



Problem 1 – The Geometric Mean

- After calculating the product of the lengths of \overline{AD} and \overline{DC} and the square of the length of \overline{BD} , record the information in the table. Change the length of \overline{AD} and/or \overline{DC} , and record the information again.

Length of \overline{AD}	Length of \overline{DC}	$AD \times DC$	Length of \overline{BD}	BD^2

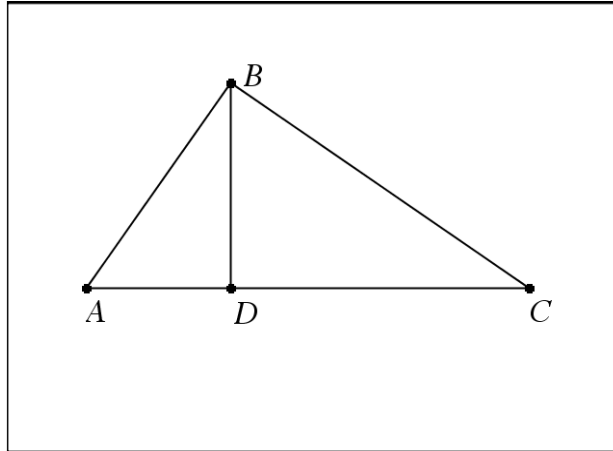
- The figure on page 1.4 can be used to find an estimated value of a radical, such as $\sqrt{21}$. What value is created for the length of \overline{BD} if $AD = 1$ and $DC = 3$?
- What would the lengths of \overline{AD} and \overline{DC} be in order for the length of segment \overline{BD} to be exactly:
 - $\sqrt{10}$
 - $\sqrt{6}$
 - $\sqrt{50}$
 - $\sqrt{72}$

Problem 2 – Similar Triangles

- Write a similarity relationship for the three triangles in the figure. Can you prove this relationship?
- What other proportions are true about the figure besides $\frac{AD}{BD} = \frac{BD}{DC}$?
- Identify other geometric means that occur when an altitude is constructed to the hypotenuse of a right triangle.

Exercises

Use the figure below to answer the following questions. $\angle ABC$ is a right angle and $\overline{BD} \perp \overline{AC}$.



Write a proportion using a geometric mean and solve the problem.

1. If $AD = 3$ inches, and $DC = 27$ inches, find the length of \overline{BD} .
2. If $AD = 4$ inches, and $BD = 8$ inches, find the length of \overline{DC} .
3. If $AD = 6$ inches, and $DC = 9$ inches, find the length of \overline{BD} .
4. If $AD = 5$ cm and $DC = 10$ cm, find the lengths of \overline{BD} , \overline{AB} , and \overline{BC} .
5. If $BD = 2$ cm and $DC = 8$ cm, find the lengths of \overline{AD} , \overline{AB} , and \overline{BC} .