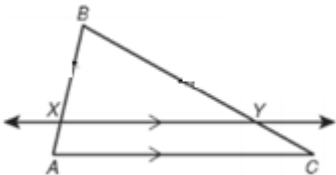
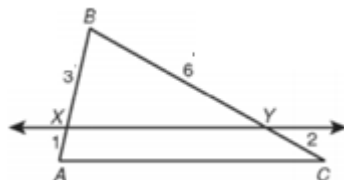




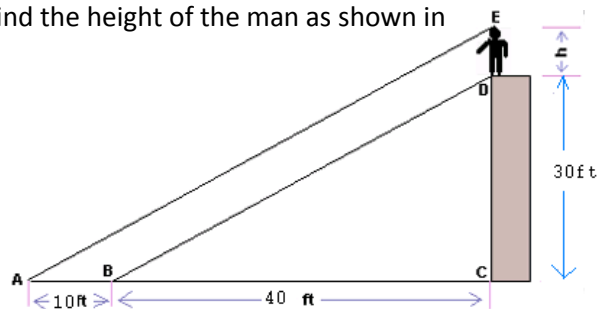
- I can use proportions with a triangle or with parallel lines.

| Triangle Proportionality Theorem  | Example   |
|---|---|
| <p>If a line parallel to one side of a triangle intersects the other two sides, then it divides those sides proportionally.</p> |  <p><math>\overline{XY} \parallel \overline{AC}</math>, so <math>\frac{BX}{XA} = \frac{CY}{YA}</math></p> |
| Converse of the Triangle Proportionality Theorem  | Example   |
| <p>If a line divides two sides of a triangle proportionally, then it is parallel to the third side.</p>                         |  <p><math>\frac{3}{1} = \frac{6}{2}</math>, so <math>\overline{XY} \parallel \overline{AC}</math></p>     |

- ✓ We can use the Triangle Proportionality Theorem to find lengths of segments in triangles.

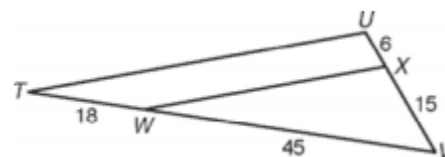
- A building height is 30 ft. A man is standing on the building with a height of  $h$  ft. The shadow of the building is 40 ft and the shadow of the man is 10 ft. Find the height of the man as shown in the figure.

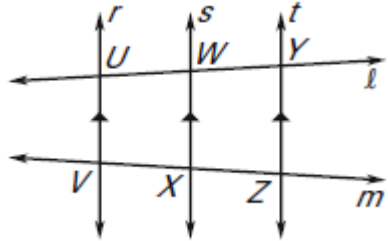
- Are the triangles similar? Explain.
- Can we determine that  $\overline{AE} \parallel \overline{BD}$ ? Explain.
- Find the height of the man.



- ✓ We can use the Triangle Proportionality Theorem to determine if lines are parallel.

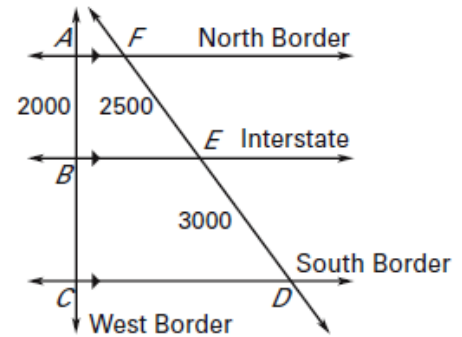
- A surveyor proposes that a walkway be added to a park so that it is parallel to one side of the park ( $\overline{TU}$ ). He draws up the following proposal for the location of the walkway ( $\overline{WX}$ ). Will the two walkways be parallel? Explain.

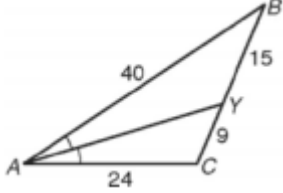


| Two Transversal Proportionality Theorem  | Example  |
|--|--|
| <p>If three parallel lines intersect two transversals, then they divide the transversals proportionally.</p> |  <p>If <math>r \parallel s \parallel t</math>, then <math>\frac{UW}{WY} = \frac{VX}{XZ}</math></p> |

✓ We can use the Two Transversal Proportionality Theorem to find lengths of segments.

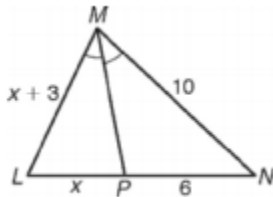
- 3) A farmer's land is divided by a newly constructed interstate. The distances shown are in meters. Find the distance CA between the north border and the south border of the farmer's land.



| Triangle Angle Bisector Theorem   | Example   |
|---|---|
| <p>If a ray bisects an angle of a triangle, then it divides the opposite side into segments whose lengths are proportional to the lengths of the other two sides.</p> |  <p>If <math>\overline{AY}</math> bisects <math>\angle BAC</math>, then <math>\frac{BY}{YC} = \frac{AB}{AC}</math></p> |

✓ We can use the Triangle Angle Bisector Theorem to find segment lengths.

- 4) Find the lengths of LP and LM.



Use the figure to complete the proportion.

1.  $\frac{EF}{FG} = \frac{BA}{?}$

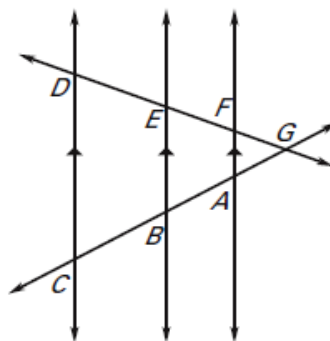
2.  $\frac{CB}{BA} = \frac{?}{EF}$

3.  $\frac{EB}{FA} = \frac{?}{FG}$

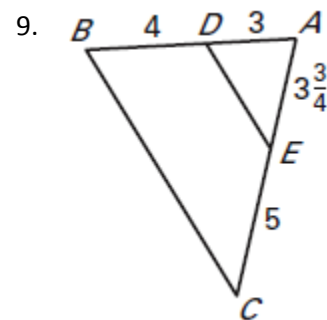
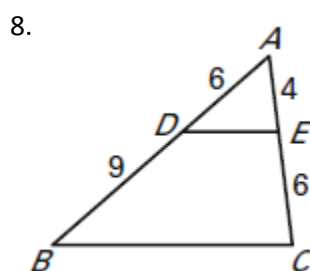
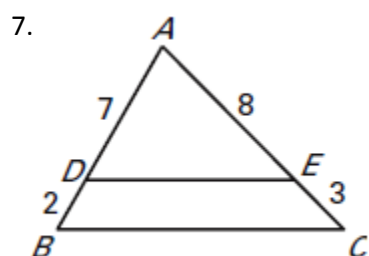
4.  $\frac{EG}{ED} = \frac{?}{CB}$

5.  $\frac{DC}{FA} = \frac{?}{AG}$

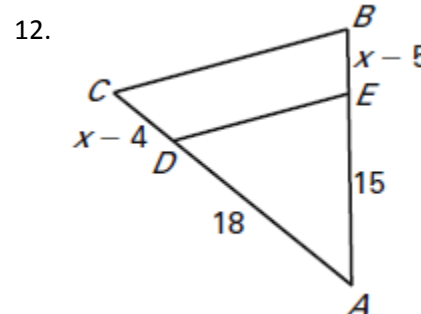
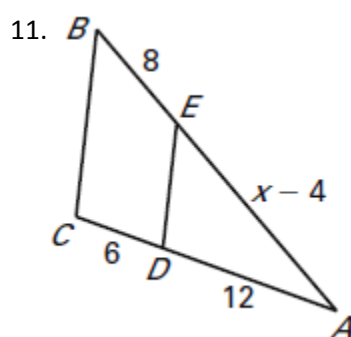
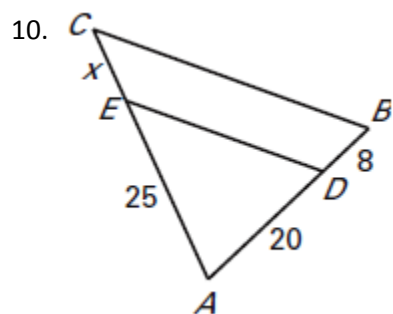
6.  $\frac{GF}{FA} = \frac{GD}{?}$



Determine whether the given information implies  $\overline{BC} \parallel \overline{DE}$ . Explain.



Determine a value of the variable so that  $\overline{BC} \parallel \overline{DE}$ .



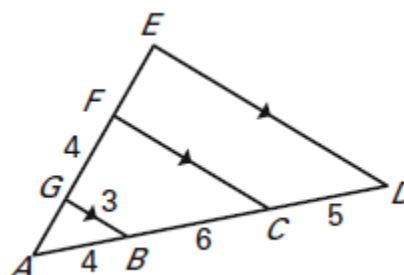
Determine the length of each segment.

13.  $\overline{AG}$

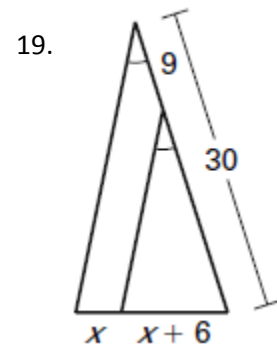
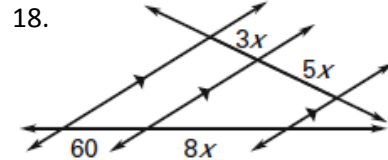
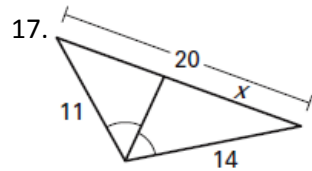
14.  $\overline{FC}$

15.  $\overline{ED}$

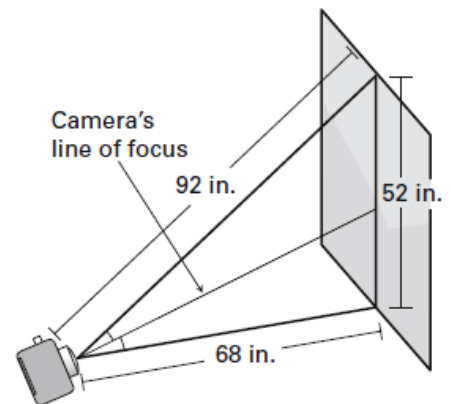
16.  $\overline{AE}$



Find the value of the variable.



20. You take a picture of a painting at an art gallery. The painting is above eye level, and you frame the painting so the top and bottom match up with the top and bottom of your view finder. Your camera's auto-focus feature focuses at the height of the angle bisector shown in the diagram. How far from the bottom of the painting is the focus?



**ANSWER KEY**

**1. AG 2. DE 3. EG 4. BG 5. CG 6. DC**

**7. no;  $\frac{7}{2} \neq \frac{8}{3}$  8. yes;  $\frac{6}{9} = \frac{2}{3} = \frac{4}{6}$  9. yes;  $\frac{3}{4} = \frac{3\frac{3}{4}}{5}$**

**10. 10 11. 20 12. 10 13.  $2\frac{2}{3}$  14. 7.5**

**15. 11.25 16. 10 17. 11.2 18. 12.5 19. 4.5**

**20. 22.1 in.**