

Directions: Determine if the following side lengths create a right triangle.

7) 20, 21, (29)

$$20^2 + 21^2 = 29^2$$

$$400 + 441 = 841$$

$$841 = 841 \checkmark$$

yes it is
a rt Δ

8) 5, 9, (10)

$$5^2 + 9^2 = 10^2$$

$$25 + 81 = 100$$

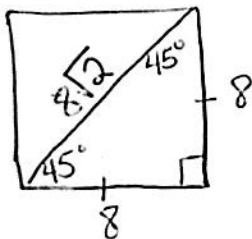
$$106 \neq 100$$

No, it is not
a rt Δ .

Topic 2: Special Right Triangles

Directions: Set up the tables for the 30°-60°-90° or 45°-45°-90° triangles to answer each question. Draw pictures when necessary and label given parts.

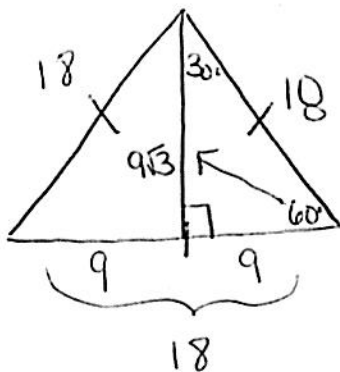
9) Find the length of a diagonal of a square, in simplest radical form, if one side measures 8 centimeters.



45	x	8
45	x	8
90	$x\sqrt{2}$	$8\sqrt{2}$

The diagonal
is $8\sqrt{2}$

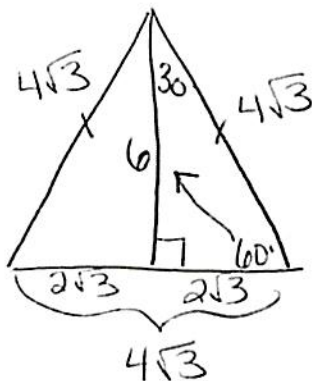
10) The length of the altitude of an equilateral triangle is $9\sqrt{3}$. Find the length of a side of the equilateral triangle.



30	x	9
60	$x\sqrt{3}$	$9\sqrt{3}$
90	2x	18

The side is
18.

11) The altitude of an equilateral triangle is 6 inches. Find the perimeter of the triangle.



30	x	$2\sqrt{3}$
60	$x\sqrt{3}$	6
90	2x	$4\sqrt{3}$

$$P = 4\sqrt{3} + 4\sqrt{3} + 4\sqrt{3}$$

$$P = 12\sqrt{3}$$

$$\frac{x\sqrt{3}}{\sqrt{3}} = \frac{6}{\sqrt{3}}$$

$$x = \frac{6}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{6\sqrt{3}}{3} = 2\sqrt{3}$$

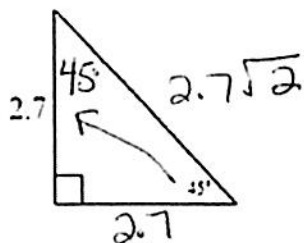
Directions:

Step 1: Fill in the missing angle measures.

Step 2: Fill in the missing side lengths of each triangle using the table we set up in class.

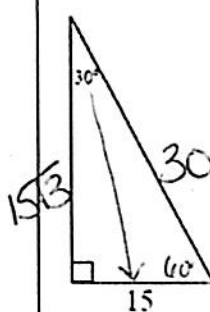
Write your answer in simplest radical form.

12)



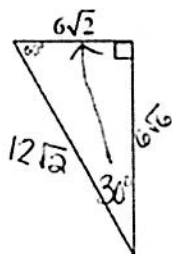
45	x	2.7
45	x	2.7
90	$x\sqrt{2}$	$2.7\sqrt{2}$

13)



30	x	15
60	$x\sqrt{3}$	$15\sqrt{3}$
90	2x	30

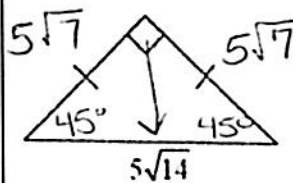
14)



30	x	$6\sqrt{2}$
60	$x\sqrt{3}$	$6\sqrt{6}$
90	2x	$12\sqrt{2}$

$$\begin{array}{l} 6\sqrt{2}\sqrt{3} \\ 6\sqrt{6} \end{array} \quad \begin{array}{l} 2 \cdot 6\sqrt{2} \\ 12\sqrt{2} \end{array}$$

15)



45	x	$5\sqrt{7}$
45	x	$5\sqrt{7}$
90	$x\sqrt{2}$	$5\sqrt{14}$

$$\frac{x\sqrt{2}}{\sqrt{2}} = \frac{5\sqrt{14}}{\sqrt{2}}$$

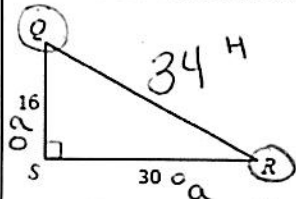
$$x = 5\sqrt{7}$$

Topic 3: Right Triangle Trigonometry

For Sine, Cosine, and Tangent, remember: Soh-Cah-Toa

16)

Directions: Find each trigonometric ratio. Give your answer as a fraction in simplest form.



$$16^2 + 30^2 = x^2$$

$$256 + 900 = x^2$$

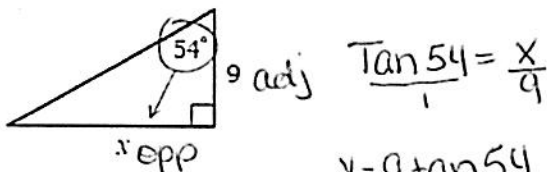
$$\sqrt{1156} = \sqrt{x^2}$$

$$34 = x$$

- $\sin Q = \frac{30}{34} = \frac{15}{17}$ • $\sin R = \frac{16}{34} = \frac{8}{17}$
- $\cos Q = \frac{16}{34} = \frac{8}{17}$ • $\cos R = \frac{30}{34} = \frac{15}{17}$
- $\tan Q = \frac{30}{16} = \frac{15}{8}$ • $\tan R = \frac{16}{30} = \frac{8}{15}$

Directions: Solve for x . Round your answer to the nearest tenth.

17)

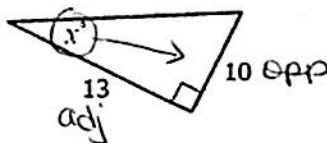


$$\tan 54 = \frac{x}{9}$$

$$x = 9 \tan 54$$

$$x \approx 12.4$$

18)



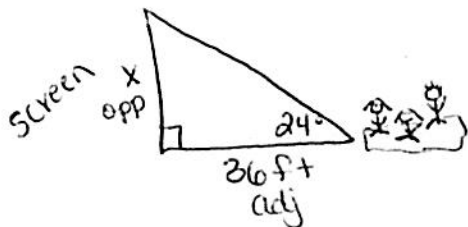
$$\tan x = \frac{10}{13}$$

$$x = \tan^{-1}(10/13)$$

$$x \approx 37.6^\circ$$

19)

The town park does an outdoor movie night every Saturday during the summer on a large screen. Kate is sitting 36 feet from the base of the screen, watching a movie with her family. If the angle of elevation from Kate to the top of the screen is 24° , how tall is the movie screen?

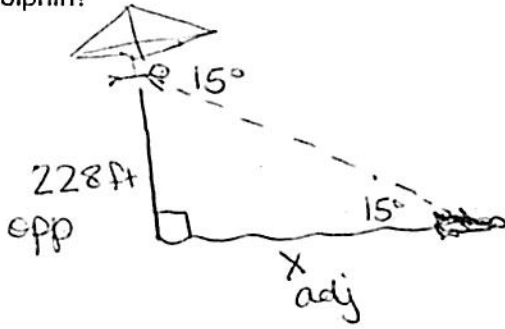


$$\tan 24 = \frac{x}{36}$$

$$x = 36 \tan 24$$

$$x \approx 16 \text{ feet}$$

While parasailing, Ryan spots a dolphin on the water below. If Ryan is 228 feet above the water and the angle of depression to the dolphin is 15° , what is the horizontal distance between Ryan and the dolphin?



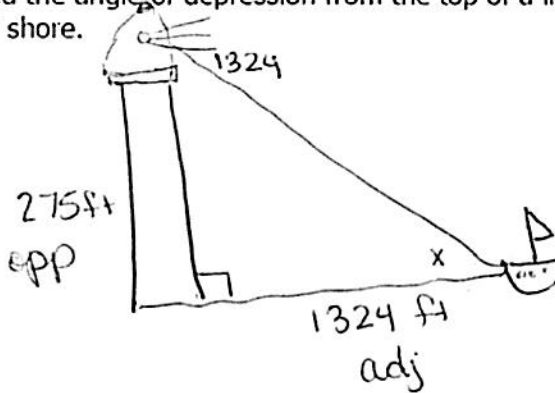
$$\tan 15 = \frac{228}{x}$$

$$x \tan 15 = \frac{228}{\tan 15}$$

$$x \approx 850.9 \text{ ft}$$

21)

Find the angle of depression from the top of a lighthouse 275 feet above water to a boat 1,324 feet off shore.



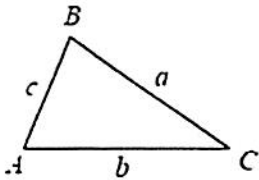
$$\tan x = \frac{275}{1324}$$

$$x = \tan^{-1}(275/1324)$$

$$x \approx 11.7^\circ$$

Topic 4: Law of Sines

Law of Sines



We have practiced using trigonometric ratios to find side lengths and angle measurements in right triangles.

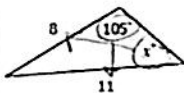
The **Law of Sines** shows the proportional relationship between angles and their opposite sides. It can be used to find side lengths and angle measurements for **any triangle**.

Given $\triangle ABC$:

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Directions: Solve for x. Round to the nearest tenth, if necessary.

22)



$$\frac{\sin x}{8} = \frac{\sin 105}{11}$$

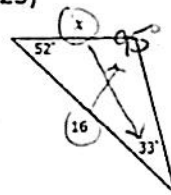
$$\frac{11 \sin x}{11} = \frac{8 \sin 105}{11}$$

$$\sin x = \left(\frac{8 \sin 105}{11} \right)$$

$$x = \sin^{-1} \left(\frac{8 \sin 105}{11} \right)$$

$$x \approx 44.6^\circ$$

23)



$$\frac{\sin 95}{16} = \frac{\sin 33}{x}$$

$$\frac{x \sin 95}{\sin 95} = \frac{16 \sin 33}{\sin 95}$$

$$x \approx 8.7$$

$$52 + 33$$

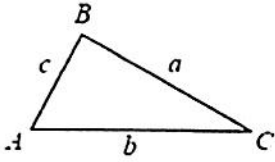
$$85$$

$$180 - 85$$

$$95$$

Topic 5: Law of Cosines

Law of Cosines



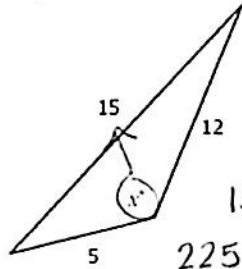
Just like the Law of Sines, the **Law of Cosines** can be used to find side lengths and angle measurements for **any triangle**.

Given $\triangle ABC$:

- $a^2 = b^2 + c^2 - 2bc \cos A$
- $b^2 = a^2 + c^2 - 2ac \cos B$
- $c^2 = a^2 + b^2 - 2ab \cos C$

Directions: Solve for x. Round to the nearest tenth, if necessary.

24)



$$15^2 = 5^2 + 12^2 - 2(5)(12)\cos x$$

$$225 = 25 + 144 - 120\cos x$$

$$225 = 169 - 120\cos x$$

$$-169 - 169$$

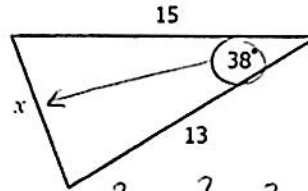
$$\frac{56}{-120} = \frac{-120\cos x}{-120}$$

$$-56/120 = \cos x$$

$$x = \cos^{-1}(-56/120)$$

$$x \approx 117.8$$

25)



$$x^2 = 15^2 + 13^2 - 2(15)(13)\cos 38$$

$$x = \sqrt{15^2 + 13^2 - 2(15)(13)\cos 38}$$

$$x \approx 9.3$$

Mixed Multiple Choice Practice

26) As shown in the diagram below, the angle of elevation from a point on the ground to the top of the tree is 34° .

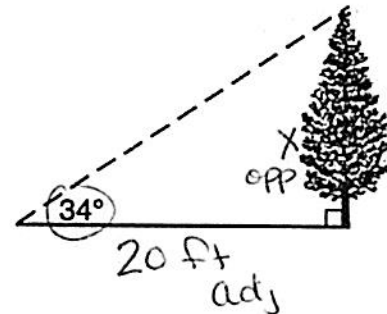
If the point is 20 feet from the base of the tree, what is the height of the tree, to the *nearest tenth of a foot*?

- 1) 29.7
- 2) 16.6
- 3) 13.5
- 4) 11.2

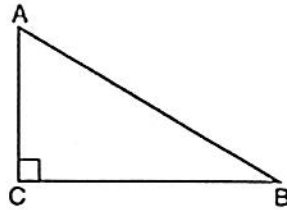
$$\tan 34 = \frac{x}{20}$$

$$x = 20 \tan 34$$

$$x \approx 13.4901..$$



27) In scalene triangle ABC shown in the diagram below, $m\angle C = 90^\circ$.



Which equation is always true?

- 1) $\sin A = \sin B$
- 2) $\cos A = \cos B$
- 3) $\cos A = \sin C$
- 4) $\sin A = \cos B$

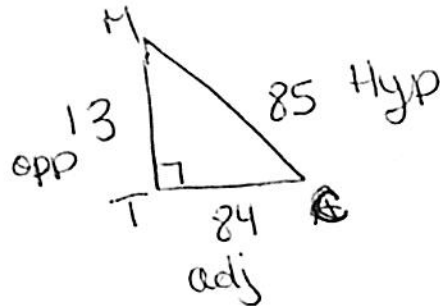
28) In triangle MCT , the measure of $\angle T = 90^\circ$, $MC = 85$ cm, $CT = 84$ cm, and $TM = 13$ cm. Which ratio represents the sine of $\angle C$?

(1) $\frac{13}{85}$

(3) $\frac{13}{84}$

(2) $\frac{84}{85}$

(4) $\frac{84}{13}$



$$\sin C = \frac{\text{opp}}{\text{Hyp}} = \frac{13}{85}$$

