Lesson 3: The Area of Acute Triangles Using Height and Base

Classwork

Exercises

1. Work with a partner on the exercises below. Determine if the area formula $A=\frac{1}{2}bh$ is always correct. You may use a calculator, but be sure to record your work on your paper as well. Figures are not drawn to scale.

|  |  |  |
| --- | --- | --- |
|  | **Area of Two Right Triangles** | **Area of Entire Triangle** |
| $$17.4 cm$$$$12 cm$$$$15 cm$$$$9 cm$$$$12.6 cm$$ |  |  |
| $$8 ft.$$$$3.9 ft.$$$$5.2 ft.$$$$6.5 ft.$$ |  |  |
| $$2\frac{5}{6} in.$$$$2 in.$$$$\frac{5}{6} in.$$ |  |  |
| $$34 m$$$$32 m$$$$12 m$$ |  |  |

1. Can we use the formula $A=\frac{1}{2}×base×height$ to calculate the area of triangles that are not right triangles? Explain your thinking.
2. Examine the given triangle and expression.

$$3 ft.$$

$$8 ft.$$

$$4 ft.$$

 $\frac{1}{2}(11 ft.)(4 ft.)$

Explain what each part of the expression represents according to the triangle.

1. Joe found the area of a triangle by writing $A=\frac{1}{2}(11 in.)(4 in.)$, while Kaitlyn found the area by writing
$A=\frac{1}{2}(3 in.)(4 in.)+\frac{1}{2}(8 in.)(4 in.)$. Explain how each student approached the problem.
2. The triangle below has an area of $4.76 sq. in$. If the base is $3.4 in.$, let $h$ be the height in inches.



* 1. Explain how the equation $4.76 in^{2}=\frac{1}{2}\left(3.4 in.\right)h$ represents the situation.
	2. Solve the equation.

Problem Set

Calculate the area of each shape below. Figures are not drawn to scale.

$$8 m$$

$$14 m$$

$$16 m$$

$$16 m$$

1. 2.

$$4.4 in.$$

$$3.3 in.$$

$$6.1 in.$$

$$5.5 in.$$

1. 4.

$$5 ft.$$

$$12 ft.$$

$13$ ft.

$$13 ft.$$

$12$ ft.

$$12 ft.$$

$$5 ft.$$

1. Immanuel is building a fence to make an enclosed play area for his dog. The enclosed area will be in the shape of a triangle with a base of $48 in.$ and an altitude of $32 in$. How much space does the dog have to play?
2. Chauncey is building a storage bench for his son’s playroom. The storage bench will fit into the corner and against two walls to form a triangle. Chauncey wants to buy a cover for the bench.

If the storage bench is $2\frac{1}{2} ft.$ along one wall and $4\frac{1}{4} ft.$ along the other wall, how big will the cover
have to be in order to cover the entire bench?

1. Examine the triangle to the right.

$5$ in.

$3$ in.

$4$ in.

$7$ in.

* 1. Write an expression to show how you would calculate the area.
	2. Identify each part of your expression as it relates to the triangle.
1. A triangular room has an area of $32\frac{1}{2} sq. m.$ If the height is $7\frac{1}{2} m$, write an equation to determine the length of the base, $b$, in meters. Then solve the equation.