

BY: STUDY-HACK.COM

MAKING & USING A STUDY GUIDE

Personal Math Trainer

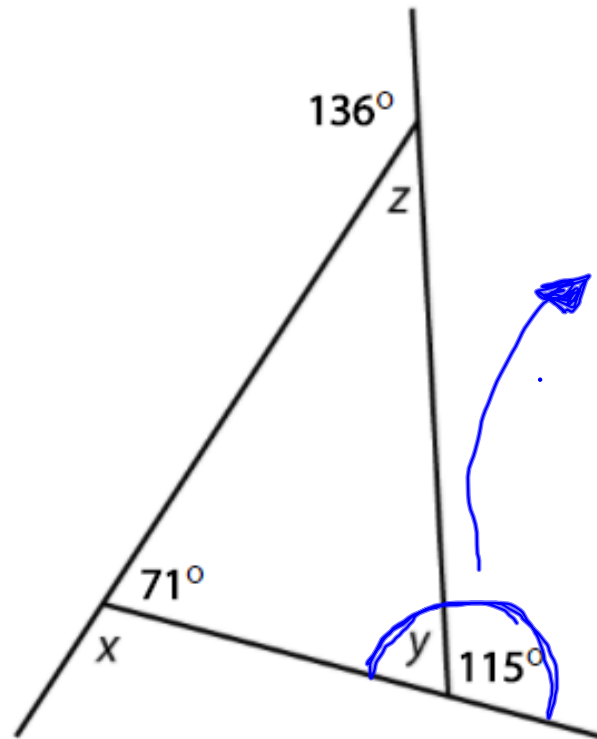
Review: Exam-3: Proofs with Triangles and
Quadrilaterals

HMH

Study Guide: helps you ① summarize,
② visualize, and analyze ③
concepts learned in class

* Warning: simply making a study guide
does not guarantee you an
A+ on the test.

1. Find the measure of the angle in the image.



Definition of supplementary angles.

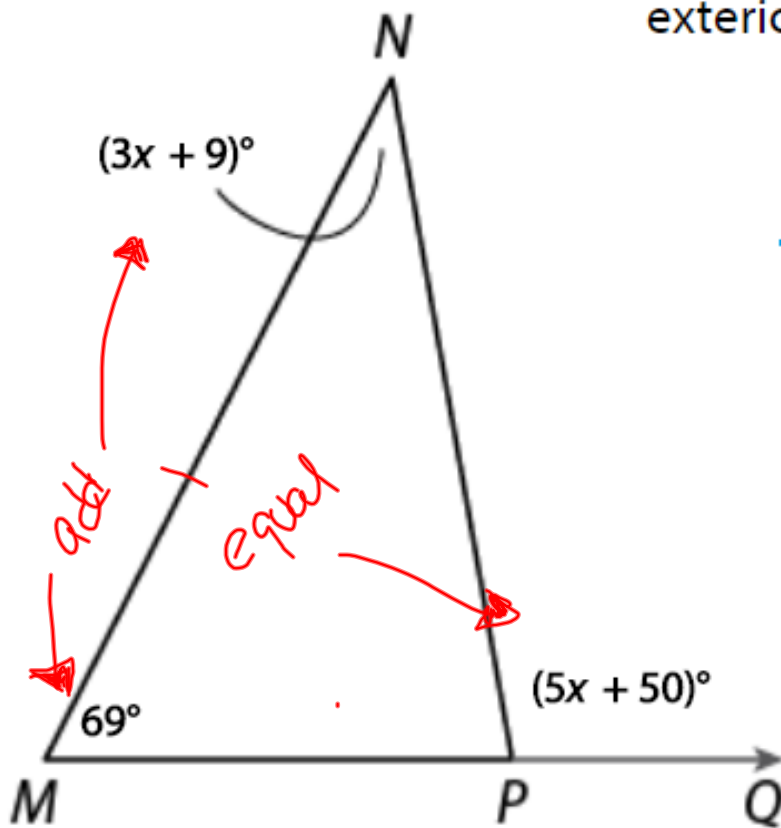
$$m \angle y + 115^\circ = 180^\circ$$

$$- 115^\circ \quad - 115^\circ$$

$$m \angle y = 65^\circ \quad \text{Solve for } m \angle y.$$

$$m \angle y = \boxed{65}^\circ$$

2. Determine $m\angle N$ in $\triangle MNP$.



exterior and remote interior angles.

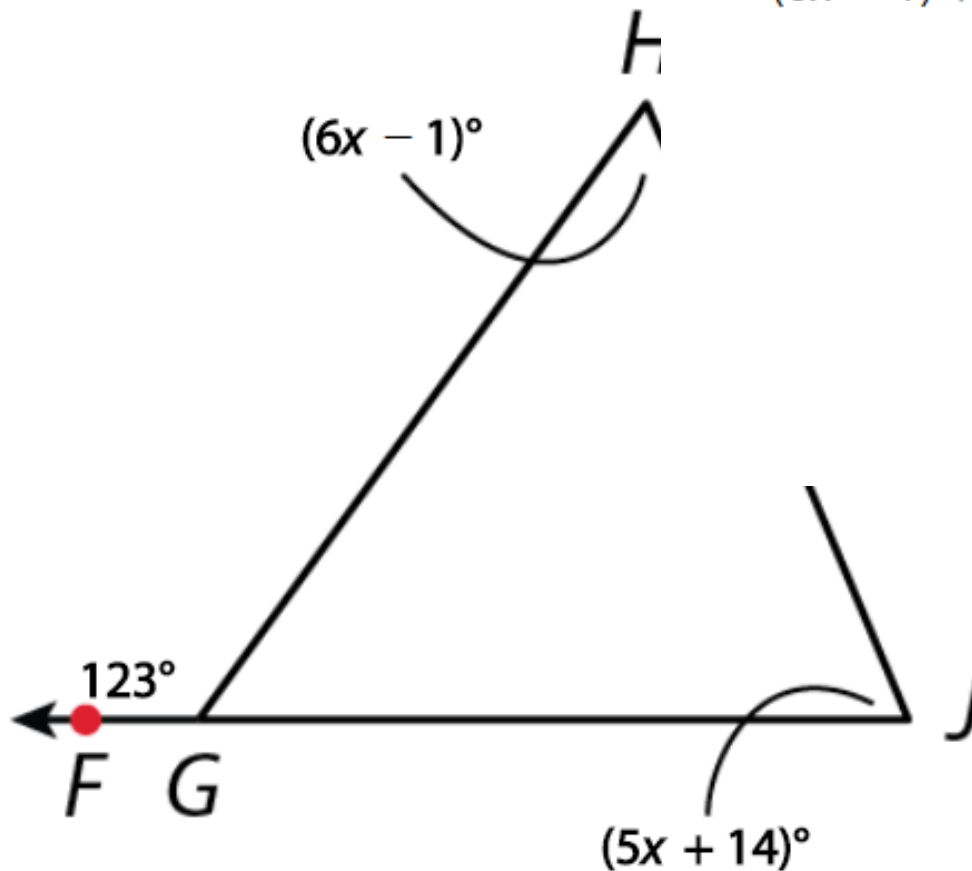
$$\begin{aligned}
 5x + 50 &= (3x + 9) + 69 \\
 \cancel{5x + 50} &= \cancel{3x} + 78 \\
 \hline
 \cancel{2x} &= \frac{28}{2} \\
 x &= 14
 \end{aligned}$$

for $m\angle N$.

$$\begin{aligned}
 (3x + 9)^\circ &= (3(14) + 9)^\circ \\
 &= 51^\circ
 \end{aligned}$$

$$m\angle N = 51^\circ$$

3. Find $m\angle H$.



the exterior and remote interior angles.

$$(6x - 1) + (5x + 14) = 123$$

$$\begin{array}{r} 11x + 13 = 123 \\ -13 \quad -13 \\ \hline \end{array}$$

$$11x = 110$$

$$x = 10$$

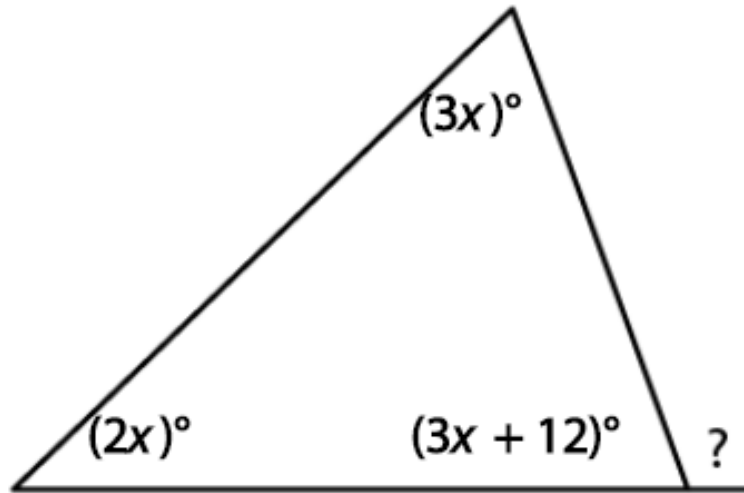
for $m\angle H$.

$$(6x - 1)^\circ = (6(10) - 1)^\circ$$

$$m\angle H = 59^\circ$$

$$m\angle H = \boxed{59}^\circ$$

4. Determine the measure of the indicated exterior angle in the diagram.



the exterior and remote interior angles.

$$180 - (3x + 12) = 3x + 2x$$

$$\begin{array}{r} 180 - 3x - 12 = 5x \\ + 3x \qquad \qquad + 3x \\ \hline \end{array}$$

$$\frac{168}{8} = \frac{8x}{8}$$

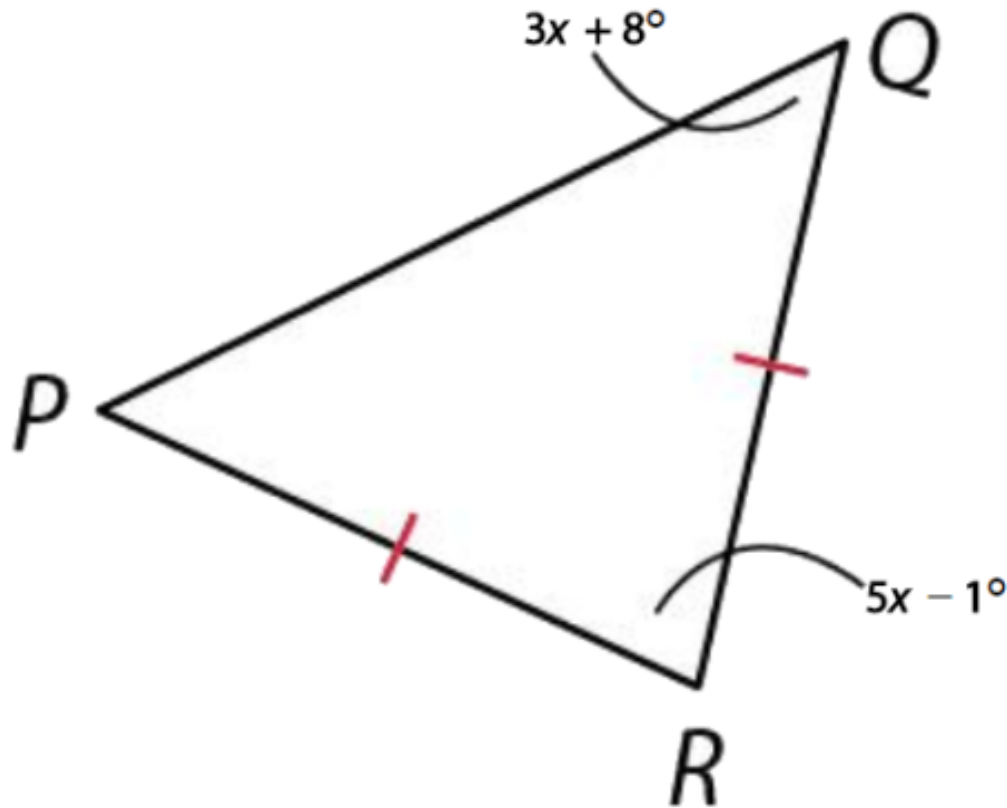
$$21 = x$$

indicated exterior angle measure.

$$\begin{aligned} & 180 - (3x + 12) \\ &= 180 - (3(21) + 12) \\ &= 105^\circ \end{aligned}$$

The indicated exterior angle measures 105°.

5. Find the angle measure.



$$m\angle P = \boxed{53}^\circ$$

Isosceles Triangle Theorem

$$m\angle P = m\angle Q = (3x + 8)^\circ$$

Triangle Sum Theorem

$$m\angle P + m\angle Q + m\angle R = 180^\circ$$

Same

$$(3x + 8) + (5x - 1) = 180$$

$$6x + 16 + 5x - 1 = 180$$

$$\begin{array}{r} 11x + 15 = 180 \\ -15 \quad -15 \\ \hline \end{array}$$

$$11x = 165$$

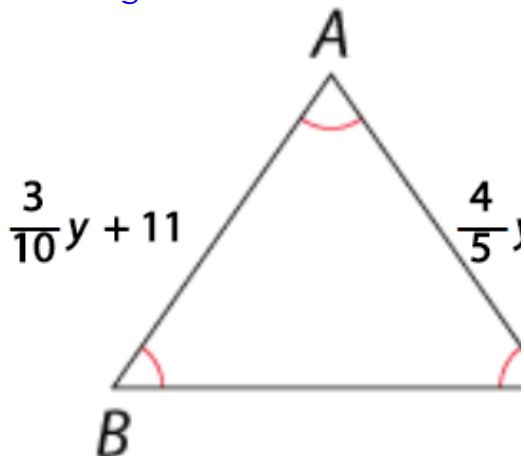
$$x = 15$$

$$\text{So, } m\angle P = (3x + 8)^\circ$$

$$= (3(15) + 8)^\circ$$

$$= 53^\circ$$

6. Katie's tutorial service is going so well that she is having shirts made with the equilateral triangle emblem. She has given the t-shirt company these dimensions. What is the length of each side of the triangle in centimeters?



Definition of congruence
Equilateral Triangle

$$AB = AC$$

$$\frac{3}{10}y + 11 = \frac{4}{5}y - 4$$

$$-\frac{4}{5}y - 11 \quad -\frac{4}{5}y - 11$$

$$-\frac{1}{2}y = -15$$

$$y = 30$$

$$\frac{3}{10} - \frac{4}{5} = \frac{2}{5}$$

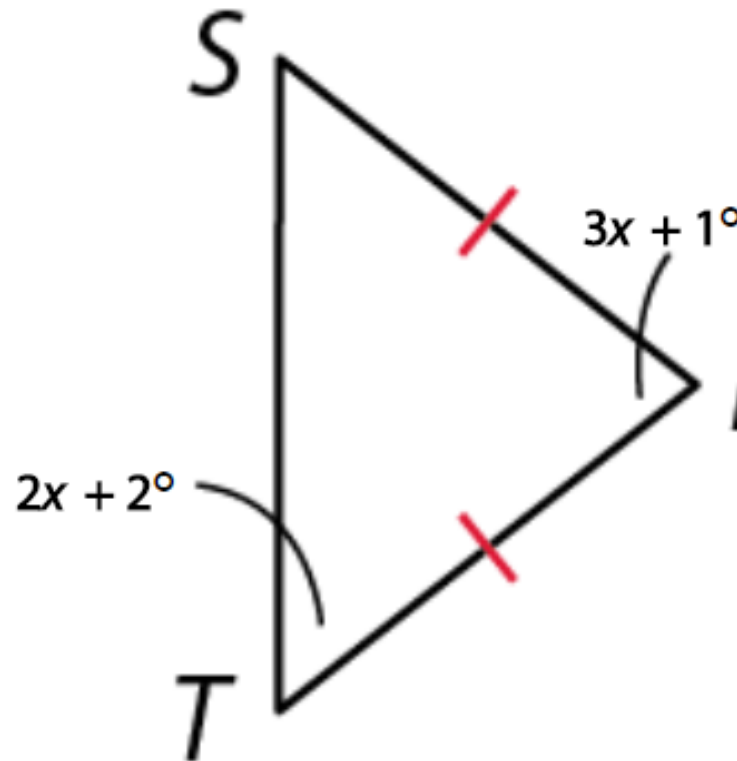
$$\frac{3}{10} - \frac{8}{10} = -\frac{5}{10} = -\frac{1}{2}$$

Substitute 30 for y into $\frac{3}{10}y + 11$.

$$\frac{3}{10}(30) + 11 = 20$$

The length of each side of the triangle is 20 centimeters.

7. Find the measure of the indicated angle.



$$m \angle R = \boxed{76}^\circ$$

Isosceles Triangle Theorem

$$m \angle S = m \angle T = (2x + 2)^\circ$$

Triangle Sum Theorem

$$m \angle R + m \angle S + m \angle T = 180^\circ$$

$$(3x + 1) + 2(2x + 2) = 180$$

$$3x + 1 + 4x + 4 = 180$$

$$7x + 5 = 180$$

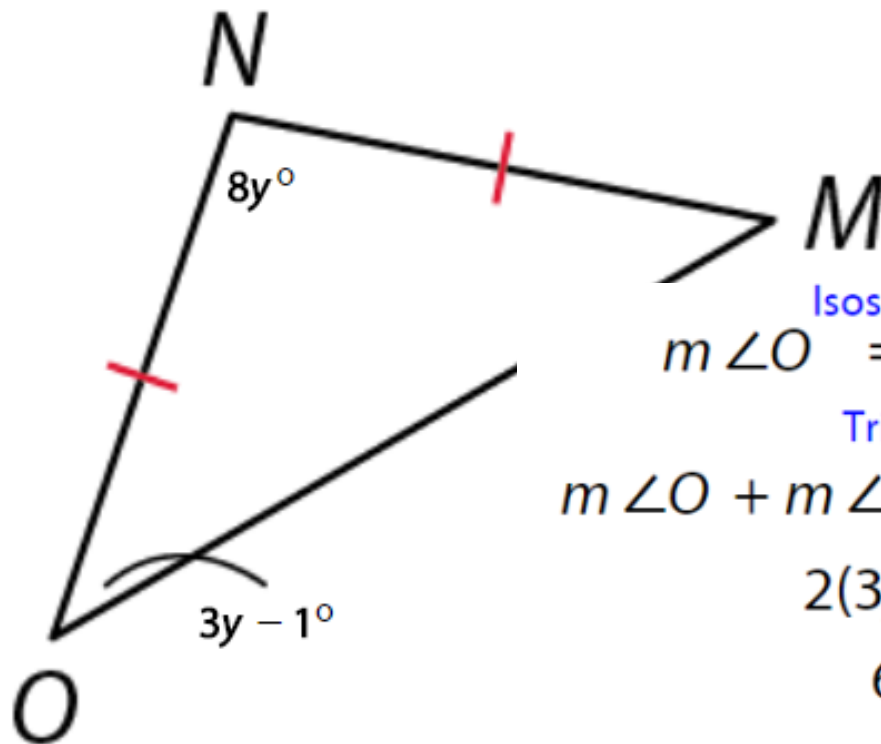
$$7x = 175$$

$$x = 25$$

$$\text{So, } m \angle R = (3x + 1)^\circ$$

$$= (3(25) + 1)^\circ = 76^\circ.$$

8. Find the measure of the indicated angle.



$$m\angle O = \boxed{38}^\circ$$

Isosceles Triangle Theorem

$$m\angle O = m\angle M = (3y - 1)^\circ$$

Triangle Sum Theorem

$$m\angle O + m\angle M + m\angle N = 180^\circ$$

$$2(3y - 1) + 8y = 180$$

$$6y - 2 + 8y = 180$$

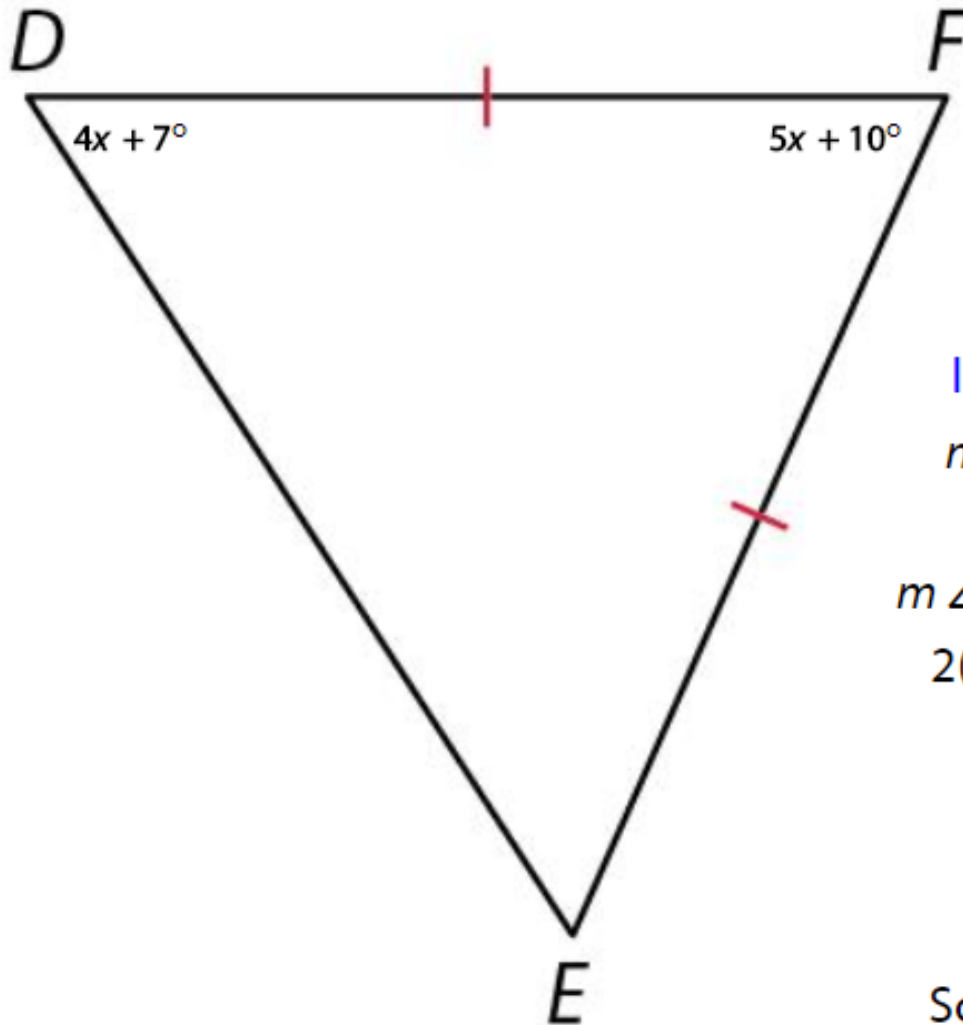
$$14y - 2 = 180$$

$$14y = 182$$

$$y = 13$$

$$\begin{aligned} \text{So, } m\angle O &= (3y - 1)^\circ \\ &= (3(13) - 1)^\circ = 38^\circ \end{aligned}$$

9. Find the measure of the indicated angle.



Isosceles Triangle Theorem

$$m\angle D = m\angle E = (4x + 7)^\circ$$

Triangle Sum Theorem

$$m\angle D + m\angle E + m\angle F = 180^\circ$$

$$2(4x + 7) + (5x + 10) = 180$$

$$8x + 14 + 5x + 10 = 180$$

$$13x + 24 = 180$$

$$13x = 156$$

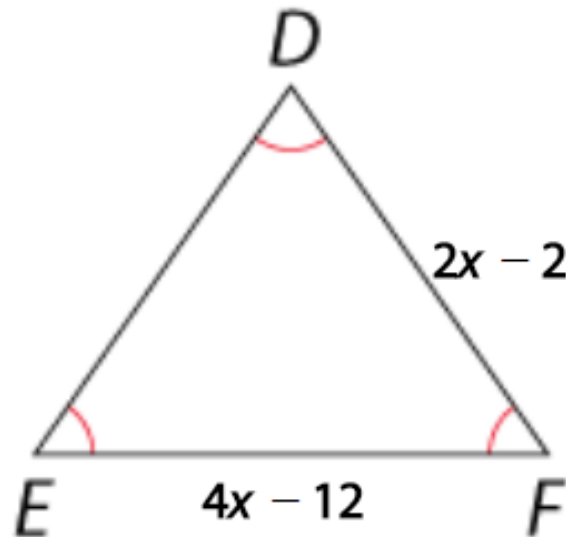
$$x = 12$$

$$\text{So, } m\angle E = (4x + 7)^\circ$$

$$= (4(12) + 7)^\circ = 55^\circ.$$

$$m\angle E = \boxed{55}^\circ$$

10. Find the length of the indicated side.



The length of side \overline{DE} is .

Definition of congruence
Equilateral Triangle Theorem

$$DF = EF$$

$$2x - 2 = 4x - 12$$

$$-2 = 2x - 12$$

$$10 = 2x$$

$$5 = x$$

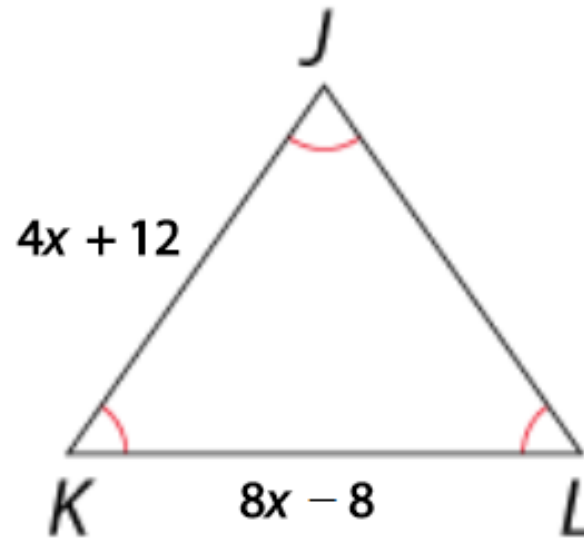
Substitute 5 for x .

$$DE = EF$$

$$DE = 4(5) - 12$$

$$DE = 8$$

11. Find the length of the indicated side.



The length of side \overline{KL} is 32.

Definition of congruence
Equilateral Triangle Theorem

$$JK = KL$$

$$4x + 12 = 8x - 8$$

$$12 = 4x - 8$$

$$20 = 4x$$

$$5 = x$$

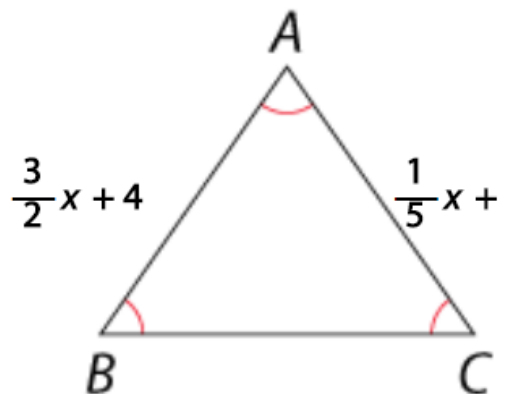
Substitute 5 for x .

$$KL = 8x - 8$$

$$KL = 8(5) - 8$$

$$KL = 32$$

12. Find the length of the indicated side



Definition of congruence
Equilateral Triangle

$$AB = AC$$

$$\frac{3}{2}x + 4 = \frac{1}{5}x + 9$$

$$\frac{3}{2}x = \frac{1}{5}x + 5$$

$$\frac{13}{10}x = 5$$

$$x = \frac{50}{13}$$

$$\frac{5}{5} \frac{3}{2} - \frac{1}{5} \frac{2}{2} = \frac{15}{10} - \frac{2}{10}$$

The length of side \overline{AB} is $\frac{127}{13}$

Substitute $\frac{50}{13}$ for x .

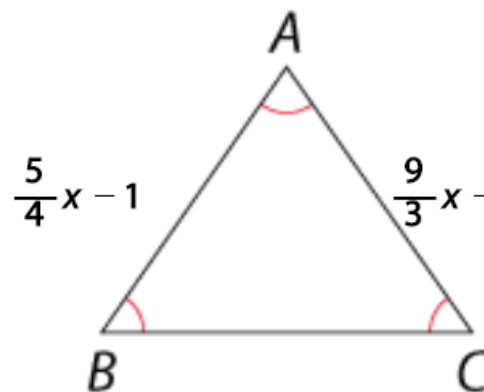
$$AB = \frac{3}{2}x + 4$$

$$AB = \frac{3}{2} \left(\frac{50}{13} \right) + \frac{4}{1}$$

$$AB = \frac{75}{13} + \frac{4}{1} \frac{13}{13}$$

$$AB = \frac{75}{13} + \frac{52}{13} = \frac{127}{13}$$

13. Find the length of the indicated



Definition of congruence
Equilateral Triangle Theorem

$$AB = AC$$

$$\frac{5}{4}x - 1 = \frac{9}{3}x - 3$$

$$\frac{5}{4}x = \frac{9}{3}x - 2$$

$$-\frac{9}{3}x = -\frac{9}{3}x - 2$$

$$-\frac{21}{21}x = -2 \frac{-12}{21}$$

$$x = \frac{24}{21} \div \frac{3}{3}$$

$$x = \frac{8}{7}$$

$$\frac{3}{3} \frac{5}{4} - \frac{9}{3} \frac{4}{4}$$

$$\frac{15}{12} - \frac{36}{12}$$

The length of side \overline{BC} is $\frac{3}{7}$

Substitute $\frac{8}{7}$ for x .

$$BC = \frac{5}{4}x - 1$$

$$BC = \frac{5}{4}\left(\frac{8}{7}\right) - 1$$

$$BC = \frac{10}{7} - \frac{7}{7} = \frac{3}{7}$$

The length of side \overline{BC} is $\frac{3}{7}$.

14. Find the measure.

VY

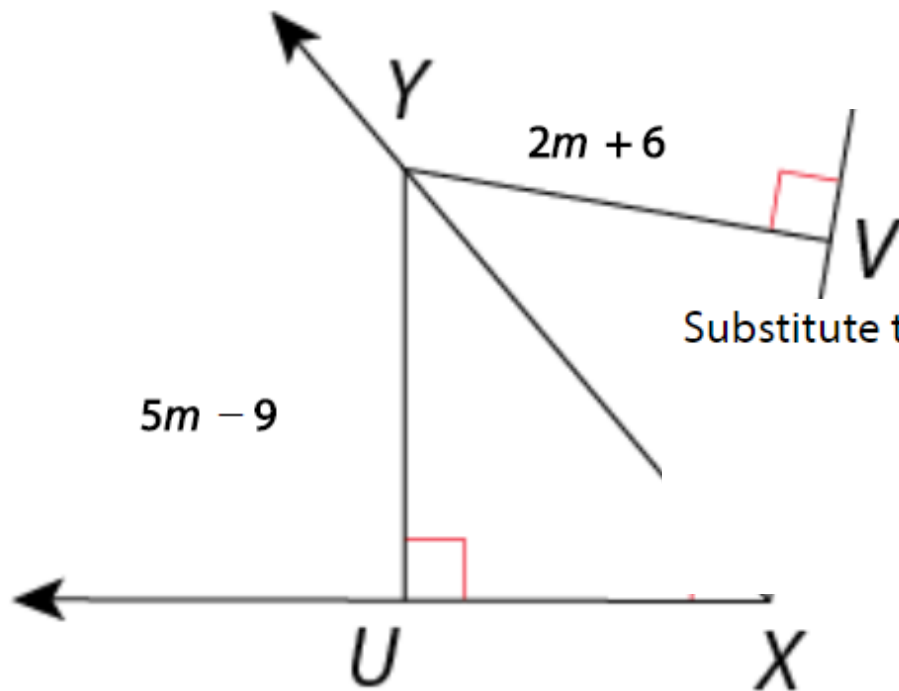
By the Angle Bisector Theorem,

$VY = YU$, so:

$$\frac{2m + 6}{-5m} = \frac{5m - 9}{-5m - 6}$$

$$\frac{-3m}{-3} = \frac{-15}{-3}$$

$$m = 5$$



Substitute the value of m to find VY .

$$VY = 2m - 6$$

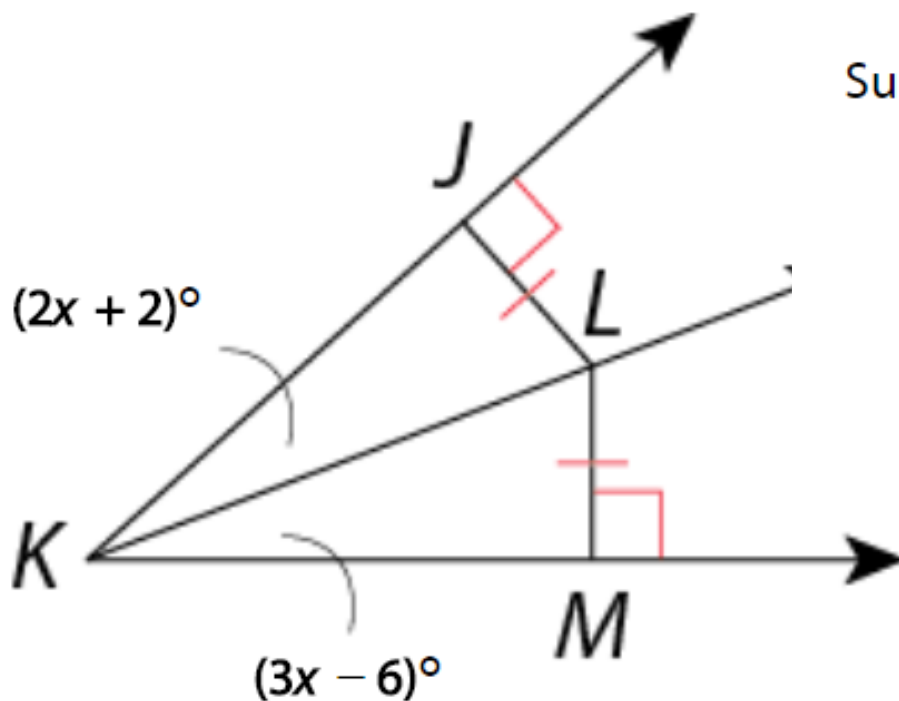
$$VY = 2(5) - 6$$

$$VY = 16$$

The measure of VY is .

15. Find the measure.

$m\angle JKL$



The measure of $\angle JKL$ is $^\circ$.

definition of angle bisector,

$$m\angle JKL = m\angle MKL.$$

$$\begin{array}{r} 2x + 2 = 3x - 6 \\ -3x \quad -2 \quad -3x \quad -2 \\ \hline \end{array}$$

$$x = 8$$

Substitute x to solve for $m\angle JKL$.

$$m\angle JKL = 2(x) + 2$$

$$m\angle JKL = 2(8) + 2$$

$$m\angle JKL = 18^\circ$$