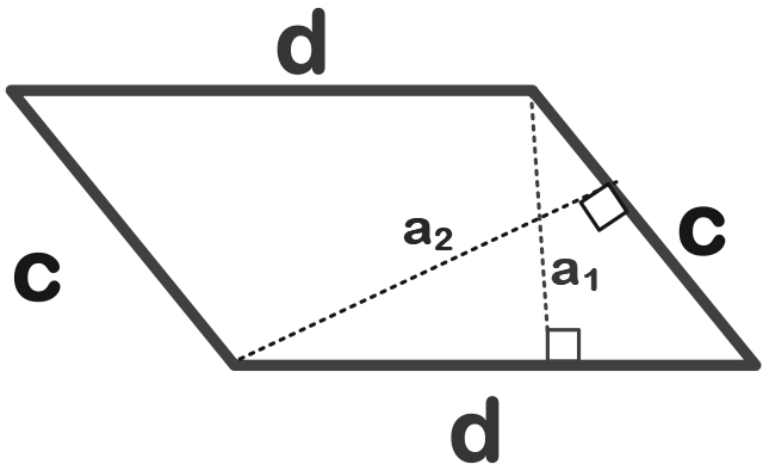
Unit 8-1 Areas of Parallelograms and Triangles [section 11-1]
Objectives: Find perimeters and areas of parallelograms. Find perimeters and areas of trangles.

Remember that a parallelogram is a quadrilateral with BOTH pairs of opposite sides parallel. For each base, there is a corresponding altitude that is perpendicular to the base. The altitutde corresponds to the height of the parallelogram.



For base c, a_2 is the altitude or height.

For base d, a_1 is the altitude or height.

*** Any side of a parallellogram can be a base, but the Altitude is unique to that base.**

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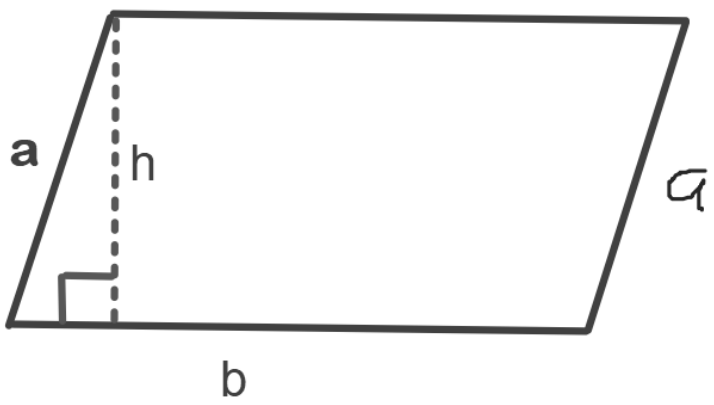
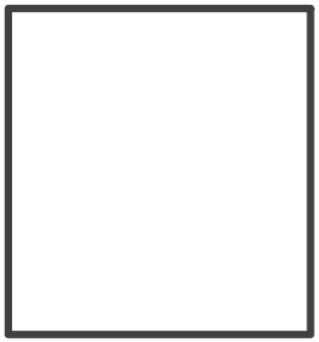
Area of a Parallelogram $A = bh$

If a parallelogram has an area of *A* square units, a base of *b* units, and a height of *h* units, then $A = bh$. WHY??? Isn't that the formula for area of a rectangle?





distance around

What does the word perimeter mean? How would we find the perimeter of a parallelogram? $P = a + b + a + b$

$P = 2a + 2b$

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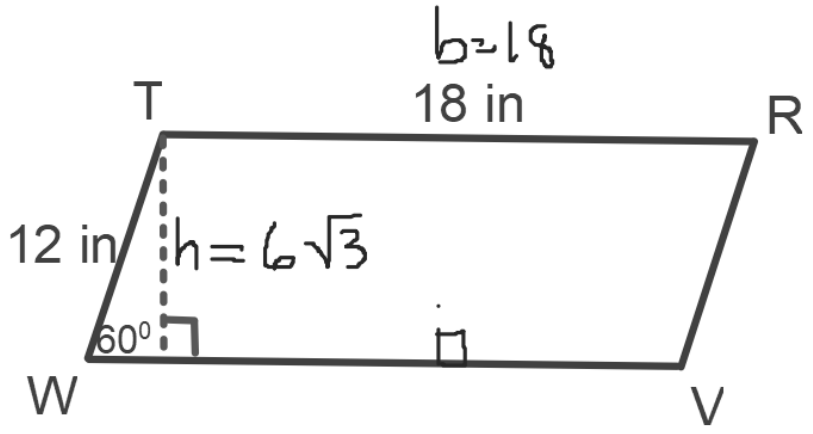
Example 1

Find the perimeter and area of ▱ TRVW.

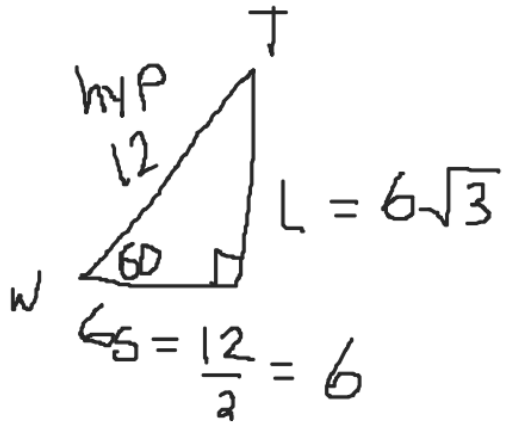


Find perimeter. $P = 2(12) + 2(18)$

$24 + 36$

$P = 60 \text{ in}$

Find height.



$\frac{6}{5} = \frac{12}{2} = 6$

Find area. $A = bh$

$A = 18(6\sqrt{3})$

$A \simeq 187.1 \text{ in}^2$

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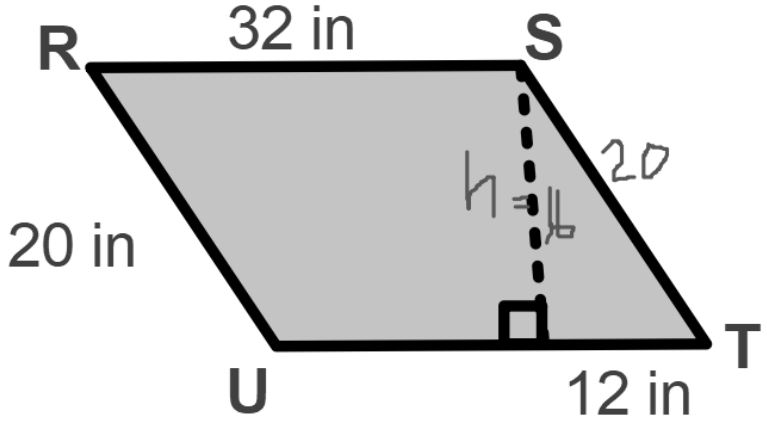
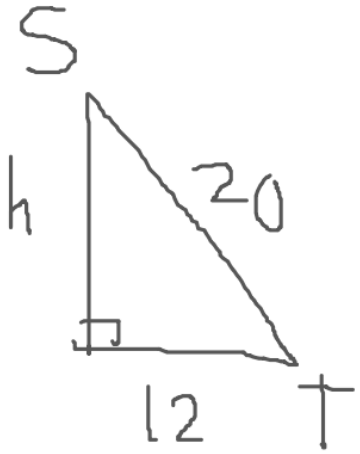
Example 2: Find the perimeter and area of ▱RSTU





$P = 2(32) + 2(20)$

$64 + 40 = \boxed{104 \text{ in}}$

$A = bh$

$(32)(16) = \boxed{512 \text{ in}^2}$

$h^2 + 12^2 = 20^2$

$h^2 + 144 = 400$

$-144 \quad -144$

$h^2 = 256$

$h = \pm\sqrt{256}$

$h = 16$

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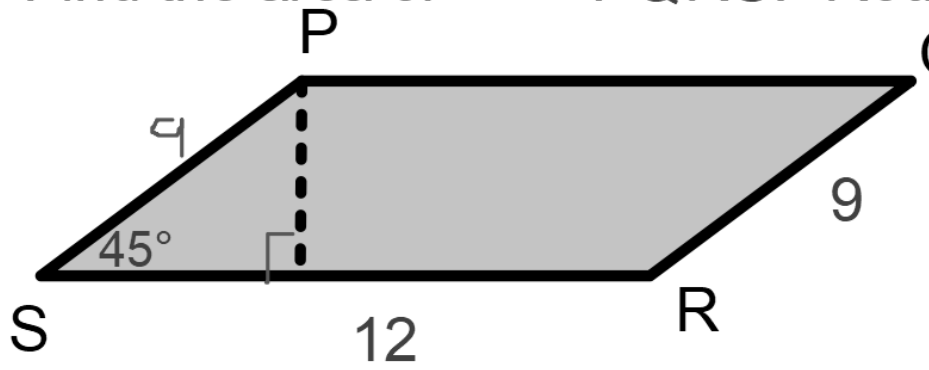
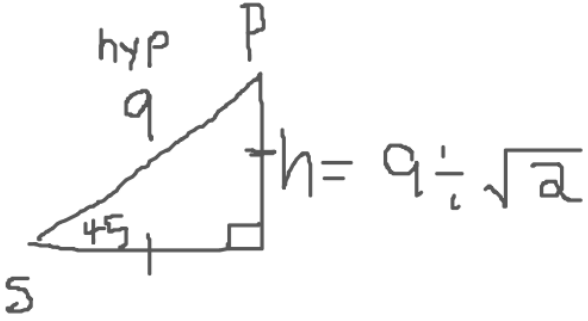
Example 3

Find the area of ▱ PQRS. Round to the nearest tenth.



$A = bh$

$A = (12)(9 \div \sqrt{2}) \approx \boxed{76.4}$



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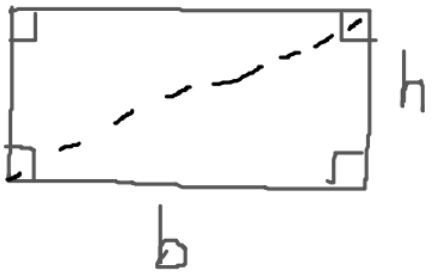
For a **triangle** the **area** A is one half the product of a base b and its corresponding height (from opp. vertex and perpendicular to the side. Can fall in or out of the triangle.) $A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$



To find the **perimeter** of a **triangle** we simply add all 3 sides together.

$P = S_1 + S_2 + S_3$

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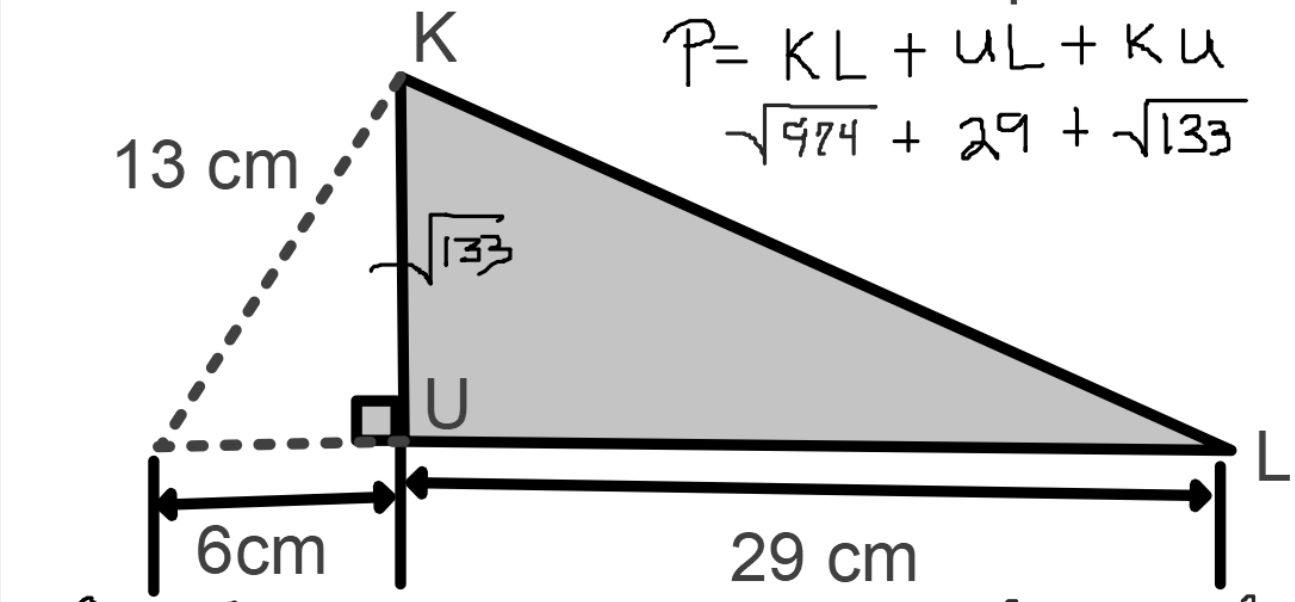
Example 4

Find the area and the perimeter of $\triangle KLU$



$P = KL + UL + KU$

$\sqrt{974} + 29 + \sqrt{133} \approx$ **71.7 cm**

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

$A = \frac{(29)(\sqrt{133})}{2}$

$A \approx 167.2\ cm^2$

$6^2 + KU^2 = 13^2$

$36 + KU^2 = 169$

$-36 \quad -36$

$KU^2 = 133$

$KU = \sqrt{133}$

$29^2 + (\sqrt{133})^2 = KL^2$

$841 + 133 = KL^2$

$974 = KL^2$

$\sqrt{974} = KL$

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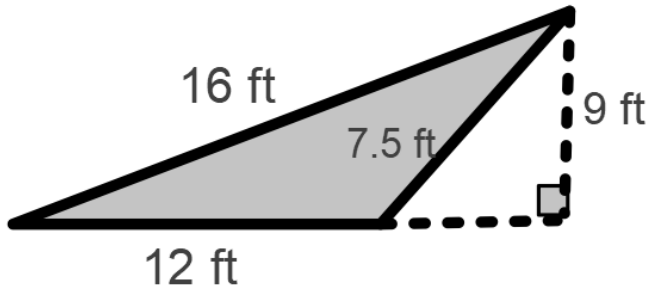
Example 5

You need to buy enough boards to make the frame of the triangular sandbox shown and enough sand to fill it. If one board is 3 feet long and one bag of sand fills 9 square feet of the sandbox, how many boards and bags do you need to buy?



$P = 16 + 12 + 7.5 = 35.5 \text{ ft}$

$35.5 \div 3 = 11.8$

12 boards

$A = \frac{bh}{2} = \frac{(12)(9)}{2} = \frac{108}{2} = 54 \text{ ft}^2$

$54 \div 9 =$ 6 bags of sand