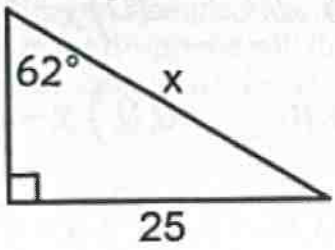
cel Pre-Calculus
.03 Solving Right Triangles Notes

Date: _____

Examples: Find the missing side length using trigonometry (solve for x).

1.



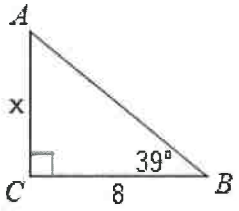
$\sin 62 = \frac{25}{x}$

$x \sin 62 = 25$

$x = \frac{25}{\sin 62}$

$x = 28.31$

2.



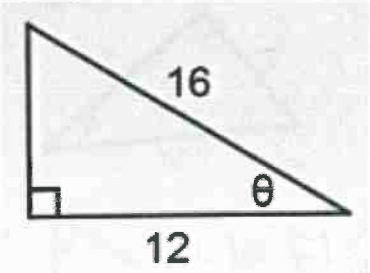
$\tan 39 = \frac{x}{8}$

$x = 8 \tan 39$

$x = 6.48$

Examples: Find the missing angle measure using trigonometry (solve for θ).

3.



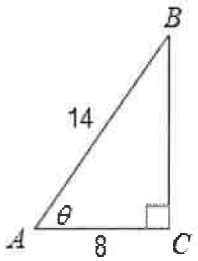
$\cos\theta = \frac{12}{16}$

$\cos^{-1}(\cos\theta) = \cos^{-1}\left(\frac{12}{16}\right)$

$\theta = \cos^{-1}\left(\frac{12}{16}\right)$

$\theta = 41.41°$

4.



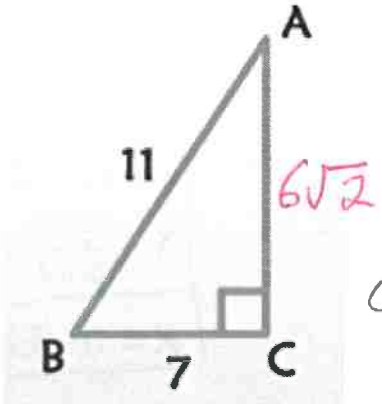
$\cos\theta = \frac{8}{14}$

$\cos^{-1}(\cos\theta) = \cos^{-1}\left(\frac{8}{14}\right)$

$\theta = 55.15°$

Examples: Solve the triangle (find all side lengths and all angle measures).

5.



$7^2 + y^2 = 11^2$

$y^2 = 72$

$y = \sqrt{72} = 6\sqrt{2}$

$\cos\theta = \frac{7}{11}$

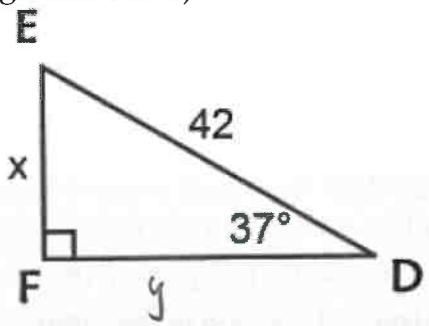
$\theta = 50.48°$

$\angle B = 50.48°$

$\angle A = 180 - 90 - 50.48$

$\angle A = 39.52°$

6.



$\sin 37 = \frac{x}{42}$

$x = 42 \sin 37$

$x = 25.28$

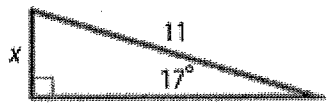
$25.28^2 + y^2 = 42^2$

$y = 33.54$

$\angle E = 53°$

Find the value of x. Round to the nearest tenth, if necessary.
(Example 3)

19.



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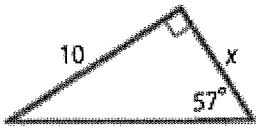

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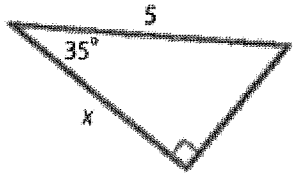

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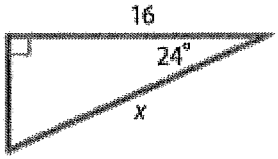

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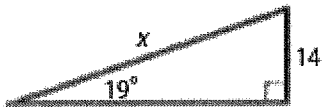

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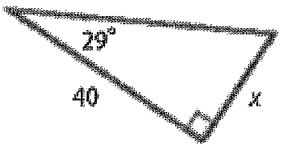

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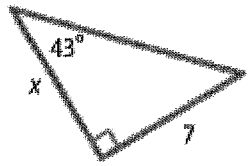

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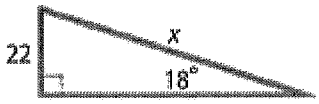


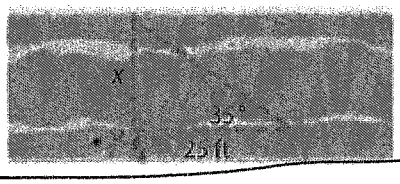
19) $x = 3.2$ 20) $x = 6.5$

21) $x = 4.10$ 22) $x = 17.5$

23) $x = 43.0$ 24) $x = 72.2$

25) $x = 7.5$ 26) $x = 71.2$

27 MOUNTAIN CLIMBING A team of climbers must determine the width of a ravine in order to set up equipment to cross it. If the climbers walk 25 feet along the ravine from their crossing point, and sight the crossing point on the far side of the ravine to be at a 35° angle, how wide is the ravine? (Example 4)



27) $x = 17.51$ ft

$\tan 35 = \frac{x}{25}$

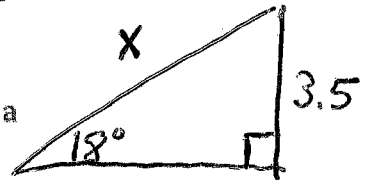
$x = 25 \tan 35$

$x = 17.51$ ft

28. SNOWBOARDING Brad built a snowboarding ramp with a height of 3.5 feet and an 18° incline. (Example 4)

a. Draw a diagram to represent the situation.

b. Determine the length of the ramp.



$\sin 18 = \frac{3.5}{x}$

$x \sin 18 = 3.5$

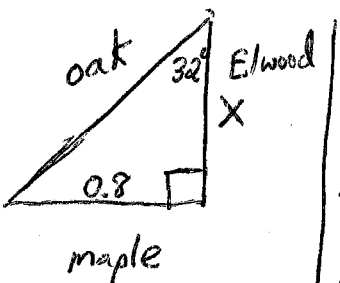
$x = \frac{3.5}{\sin 18}$

$x = 11.33$ ft

29. DETOUR Traffic is detoured from Elwood Ave., left 0.8 mile on Maple St., and then right on Oak St., which intersects Elwood Ave. at a 32° angle. (Example 4)

a. Draw a diagram to represent the situation.

b. Determine the length of the Elwood Ave. that is detoured.

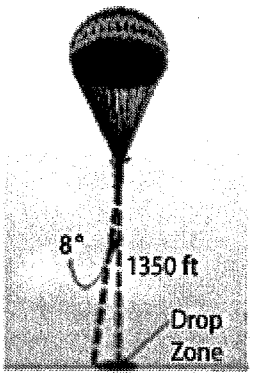


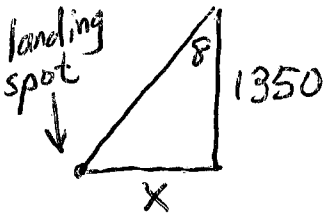
$\tan 32 = \frac{0.8}{x}$

$x \tan 32 = 0.8$

$x = \frac{0.8}{\tan 32} = 1.3$ mi

30. **PARACHUTING** A paratrooper encounters stronger winds than anticipated while parachuting from 1350 feet, causing him to drift at an 8° angle. How far from the drop zone will the paratrooper land? (Example 4)



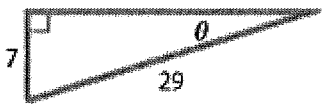


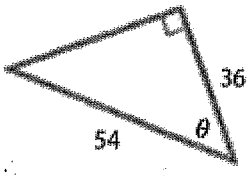
$\tan 8 = \frac{x}{1350}$

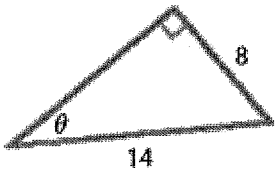
$x = 1350 \tan 8$

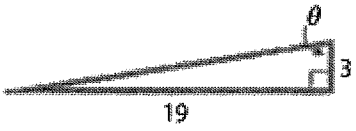
$x = 190$ ft.

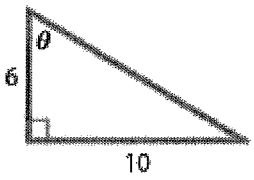
Find the measure of angle θ. Round to the nearest degree, if necessary. (Example 5)

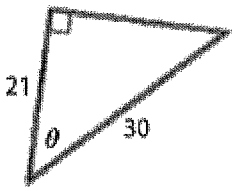
31. 

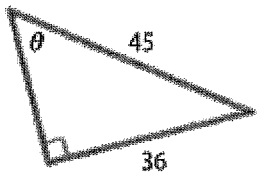
32. 

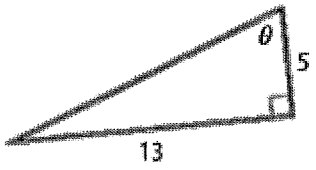
33. 

34. 

35. 

36. 

37. 

38. 

31) $\theta = 14°$ 32) $\theta = 48°$

33) $\theta = 35°$ 34) $\theta = 81°$

35) $\theta = 59°$ 36) $\theta = 46°$

37) $\theta = 53°$ 38) $\theta = 69°$