

Trigonometry -
Problem Solving

Name _____

Date _____

inverse
 $\left\{ \begin{array}{l} \sin^{-1} \\ \cos^{-1} \end{array} \right.$

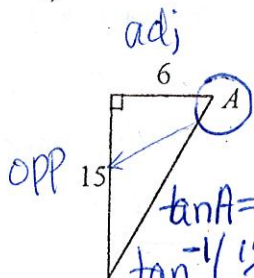
KEY

Use inverse to find angles.

Find the measure of $\angle A$ to the nearest degree.

Focus on reference, then decide which trig function is best. 3)

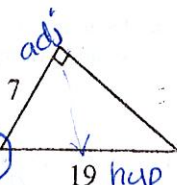
1)



$\tan A = \frac{15}{6}$
 $\tan^{-1}(\frac{15}{6}) = A$

$A^\circ \approx 68^\circ$

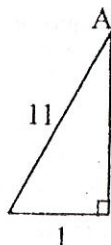
2)



$\cos A = \frac{7}{19}$
 $\cos^{-1}(\frac{7}{19}) = A$

$A^\circ \approx 68.4^\circ$

68



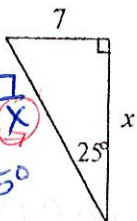
$\sin^{-1}(\frac{1}{11}) = A$

$A^\circ \approx 5.2^\circ$

5

Find the length of the variable to the nearest tenth.

4)

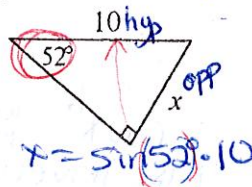


$\tan 25^\circ = \frac{1}{x}$
 $x = \frac{1}{\tan 25^\circ}$

$x \approx 2.3$

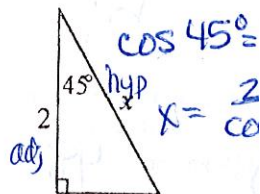
5)

$\sin 52^\circ = \frac{x}{10}$



$x \approx 7.9$

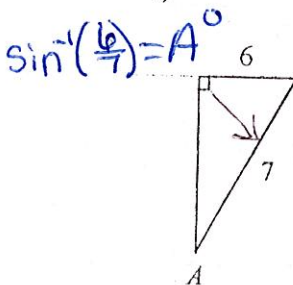
6)



$x \approx 1.4$

Find the measure of $\angle A$ to the nearest degree.

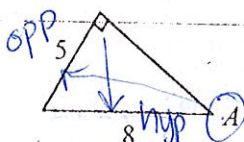
1)



$\cos^{-1}(\frac{6}{7}) = A^\circ$

$A^\circ \approx 59$

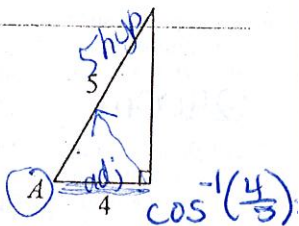
2)



$\sin^{-1}(\frac{5}{8}) = A$

$A^\circ \approx 39$

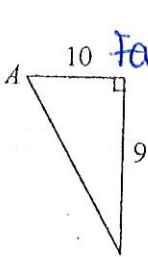
3)



$\cos^{-1}(\frac{4}{5}) = A$

$A^\circ \approx 37$

4)

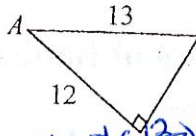


$\tan^{-1}(\frac{9}{10}) = A^\circ$

A°

$A^\circ \approx \boxed{42^\circ}$

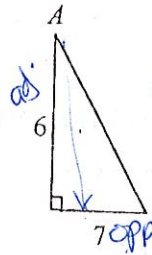
5)



$\cos^{-1}(\frac{12}{13}) = A^\circ$

$A^\circ \approx \boxed{23^\circ}$

6)



$\tan^{-1}(\frac{7}{6}) = A^\circ$

$A^\circ \approx \boxed{49^\circ}$

Find the indicated values. Round to the nearest ten-thousandths. Use calculator. 4 deci.

1) $\sin 30^\circ \approx \underline{0.5000}$

2) $\tan 30^\circ \approx \underline{.5774}$

\approx - approx. eg

3) $\cos 30^\circ \approx \underline{.8660}$

4) $\sin 12^\circ \approx \underline{.2079}$

regular
Sine, cos, tan.

5) $\tan 88^\circ \approx \underline{28.6363}$

6) $\cos 89^\circ \approx \underline{.0175}$

7) $\sin 60^\circ \approx \underline{.8660}$

8) $\tan 45^\circ \approx \underline{1.000}$

9) $\cos 57^\circ \approx \underline{.5446}$

10) $\sin 49^\circ \approx \underline{.7547}$

11) $\tan 6^\circ \approx \underline{.1051}$

12) $\cos 32^\circ \approx \underline{.8481}$

Find the measure of the angle to the nearest degree. Use inverse to find angles.

13) $\sin A^\circ = 0.6248$

$A^\circ \approx \underline{39^\circ}$

14) $\tan B^\circ = 7.2483$

$B^\circ \approx \underline{82^\circ}$

15) $\cos C^\circ = 0.4233$

$C^\circ \approx \underline{65^\circ}$

16) $\sin D^\circ = 0.1763$

$D^\circ \approx \underline{10^\circ}$

17) $\tan E^\circ = 0.9010$

$E^\circ \approx \underline{42^\circ}$

18) $\cos F^\circ = 0.7536$

$F^\circ \approx \underline{41^\circ}$

19) $\sin G^\circ = 0.0175$

$G^\circ \approx \underline{1^\circ}$

20) $\tan H^\circ = 0.1458$

$H^\circ \approx \underline{8^\circ}$

21) $\cos I^\circ = 0.2315$

$I^\circ \approx \underline{77^\circ}$

22) $\sin J^\circ = 0.5001$

$J^\circ \approx \underline{30^\circ}$

23) $\tan K^\circ = 4.3541$

$K^\circ \approx \underline{77^\circ}$

24) $\cos L^\circ = 0.9178$

$L^\circ \approx \underline{23^\circ}$

KEY

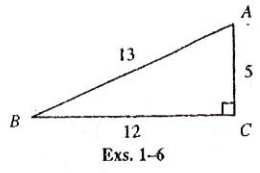
NAME _____ DATE _____ SCORE _____

The Sine, Cosine, and Tangent Ratios

For use after Section 8-6

Use the diagram to express the ratio as a fraction.

- | | |
|-----------------------------|----------------------------|
| 1. $\sin A = \frac{12}{13}$ | 2. $\cos A = \frac{5}{13}$ |
| 3. $\cos B = \frac{12}{13}$ | 4. $\tan A = \frac{12}{5}$ |
| 5. $\tan B = \frac{5}{12}$ | 6. $\sin B = \frac{5}{13}$ |



Complete. Use a scientific calculator or the table on page 311 of the text.

- | | |
|------------------------------------|------------------------------------|
| 7. $\sin 3^\circ \approx .05$ | 8. $\cos 30^\circ \approx .8660$ |
| 9. $\tan 48^\circ \approx 1.11$ | 10. $\sin 79^\circ \approx .982$ |
| 11. $\cos 19^\circ \approx 0.9455$ | } use inverse to find angles. |
| 13. $\tan 68^\circ \approx 2.4751$ | |
| | 14. $\cos 50^\circ \approx 0.6428$ |

Use a scientific calculator or the table on page 311 of the text to find the values of the variables. Find lengths correct to the nearest integer and angles to the nearest degree.

15. $\tan 38^\circ = \frac{x}{46}$
 $x \approx 36$

16. $\sin 55^\circ = \frac{x}{48}$
 $x = \sin 55^\circ \cdot 48$
 $x \approx 39.3 = 39$

17. $\cos 58^\circ = \frac{6.2}{x} = 11.6$
 $x \approx 12$

18. $\sin x^\circ = \frac{n}{3n} = \frac{1}{3}$
 $x \approx 19$

19. $\cos x^\circ = \frac{8}{12} = \frac{2}{3}$
 $\cos^{-1}(\frac{2}{3}) = x$
 $x \approx 48^\circ$

20. $\tan 65^\circ = \frac{x}{16}$
 $x \approx 34$

21. $\sin 38^\circ = \frac{x}{72}$
 $\cos 38^\circ = \frac{y}{72}$
 $x \approx 44$
 $y \approx 57$

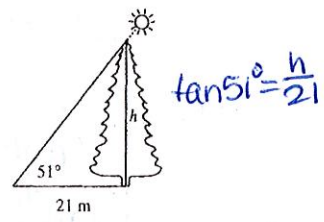
22. $\sin 58^\circ = \frac{x}{20} = 16.96$
 $\cos 58^\circ = \frac{y}{20} = 10.59$
 $x \approx 17$
 $y \approx 11$

Applications of Trigonometry

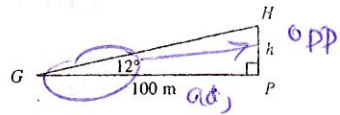
For use after Section 8-7

In Exercises 1-5 express lengths correct to the nearest meter and angles correct to the nearest degree. Use a scientific calculator or the table on page 311 of the text.

1. A tree casts a shadow 21 m long. The angle of elevation of the sun is 51° . What is the height of the tree? 26m

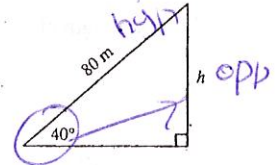


2. A helicopter (H) is hovering over a landing pad (P) 100 m from where you are standing (G). The helicopter's angle of elevation with the ground is 12° . What is the altitude of the helicopter? 21m $\tan 12^\circ = \frac{h}{100}$



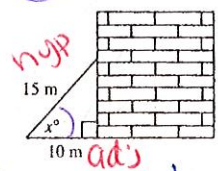
3. You are flying a kite and have let out 80 m of string. The kite's angle of elevation with the ground is 40° . If the string is stretched straight, how high is the kite above the ground?

~~51~~ $\sin 40^\circ = \frac{h}{80}$



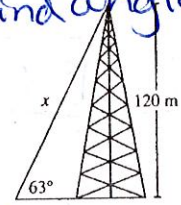
4. A 15 m pole is leaning against a wall. The foot of the pole is 10 m from the wall. Find the angle the pole makes with the ground. 48 degrees

$\cos X^\circ = \frac{10}{15}$
Use inverse to find angles.
 $\cos^{-1}(\frac{10}{15}) = X^\circ$



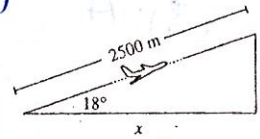
5. A guy wire reaches from the top of a 120 m television transmitter tower to the ground. The wire makes a 63° angle with the ground. Find the length of the guy wire.

135m $\sin 63^\circ = \frac{120}{x}$
 $x = 134.67$



6. An airplane climbs at an angle of 18° with the ground. Find the ground distance the plane travels as it moves 2500 m through the air. Give your answer to the nearest 100 m.

2400m $\cos 18^\circ = \frac{2500}{x} = 2377$



7. A lighthouse operator at point P 25 m above sea level sights a sailboat at point S . The angle of depression of the sighting is 10° . How far is the boat from the base of the lighthouse? Give your answer to the nearest 10 m.

142m (140m)

