Pull out your Alg/Geometry Reference Sheet

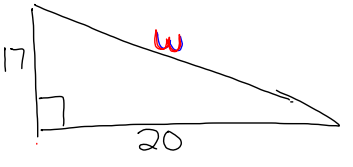
HW Help

Write the following title in your notes:

Right Triangles vs Non-Right Triangles

Warm Up

Use the Pythagorean Theorem to solve for w. Round your answer to 3 decimal places.



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

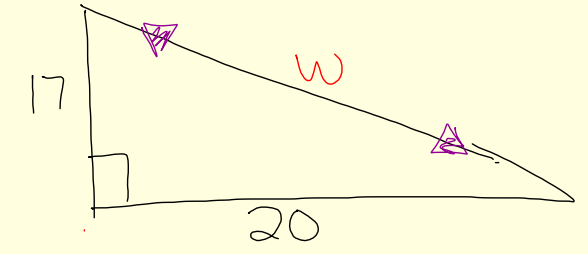
$17^2 + 20^2 = w^2$

$\sqrt{\quad}$ $\sqrt{\quad}$

$w = \sqrt{17^2 + 20^2} = \sqrt{689}$ ← exact

≈ 26.249 ← Approx

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

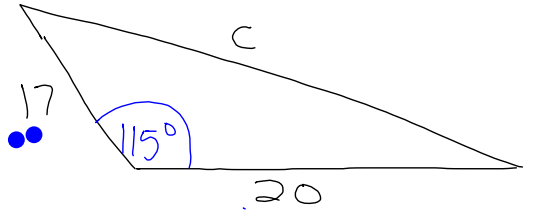


So what would happen if we stretched the hypotenuse?

Law of Cosines

$$c^2 = a^2 + b^2 - 2ab \cdot \cos C$$

side — opposites — angle



$$c^2 = 17^2 + 20^2 - 2(17)(20)\cos(115)$$

$$c^2 = 976.38\ldots$$

$$c = 31.25 \text{ feet}$$

Geometry

in right triangles: Can use both the Pythagorean Theorem $a^2 + b^2 = c^2$ if only dealing with sides

or Soh-Cah-Toa $sine\ A = \frac{opposite}{hypotenuse}$, $cosine\ A = \frac{adjacent}{hypotenuse}$, $tangent\ A = \frac{opposite}{adjacent}$

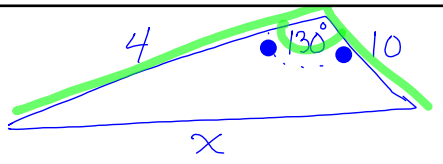
Any right triangle: Law of Sines $\frac{\sin A}{a} = \frac{\sin B}{b}$ where a is the side length opposite angle A, etc.

Law of Cosines $c^2 = a^2 + b^2 - 2ab \cdot cos\ C$ where c is the side length opposite angle C

Law of Cosines $c^2 = a^2 + b^2 - 2ab \cdot cos\ C$

where c is the side length opposite angle C

Try it



SAS

$$x^2 = 4^2 + 10^2 - 2(4)(10)\cos(130^\circ)$$

$$x^2 = 167.42\ldots$$

$$x = 12.94 \text{ feet}$$

Notice the incoming known information is in a SAS format

MORE Later on this topic

Questions on HW

47

$f(x) = \frac{1}{x}$

(a) $f\left(\frac{1}{2}\right) = \frac{1}{\frac{1}{2}} =$

(b) $f\left(\frac{1}{10}\right) =$

(c) $f(.01) = \frac{1}{.01} =$

(d) $f(.007) = \frac{1}{.007} \approx$

48a $x^2 - 8x + 15 = 0$

$(\quad)(\quad) = 0$

x^2	
	15

$-8x$

$1x \quad 15x$
$-1x \quad -15x$
$-3x \quad -5x$
$3x \quad 5x$

48b $2x^2 - 5x - 6 = 0$

can't be factored

$a = 2 \quad b = -5 \quad c = -6$

$2x^2$	
	-6

$-12x^2$

$-5x$

$-1x \quad 12x$
$1x \quad -12x$

$-2x \quad 6x$
$2x \quad -6x$

$-3x \quad 4x$
$3x \quad -4x$

Can't be factored

48b $2x^2 - 5x - 6 = 0$ $a = 2$ $b = -5$ $c = -6$

can't be factored

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(-6)}}{2(2)} = \frac{5 \pm \sqrt{73}}{4}$$

$$x = \frac{(5 + \sqrt{73})}{4} \approx 3.39$$

$$x = \frac{5 - \sqrt{73}}{4}$$

49 $(-5, 0)$ $(0, 3)$

distance formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\sqrt{(-5 - 0)^2 + (0 - 3)^2}$$

$$\sqrt{25 + 9} = \sqrt{34}$$

slope

$$m = \frac{0 - 3}{-5 - 0}$$

$$= \frac{-3}{-5}$$

$$= \frac{3}{5}$$

51

$$4.1x = 9.5x + 23.7$$
$$-4.1x = -4.1x$$
$$5.4x = 23.7$$
$$\frac{5.4x}{5.4} = \frac{23.7}{5.4}$$
$$x = 4.39$$

error is .

52 a $3.9x - 2.1 = 11.2x + 51.7$

52b $\frac{1}{5}x - 2 = \frac{13}{25} - 0.7x$

Agenda: Revisit Trigonometry from Geometry

Right Triangles
- Pythagorean Theorem
- Soh Cah Toa

NOTES

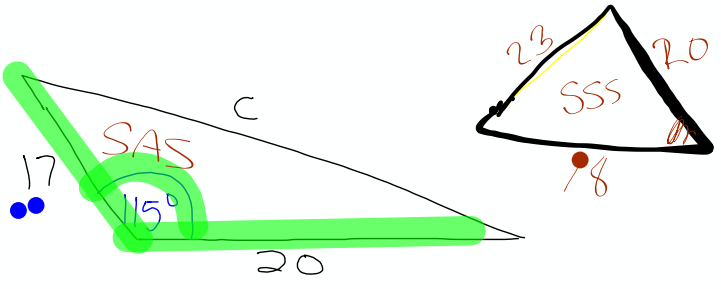
Trig for All triangles
- Law of Sines
- Law of Cosines

LCQ

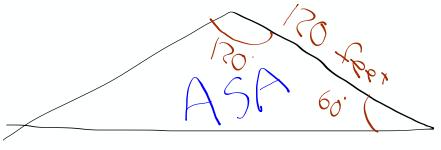
Any triangle

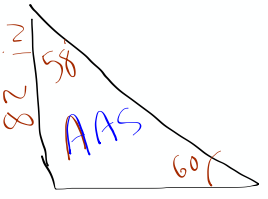
Given SSS → Law of Cosines
SAS

Given SSA → Law of Sines
ASA
AAS



HL
SSA





Remember the Law of Cosines

Geometry

in right triangles: Can use both the Pythagorean Theorem $a^2 + b^2 = c^2$ if only dealing with sides

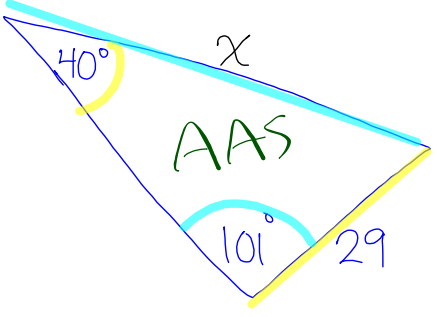
or Soh-Cah-Toa $sine\ A = \frac{opposite}{hypotenuse}$, $cosine\ A = \frac{adjacent}{hypotenuse}$, $tangent\ A = \frac{opposite}{adjacent}$

Any ~~right~~ triangle: Law of Sines $\frac{\sin A}{a} = \frac{\sin B}{b}$ where a is the side length opposite angle A, etc.

SSA ASA AAS

Law of Cosines $c^2 = a^2 + b^2 - 2ab \cdot \cos C$ where c is the side length opposite angle C

SAS SSS



Law of Sines

$$\frac{\sin(40^\circ)}{29} = \frac{\sin(101^\circ)}{x}$$

$$29 \cdot \frac{x}{29} = \frac{\sin(101^\circ)}{\sin(40^\circ)}$$

mult. by 29

$$x = \frac{29 \cdot \sin(101)}{\sin(40)}$$

$$\approx 44.29$$

$$\frac{2}{4} = \frac{6}{12} \qquad \frac{12}{4} = \frac{6}{2}$$

$$\frac{2}{6} = \frac{4}{12}$$

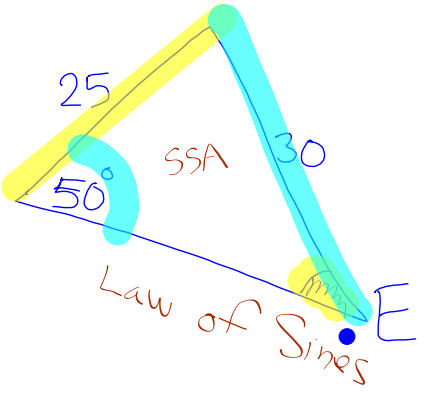
find m∠E

$$\frac{\sin(E^\circ)}{25} = \frac{\sin(50^\circ)}{30}$$

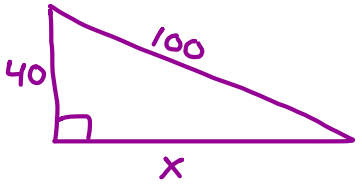
$$\sin(E^\circ) = \frac{25 \cdot \sin(50)}{30}$$

$$E = \sin^{-1}\left(\frac{25\sin(50)}{30}\right)$$

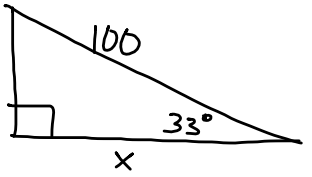
$$\approx 39.67^\circ$$



What is the main difference ?

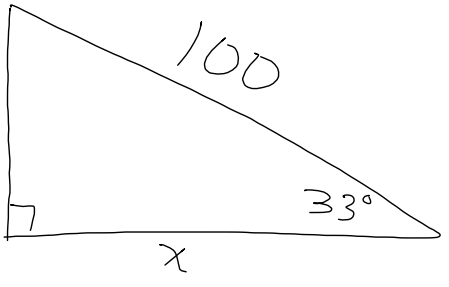


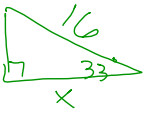
Could use Pythag. Theorem

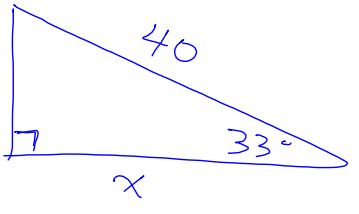


Can't

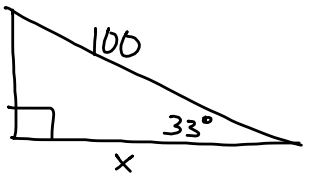
but the ratios of sides in all 33° right triangles are the same!







Use SOH-CAH-TOA to solve for missing lengths.



S
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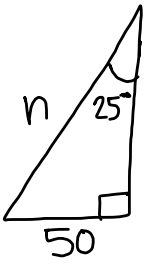
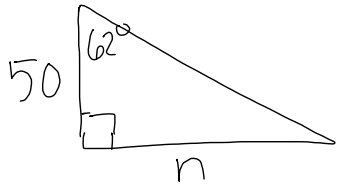
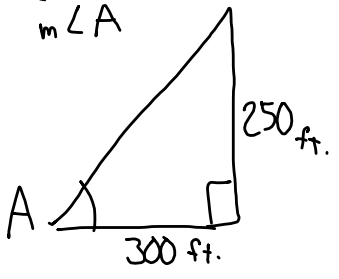
(2)



(3)



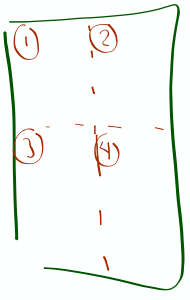
(4) Calculate $m\angle A$



Brain Break

Next: Take LCQ
(learning check quiz)

Then
copy
assignment



front

LCQ

Learning Check Quiz

10 pts

drop lowest 1/3

Back side

Non-graded

Pre-check

for a chapter 2

skill

get some free points on the LCQ if you do your best

TRIANGLE Assignment

- ON separate paper
- Draw diagram
- Solve for missing variable
- Show steps!

① 15, 75°, x

② Solve for B. B, 120 cm, 100 cm

③ 14, y, 130°, 16

④ 140°, 42°, 33°, w