4.33 a) \[ \frac{50}{5} = 10 \]  
   b) The angle is about 84°, so the tower will not topple.

4.34 a) \[ \angle = 110° \]  
   \[ \theta = 110° \]  
   \[ \frac{\theta}{12} = \frac{1}{5} \]  
   \[ \frac{5\theta}{5} = \frac{12}{5} \]  
   \[ \theta = 2.4 \]  

4.35 a) Yes, then \[ \frac{3}{4} = \frac{4}{a} \]  
   \[ a = 3.4 \]  
   \[ a = 12 \]  
   b) No, \( \Delta y \) is always opposite the slope angle (18° + 32°).
   c) \( \angle = 72° \) is the slope angle, then \( \Delta y = a \), so \( \Delta x = 4 \).
   d) \( \angle = 72° \)  
   \[ \frac{a}{4} = \frac{3}{1} \]  
   \[ a = 3.4 \]  
   \[ a = 12 \]  

4.36 a) \( \frac{\Delta y}{\Delta x} = \frac{5}{8} = 0.625 \)  
   b) \( \frac{\Delta y}{\Delta x} = \frac{5}{8} = 1.6 \)  
   \[ \text{Note the similarity between slope ratios and reciprocals.} \]
   \[ \text{Also recall: } \Delta y \text{ is always opposite the slope angle, } \theta. \]

4.38 a) Yes, always test a new calculator with one you know. Some calculators have you enter 32 degrees to get 32 degrees. While others have you enter Tan, then 32.
   b) Read in math notes about no equation.
   \[ \tan 32° = \frac{5}{8} \]
The Tangent Ratio

The change in $y$ ($\Delta y$) is always opposite to slope $\theta$.
The change in $x$ ($\Delta x$) is always opposite to $\theta$.

$\tan (\text{slope angle } \theta) = \frac{\Delta y}{\Delta x}$

$\tan \theta = \frac{\Delta y}{\Delta x} = \frac{\text{opposite leg}}{\text{adjacent leg}}$

When solving, $\tan \theta$ can be treated as $\frac{\Delta y}{\Delta x}$ if it is $\frac{x}{y}$ and just use algebra. See 4-37 for an example.
4.14 (continued)

4.39 a) \( \tan 8^\circ = \frac{\text{opposite}}{\text{adjacent}} = \frac{8}{2} = 4 \)

b) \( \tan 75^\circ = \frac{12}{\text{adjacent}} \)

\[ p(\tan 75^\circ) = 12 \]

\[ 60(\tan 60^\circ) = b \]

\[ b = 189.505 \]

\[ p = \frac{12}{\tan 75^\circ} \]

\[ p \approx 3.215 \]

4.40 a) By Pythagorean Theorem:

\[ x^2 + 15^2 = 50^2 \]

\[ x^2 = 30^2 - 18^2 \]

\[ x^2 = 900 - 324 \]

\[ x^2 = 576 \]

\[ x = \sqrt{576} = 24 \]

b) \( \sin \angle ABC = 360^\circ \)

\[ x + 2x + 2x + 20 + 3x + 20 = 360 \]

\[ 8x + 40 = 360 \]

\[ \frac{8x}{8} = \frac{320}{8} \]

\[ x = 40^\circ \]

\[ \frac{x}{12} = \frac{3}{5} \]

\[ x = \frac{360}{5} = 72 \]

4.41) Two congruent triangles, may be similar by SSS and have side ratios of 1.

\[ \frac{3}{3} = 1 \]

\[ \frac{5}{5} = 1 \]

\[ \frac{7}{7} = 1 \]

\[ \triangle ASD \sim \triangle FGH \]

SSS

4.42) 24 possible ways:

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4.43) Mary's Farm's eyes are \( x + 32'' \) from the ground.

\[ \tan 65^\circ = \frac{x}{15} \]

\[ x = 15(\tan 65^\circ) = 37.126'' \]

So, Mary's Farm's Eyes are \( 37.126 + 32 = 69.126 \) inches high.
Check Point # 4

4-44  a) \( A = bh \)
    \[ P = 2(16) + 2(10) = 60 \]
    \[ A = 16 \times 9 = 144 \text{ cm}^2 \]
    \[ P = 52 \text{ cm} \]

    a. Parallelogram

    \[ A = 144 \text{ cm}^2, P = 52 \text{ cm} \]

    b. Trapezoid

    \[ A = \frac{1}{2} (b_1 + b_2) \cdot h \]
    \[ P = 21 + 25 + 24 + 44.67 \]
    \[ P = 114.67 \text{ m} \]

    \[ A = \frac{1}{2} (25 + 44.67) \cdot 20 = \frac{1}{2} (69.67) \cdot 20 = 696.7 \text{ m}^2 \]

    \[ A = 696.67 \text{ m}^2, P = 114.67 \text{ m} \]

b) \[ P = 21 + 25 + 24 + 44.67 \]
    \[ P = 114.67 \text{ m} \]

    b) \[ A = \frac{1}{2} (b_1 + b_2) \cdot h \]
    \[ P = \frac{1}{2} (25 + 44.67) \cdot 20 = \frac{1}{2} (69.67) \cdot 20 = 696.7 \text{ m}^2 \]

    \[ A = 696.67 \text{ m}^2, P = 114.67 \text{ m} \]

72 sq cm, \( P = 48 \text{ cm} \)

\[ A = 72 \text{ sq cm}, P = 48 \text{ cm} \]

\[ A = 130 \text{ sq feet}, P = 58 \text{ feet} \]

c) \[ P = 2 + 3 + 5 + 3 + 2 + 9 + 3 + 2 + 2 \]
    \[ P = 48 \text{ cm} \]

    \[ A = 2 \times \begin{array}{c} \frac{3}{6} \\ \frac{1}{3} \end{array} + \begin{array}{c} 9 \\ 6 \end{array} + 2 + \begin{array}{c} 3 \\ 2 \end{array} \]
    \[ A = 2(3) + 6(9) + 3(2) + 3(2) = 6 + 54 + 6 + 6 \]
    \[ A = 72 \text{ sq cm} \]

\[ A = 72 \text{ sq cm} \]

DID YOU REMEMBER THE UNITS OF MEASURE!