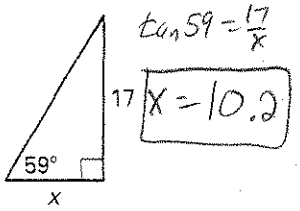
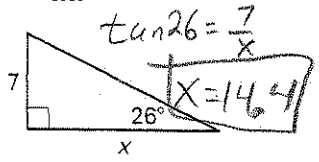
Adv. Geometry 7.5 - Tangent Ratio

Key

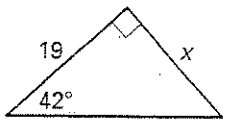
Find the value of *x* to the nearest tenth.

1. 

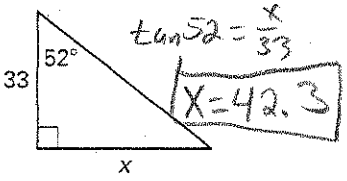
$\tan 59 = \frac{17}{x}$ $X = 10.2$

2. 

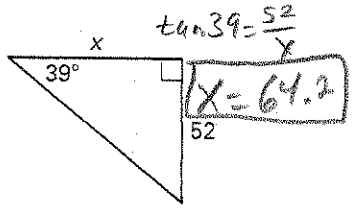
$\tan 26 = \frac{7}{x}$ $X = 14.4$

3. 

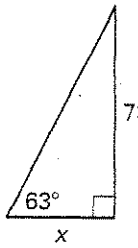
$\tan 42 = \frac{x}{19}$ $X = 17.1$

4. 

$\tan 52 = \frac{x}{33}$ $X = 42.3$

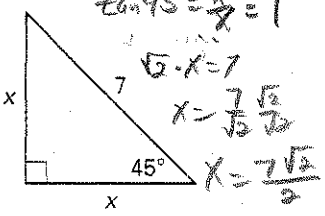
5. 

$\tan 39 = \frac{52}{x}$ $X = 64.2$

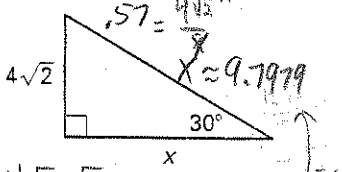
6. 

$\tan 63 = \frac{73}{x}$ $X = 37.2$

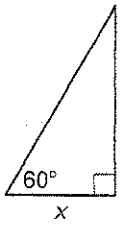
Find the value of *x* using the definition of tangent. Then find the value of *x* using the 45°-45°-90° Triangle Theorem or the 30°-60°-90° Triangle Theorem. *Compare* the results.

7. 

$\tan 45 = \frac{x}{7} = 1$ $x = 7$ $x = \frac{7\sqrt{2}}{2}$

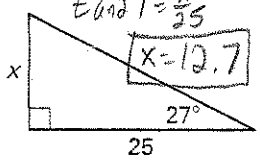
8. 

$\tan 30 = \frac{4\sqrt{2}}{x}$ $.57 = \frac{4\sqrt{2}}{x}$ $x \approx 9.7979$ $x = 4\sqrt{2}\cdot\sqrt{3}$ $4\sqrt{6} \approx 9.7979$

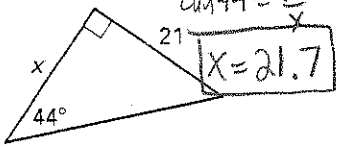
9. 

$\tan 60 = \frac{5\sqrt{7}}{x}$ $x = 7.6376$ $5\sqrt{7} = x\cdot\sqrt{3}$ $\frac{5\sqrt{7}}{\sqrt{3}} = x$ $\frac{5\sqrt{21}}{3} = x \approx 7.6376$

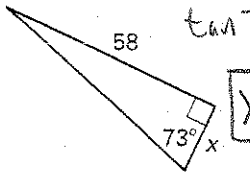
Use a tangent ratio to find the value of *x*. Round to the nearest tenth.

10. 

$\tan 27 = \frac{x}{25}$ $X = 12.7$

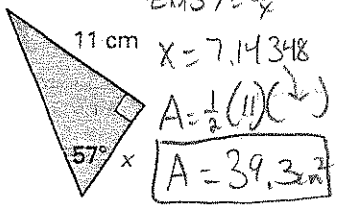
11. 

$\tan 44 = \frac{21}{x}$ $X = 21.7$

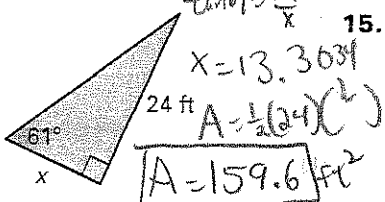
12. 

$\tan 73 = \frac{58}{x}$ $X = 17.7$

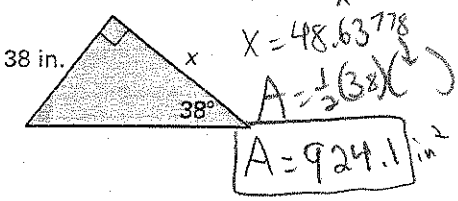
Find the area of the triangle. Round to the nearest tenth.

13. 

$\tan 57 = \frac{11}{x}$ $X = 7.14348$ $A = \frac{1}{2}(11)(\quad)$ $A = 39.3\ m^2$

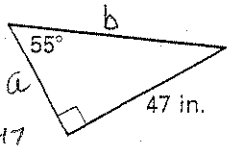
14. 

$\tan 61 = \frac{24}{x}$ $X = 13.3631$ $A = \frac{1}{2}(24)(\quad)$ $A = 159.6\ ft^2$

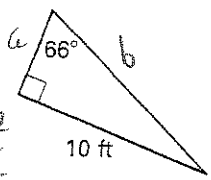
15. 

$\tan 38 = \frac{38}{x}$ $X = 48.63778$ $A = \frac{1}{2}(38)(\quad)$ $A = 924.1\ in^2$

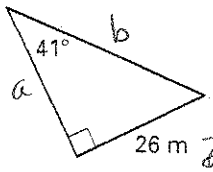
Find the perimeter of the triangle. Round to the nearest tenth.

16. 

$\tan 55 = \frac{47}{a}$ $a = 32.9097$ $(32.9)^2 + 47^2 = b^2$ $b = 57.37$ $P = 137.3\ in$

17. 

$\tan 66 = \frac{10}{a}$ $a = 4.45$ $4.45^2 + 10^2 = b^2$ $b = 10.945$ $P = 25.4\ ft$

18. 

$\tan 41 = \frac{26}{a}$ $a = 29.9096$ $29.9096^2 + 26^2 = b^2$ $b = 39.6305$ $P = 95.5\ m$

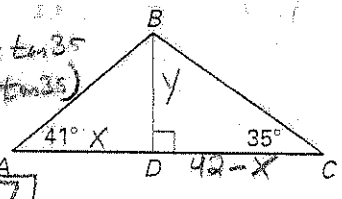
19. Perimeter What is the perimeter of an equilateral triangle with an altitude of 15 inches?

$a\sqrt{3} = 15$

$a = \frac{15}{\sqrt{3}} \frac{\sqrt{3}}{\sqrt{3}} = 5\sqrt{3}$

$b = 10\sqrt{3}$ $P = 30\sqrt{3}$

20. In the diagram to the right, $AC = 42$. What is AD? Round your answer to the nearest tenth.



$\tan 35° = \frac{y}{42-x}$ $\tan 41° = \frac{y}{x}$

$(42-x)\tan 35 = y$ $x \tan 41 = y$

$42\tan 35 - x\tan 35 = x\tan 41$

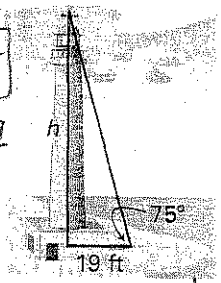
$42\tan 35 = x\tan 41 + x\tan 35$

$42\tan 35 = x(\tan 41 + \tan 35)$

$\frac{42\tan 35}{(\tan 41 + \tan 35)} = x$

$x = 18.7$

In Exercises 21–23, use the figure of the lighthouse.



21. At 2 P.M., the shadow of a lighthouse is 19 feet long and the angle of elevation is 75°. Find the height of the lighthouse.

$\tan 75 = \frac{h}{19}$

$h = 70.9$ Ft

22. At 4 P.M., the angle of elevation of the sun is 40°. Find the length of the shadow cast by the lighthouse.

$\tan 40 = \frac{70.9}{x}$

$x = 84.5$

23. At 6 P.M., will the length of the shadow be longer or shorter than it was at 4 P.M.? *Explain.*

Longer. Sun is at a smaller $\angle$ which enlongates the shadow

In Exercises 24 and 25, use the figure to the right