

6.11 Density and volume situations

1. Do Now: Complete the four problems in the Graspable Math activity linked above. Paste a cropped screenshot of the fourth problem here. It should look like the modelled solution below.

2. *Density* is a ratio that maps proportional variables having different units. For example, weight per volume or population per area.

Find the weight of a volume of water of 100 cubic feet if the density of water is 62.4 pounds per cubic feet.

$$W = V \times D$$

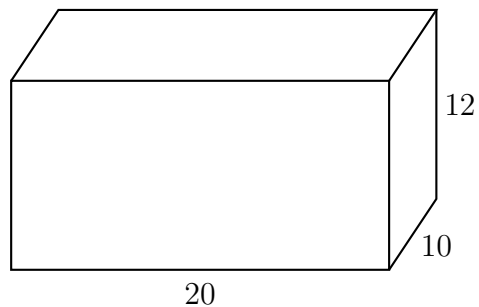
$$W = 100 \times 62.4$$

$$W = 6,240 \text{ pounds}$$

Find the weight of 125 cubic feet of water.

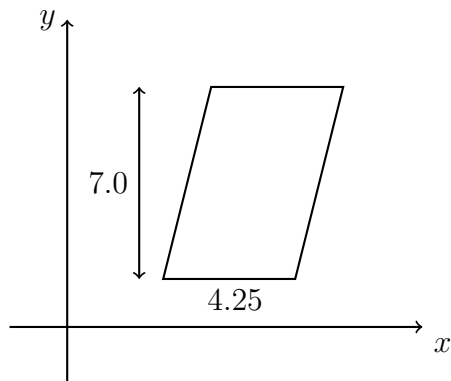
3. Find the volume of a rectangular prism volume of water. Its length is $l = 20$ feet, its height $h = 12$ feet, and depth is $w = 10$ feet. Start with the equation

$$V = l \times w \times h$$



4. A parallelogram is shown on the x - y plane having a base $b = 4.25$ and height $h = 7.0$.

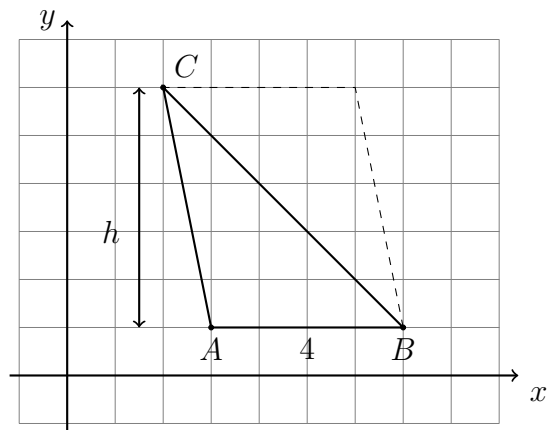
Find its area, showing the calculation.



5. The $\triangle ABC$ is shown below with $A(3, 1)$, $B(7, 1)$, and $C(2, 6)$. The length of the base of the triangle is $AB = 4$.

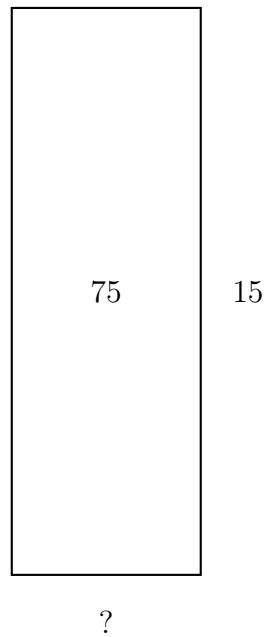
(a) Find the height h .

(b) Find the triangle's area, showing the calculation.



6. Find the width of the base of a rectangle with area $A = 75$ and height $h = 15$. Start with the form (use b or x):

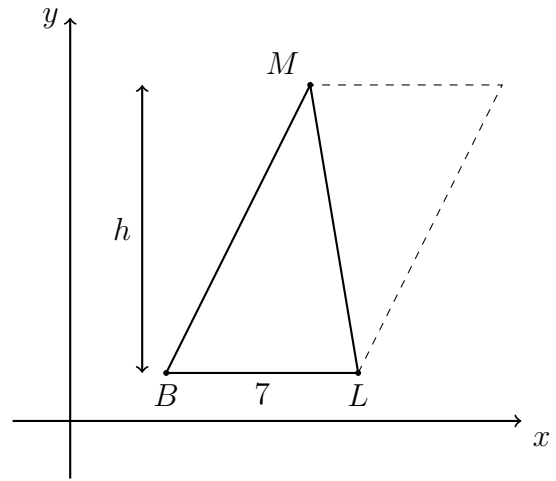
$$A = b \times h = 75$$



7. Find the height of the $\triangle BLM$, having an area of $A = 42$ and base $BL = 7$.

Start by substituting values in the area formula:

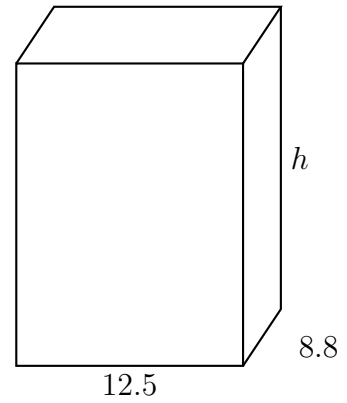
$$A = \frac{1}{2}bh = 42$$



8. The rectangular prism shown has a volume of $V = 1815$ cubic centimeters. Its base measures $l = 12.5$ cm by $w = 8.8$ cm.

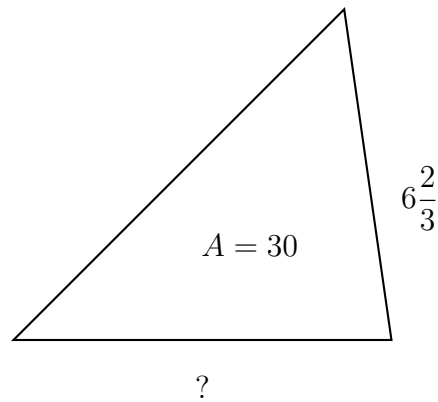
Find its height in centimeters. Begin by writing the following formula with values substituted:

$$V = l \times w \times h = 1815$$



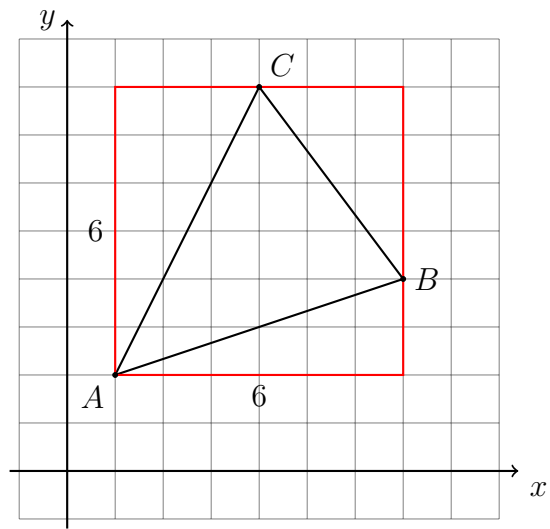
9. Find the length of the base of a triangle with area $A = 30$ and height $h = 6\frac{2}{3}$. Start with the form (use b or x):

$$A = \frac{1}{2} \times b \times h = 30$$



10. Find the area of the $\triangle ABC$, shown below, with $A(1, 2)$, $B(7, 4)$, and $C(4, 8)$.

Hint: Subtract the areas of the three right triangles from the area of the red square.



11. A rectangular prism has a square base. Its volume is $V = 162$ cubic centimeters and its height is $h = 8$ cm.

Calculate the dimensions of its base.

