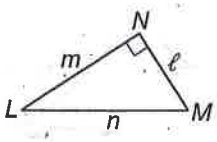
Right Triangle Trigonometry Test Review

Trigonometry

Use $\triangle LMN$ to find sin L, cos L, tan L, sin M, cos M, and tan M. Express each ratio as a fraction and as a decimal to the nearest hundredth.



1. $\ell = 15, m = 36, n = 39$

sin L = 15/39 = 5/13 ≈ 0.38

cos L = 36/39 = 12/13 ≈ 0.92

tan L = 15/36 = 5/12 ≈ 0.42

sin M = 36/39 = 12/13 ≈ 0.92

cos M = 15/39 = 5/13 ≈ 0.38

tan M = 36/15 = 12/5 = 2.4

2. $\ell = 12, m = 12\sqrt{3}, n = 24$

sin L = 12/24 = 1/2 = 0.5

cos L = 12√3/24 = √3/2 ≈ 0.87

tan L = 12/12√3 = √3/3 ≈ 0.58

sin M = 12√3/24 = √3/2 ≈ 0.87

cos M = 12/24 = 1/2 = 0.5

tan M = 12√3/12 = √3 ≈ 1.73

Use a calculator to find each value. Round to the nearest ten-thousandth.

3. sin 92.4 — 0.99991

4. tan 27.5 — 0.5206

5. cos 64.8 — 0.4258

Find the measure of each acute angle to the nearest tenth of a degree.

use inverse for these

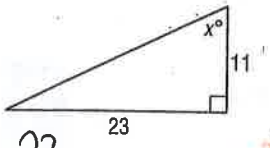
9. sin B = 0.7823 — 51.5

10. tan A = 0.2356 — 13.3

11. cos R = 0.6401 — 50.2

Find x. Round to the nearest tenth.

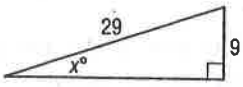
12.



tan x = 23/11

tan⁻¹(23/11) → 64.4°

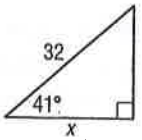
13.



sin = 9/29 → 18.1°

x = sin⁻¹(9/29)

14.



x = 32 cos 41

24.2

cos 41° = x/32

Find each angle measure to the nearest degree.

1) sin B = 0.4848

m∠B = 29°

3) cos A = 0.7431

m∠A = 42°

5) cos A = 0.5878

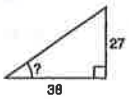
m∠A = 54°

7) cos A = 0.4226

m∠A = 65°

Find the measure of the indicated angle to the nearest degree.

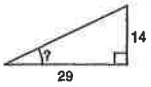
9)



tan x = 27/38

x = 35°

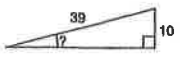
11)



x = 26°

tan x = 14/29

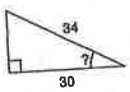
13)



sin x = 10/39

x = 15°

22)

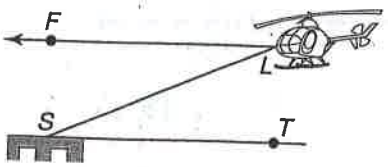


cos x = 30/34

x = 28°

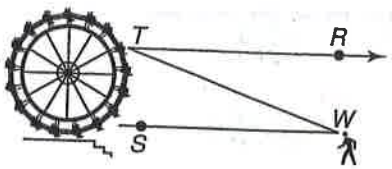
Angles of Elevation and Depression

Name the angle of depression or angle of elevation in each figure.

1. 

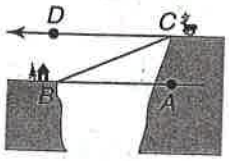
d = ∠FLS

e = ∠TSL

2. 

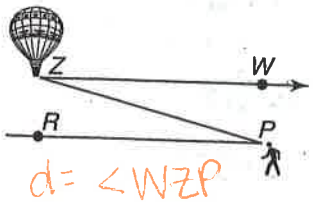
d = ∠RTW

e = ∠SWT

3. 

d = ∠DCB

e = ∠ABC

4. 

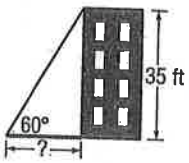
d = ∠WZP

e = ∠RPZ

5. **MOUNTAIN BIKING** On a mountain bike trip along the Gemini Bridges Trail in Moab, Utah, Nabuko stopped on the canyon floor to get a good view of the twin sandstone bridges. Nabuko is standing about 60 meters from the base of the canyon cliff, and the natural arch bridges are about 100 meters up the canyon wall. If her line of sight is five feet above the ground, what is the angle of elevation to the top of the bridges? Round to the nearest tenth degree.

≈ 57.7°

6. **SHADOWS** Suppose the sun casts a shadow off a 35-foot building. If the angle of elevation to the sun is 60°, how long is the shadow to the nearest tenth of a foot?

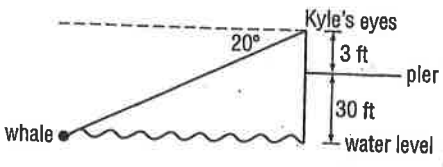


about 20.2 ft

7. **BALLOONING** From her position in a hot-air balloon, Angie can see her car parked in a field. If the angle of depression is 8° and Angie is 38 meters above the ground, what is the straight-line distance from Angie to her car? Round to the nearest whole meter.

about 273 m

8. **INDIRECT MEASUREMENT** Kyle is at the end of a pier 30 feet above the ocean. His eye level is 3 feet above the pier. He is using binoculars to watch a whale surface. If the angle of depression of the whale is 20°, how far is the whale from Kyle's binoculars? Round to the nearest tenth foot.



about 96.5 ft

The Law of Sines

Find each measure using the given measures from $\triangle EFG$. Round angle measures to the nearest tenth degree and side measures to the nearest tenth.

1. If $m\angle G = 14$, $m\angle E = 67$, and $e = 14$, find g. 3.7

2. If $e = 12.7$, $m\angle E = 42$, and $m\angle F = 61$, find f. 10.6

Solve each $\triangle STU$ described below. Round measures to the nearest tenth.

6. $m\angle T = 85$, $s = 4.3$, $t = 8.2$ $m\angle S \approx 31.5$, $m\angle U \approx 63.5$, $u \approx 7.4$

7. $s = 40$, $u = 12$, $m\angle S = 37$ $m\angle T \approx 132.6$, $m\angle U \approx 10.4$, $t \approx 48.9$

The Law of Cosines

In $\triangle JKL$, given the following measures, find the measure of the missing side.

1. $j = 1.3$, $k = 10$, $m\angle L = 77$ $l \approx 9.9$

2. $j = 9.6$, $\ell = 1.7$, $m\angle K = 43$ $K \approx 8.4$

In $\triangle MNQ$, given the lengths of the sides, find the measure of the stated angle to the nearest tenth.

5. $m = 17$, $n = 23$, $q = 25$; $m\angle Q$ 75.7

6. $m = 24$, $n = 28$, $q = 34$; $m\angle M$ 44.2

Determine whether the Law of Sines or the Law of Cosines should be used first to solve $\triangle ABC$. Then sole each triangle. Round angle measures to the nearest degree and side measure to the nearest tenth.

9. $a = 13$, $b = 18$, $c = 19$

Cosines; $m\angle A \approx 41$

$m\angle B \approx 65$, $m\angle C \approx 74$

10. $a = 6$, $b = 19$, $m\angle C = 38$

Cosines; $m\angle A \approx 15$

$m\angle B \approx 127$; $c \approx 14.7$

11. $a = 17$, $b = 22$, $m\angle B = 49$

Sines; $m\angle A \approx 36$

$m\angle C \approx 95$; $c \approx 29$

12. $a = 15.5$, $b = 18$, $m\angle C = 72$

Cosines; $m\angle A \approx 48$

$m\angle B \approx 60$; $c \approx 19.8$

Law of Sines

1. $\frac{\sin 67}{14} = \frac{\sin 14}{g}$ $g \sin 67 = 14 \sin 14$ $g = \frac{14 \sin 14}{\sin 67}$ **g = 3.7**

2. $\frac{\sin 42}{12.7} = \frac{\sin 61}{f}$ $f \sin 42 = 12.7 \sin 61$ $f = \frac{12.7 \sin 61}{\sin 42}$ **f = 16.6**

~~6~~. $\frac{\sin 85}{8.2} = \frac{\sin S}{4.3}$ $4.3 \sin 85 = 8.2 \sin S$ $\sin^{-1}\left(\frac{4.3 \sin 85}{8.2}\right)$ **m∠S = 31.5**

$31.5 + 85 = 116.5$

$180 - 116.5 =$ **63.5 = m∠U**

$\frac{\sin 63.5}{u} = \frac{\sin 85}{8.2}$

$8.2 \sin 63.5 = u \sin 85$

u = 7.4

7. $\frac{\sin 37}{40} = \frac{\sin u}{12}$

$12 \sin 37 = 40 \sin u$

$\sin^{-1}\left(\frac{12 \sin 37}{40}\right)$ **m∠U = 10.4**

$180 - 10.4 - 37$

m∠T = 132.6

$\frac{\sin 132.6}{t} = \frac{\sin 37}{40}$

$t \sin 37 = 40 \sin 132.6$

t = 48.9

Law of Cosines

1. $u^2 = 1.3^2 + 10^2 - 2(1.3)(10)\cos 77 \rightarrow u^2 = 95.84$, $u = 9.8$

2. $k^2 = 9.6^2 + 1.7^2 - 2(9.6)(1.7)\cos 43 \rightarrow k^2 = 71.18$, $k = 8.4$

5. $25^2 = 17^2 + 23^2 - 2(17)(23)\cos Q$

$\frac{625 - 289 - 529}{-2 \cdot 17 \cdot 23} = \frac{-193}{-782} = (.2468)\cos^{-1} =$ **m∠Q = 75.7**

6. $24^2 = 28^2 + 34^2 - 2(28)(34)\cos m$

$\frac{576 - 784 - 1156}{-2 \cdot 28 \cdot 34} = \frac{-1364}{-1904} = (.7163)\cos^{-1}$ **m∠M = 44.2**

9. Given 3 sides - use cosines then choose sin/cos then subtract from 180 to find 3rd ∠.

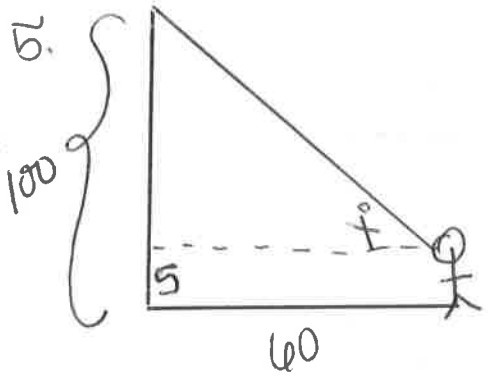
10. SAS so use cos. first

11. Have ratio of $\frac{\sin B}{b}$ so use sines

12. SAS so use cosines first

Angles of Elevation & Depression

5.



$100 - 5 = 95$ m

$\tan x = \frac{95}{60}$

$x = \tan^{-1}(95/60)$

$x \approx 57.7°$

* 100 is height from ground, must subtract out 5 for her eye level.

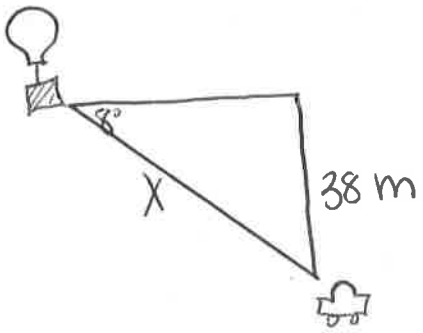
6. $\tan 60 = \frac{35}{x}$

$x \tan 60 = 35$

$x = \frac{35}{\tan 60}$

$x = 20.2$ ft

7.



$\sin 8 = \frac{38}{x}$

$x \sin 8 = 38$

$x = \frac{38}{\sin 8}$

$x \approx 273$ m

8. need to find hypotenuse again, this time his eye level is 3 feet <u>above</u> pier so have to <u>add</u> to pier height

$\sin 20 = \frac{33}{x}$

$x \sin 20 = 33$

$x = \frac{33}{\sin 20}$

$x \approx 96.5$ ft