.5}{15}$
$x = 56.44^\circ$ | 12. 
$\tan x = \frac{4}{5}$
$x = 38.66^\circ$ |

