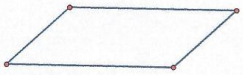
Section 11.1: Areas of Parallelograms



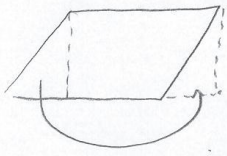
Formulas we know so far:

$A_{square} = s^2$

$A_{rectangle} = l \cdot w$ or $b \cdot h$

$P_{rectangle} = 2l + 2w$

Discovering the Formula for the Area of a Parallelogram: *(Copy what you see from the applet!)*



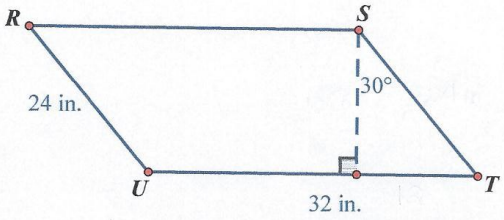
Now it's a rectangle!

Conclusion:

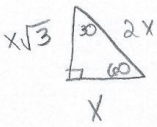
$A_{Parallelogram} = b \cdot h$

If a rectangle & a P have the same base & height, they'll have the same area. Perimeters won't be the same.

Find the area and perimeter of parallelogram RSTU.



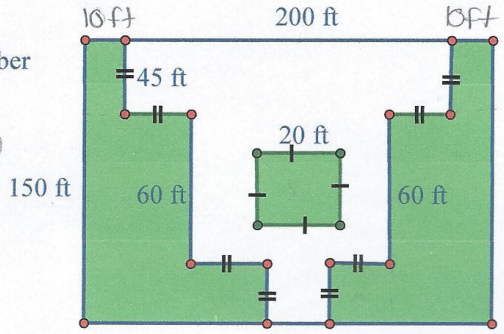
$P_{RSTU} = 2(24) + 2(32)$
$= 48 + 64$
$= 112$ in.



$A_{RSTU} = 32(12\sqrt{3})$
$= 384\sqrt{3}$ in^2

Use Area to Solve a Real World Problem:

Metamora Courthouse is planning to sod some parts of the property. Find the number of square yards of grass needed.



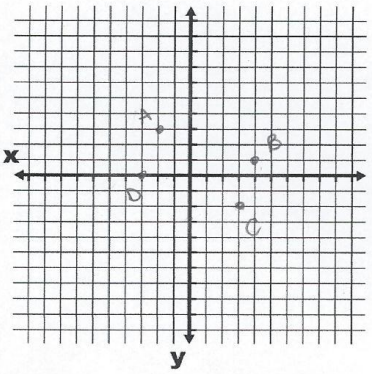
$(400\,ft)^2 + (2025)\cdot 2 + (5775)\cdot 2 + 2(450)$

$\frac{16900\,ft^2}{1} \times \frac{1\,yd^2}{9\,ft^2} =$

$\approx 1877.8\,yd^2$

And everyone's favorite...

The vertices of a quadrilateral are at A(-2, 3), B(4, 1), C(3, -2), D (-3, 0)



a. Determine whether the quadrilateral is a square, a rectangle, or a parallelogram.

Rectangle.

b. Find the area of quadrilateral ABCD.

$AD = \sqrt{(-2-3)^2 + (3-0)^2}$

$= \sqrt{1+9} = \sqrt{10}$

$AB = \sqrt{(-2-4)^2 + (3-1)^2}$

$= \sqrt{36+4} = \sqrt{40}$

$A_{ABCD} = \sqrt{10} \times \sqrt{40}$

$= \sqrt{400}$

$= 20\ units^2$

$m_{AB} = \frac{3-1}{-2-4} = \frac{2}{-6} = \frac{-1}{3}$

$m_{BC} = \frac{-2-1}{3-4} = \frac{-3}{-1} = 3$

$m_{CD} = \frac{0-(-2)}{-3-3} = \frac{2}{-6} = \frac{-1}{3}$

$m_{DA} = \frac{0-3}{-3+2} = \frac{-3}{-1} = 3$