

1) If $\sin(x+10) = \cos(2x-10)$, what is the value of θ ?

$$x+10 + 2x-10 = 90$$

$$\frac{3x}{3} = \frac{90}{3}$$

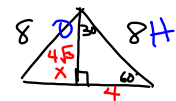
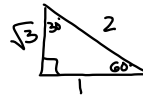
$$x = 30$$

$$\sin(30+10) = \cos(2(30)-10)$$

$$\sin 40 = \cos 50$$

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4) An equilateral triangle has sides of length 8. What is the altitude of this triangle?

$$\frac{\sin 90}{8} = \frac{\sin 60}{x}$$

$$\frac{x \cdot \sin 90}{\sin 90} = \frac{8 \sin 60}{\sin 90}$$

$$x = 6.928$$

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$$\sin 60 = \frac{x}{8}$$

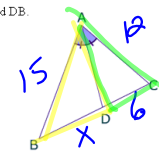
$$x = 8 \cdot \sin 60$$

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5) The angle bisector of an angle splits the opposite side of a triangle into lengths 6 and 7. The perimeter of the triangle is 52. Find the lengths of the other two sides.

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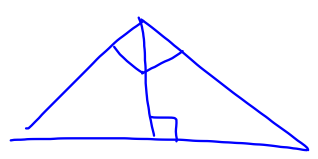
6) Use the information in the diagram given to find DB.



CA	= 12
CD	= 6
BA	= 15
DB	= ?

$$\frac{12}{6} = \frac{15}{x}$$


$$12x = 90$$

$$x = 7.5$$


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7) A 13 ft ladder leans against a wall. The foot of the ladder is 5 ft from the wall.

a. Find the vertical distance from the ground to the point where the top of the ladder touches the wall.




$$5^2 + x^2 = 13^2$$

$$25 + x^2 = 169$$

$$x^2 = 144$$

$$x = 12$$

b. Determine the measure of the angle formed by the ladder and the ground to the nearest degree.

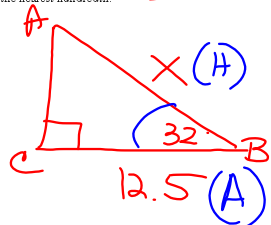


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$$\sin^{-1}\left(\frac{12}{13}\right) = 67^\circ$$

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8) Given right $\triangle ABC$, with right angle C , $BC = 12.5$ and $\angle B = 32^\circ$, find the measure of side AB to the nearest hundredth.



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$$\cos 32 = \frac{12.5}{x}$$

$$\frac{x \cdot \cos 32}{\cos 32} = \frac{12.5}{\cos 32}$$

$$x = 14.74$$

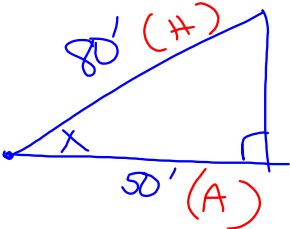
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9) Given $\triangle ABC$, with a right angle at A. If $\angle C = 50$ and $BC = 12$, find the value of AC to the nearest tenth.



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10) A roller coaster travels 80 ft of track from the loading zone before reaching its peak. The horizontal distance between the loading zone and the base of the peak is 50 ft. Model the situation using a right triangle. At what angle is the roller coaster rising according to the model?



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$$\cos X = \frac{50}{80}$$

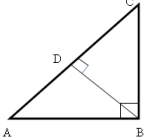
$$X = \cos^{-1}\left(\frac{50}{80}\right)$$

$$X = 51^\circ$$

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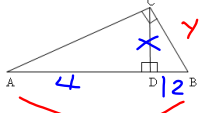
11) Given the $\triangle ABC$ with right angle B, and altitude ED from vertex B to the line containing AC. Determine which of the following are true statements?
 I) $\triangle ABC \sim \triangle ADE$
 II) $\triangle ABC \sim \triangle CDB$
 III) $\triangle ADE \sim \triangle CDB$

1) I only
 2) II only
 3) II & III
 4) I, II, & III



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12) In right triangle ABC shown in the diagram below, an altitude is drawn to the hypotenuse. $AD = 4$ and $DB = 12$. Find the lengths of CD and CB in simplest radical form.



$$\frac{S}{A} = \frac{A}{S}$$

$$\frac{4}{x} = \frac{x}{12}$$

$$x^2 = 48$$

$$x = \sqrt{48}$$

$$\sqrt{16 \cdot 3}$$

$$4\sqrt{3}$$

$$\frac{H}{L} = \frac{L}{S} \quad \frac{16}{y} = \frac{y}{12}$$

$$y^2 = 192$$

$$y = \sqrt{192}$$

$$\sqrt{64 \cdot 3}$$

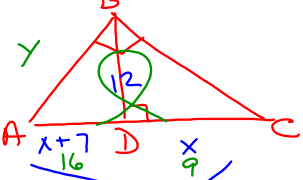
$$8\sqrt{3}$$

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13) In $\triangle ABC$, $\angle C$ is a right angle, and ED is drawn perpendicular to AC. If DC is nine times the length of AD, $ED = 6$, find the length of AC.

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14) Given $\triangle ABC$, $\angle C = 90^\circ$, altitude ED drawn to hypotenuse AC, $AD = x + 7$, $DC = x$ and $ED = 12$. Find the length of AB to the nearest tenth.



$$\frac{S}{A} = \frac{A}{S}$$

$$\frac{x+7}{12} = \frac{12}{x}$$

$$x^2 + 7x - 144 = 0$$

$$(x+16)(x-9) = 0$$

$$x = -16 \text{ or } x = 9$$

$$x = 9$$

$$\frac{H}{L} = \frac{L}{S}$$

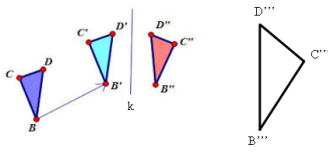
$$\frac{25}{y} = \frac{y}{16}$$

$$y^2 = 400$$

$$y = 20$$

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15) The diagram below displays a sequence of similarity transformations. Which composition rule demonstrates this sequence?



- 1) $D \circ r_k \circ T_{BB'}(\triangle BCD)$
- 2) $D \circ R_k \circ T_{BB'}(\triangle BCD)$
- 3) $T_{BB'} \circ r_k \circ D(\triangle BCD)$
- 4) $T_{BB'} \circ R_k \circ D(\triangle BCD)$

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16) Mike is on a boat going to the Statue of Liberty. The boat is stopped, waiting for other boats to leave Liberty Island. While waiting, Mike is looking at the top of the Statue of Liberty which is 305 feet tall. Mike's angle of elevation is 68 degrees. How far away, to the nearest foot, is the boat from the base of the statue?

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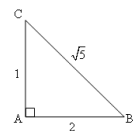
17) Two triangles are similar. The lengths of the sides of the smaller triangle are 8, 15, and 17, and the length of the shortest side of the larger triangle is 18. What is the perimeter of the larger triangle?

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18) The diagram below shows right triangle CAB. Write the following ratios based on the diagram represents the tangent of $\angle D$?

- a) $\sin \angle C$ _____
- b) $\cos \angle C$ _____
- c) $\tan \angle C$ _____

- d) $\sin \angle B$ _____
- e) $\cos \angle B$ _____
- f) $\tan \angle B$ _____



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19) Which of the following will produce an image similar, but not congruent, to the preimage?
 I. A dilation followed by a rotation.
 II. A rotation followed by a reflection.
 III. A reflection followed by a dilation.

- 1) I only
- 2) II only
- 3) I and III only
- 4) I, II, and III

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20) An eagle is perched at the top of a 355 foot cliff. He hungrily gazes at a field rabbit 100 feet from the base of the cliff. What is the angle of depression to the nearest tenth of a degree from the eagle's gaze to the rabbit?

May 4-7:18 AM

21) a) How many miles will the shipmate have to travel directly south before he is directly east of the dock? Round your answer to the nearest mile.

b) How many extra miles does the shipmate travel by going the wrong direction compared to going directly east? Round your answer to the nearest mile.

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22) Precisely describe the sequence of similarity transformations that maps $Z_1 \rightarrow Z_3$.

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23)
 Given: $\overline{DE} \parallel \overline{AB}$
 Prove: $CD \cdot CA = CE \cdot CB$

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Blank space for student work.

May 1-8:33 AM

3) Andrew's kitchen window is in the shape of a square and just got shattered when his brother accidentally threw a baseball through it! The diagonal of his window measured $5\sqrt{2}$ ft. How many square feet will a new window have to be to fit in place of the old one?

$$x^2 + x^2 = (5\sqrt{2})^2$$

$$2x^2 = 50$$

$$x^2 = 25$$

$$x = 5$$

$$A = s \cdot s$$

$$= 5 \cdot 5$$

$$= 25$$

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2) Find θ : $\sin(\theta) = \cos(\theta - 60)$.

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