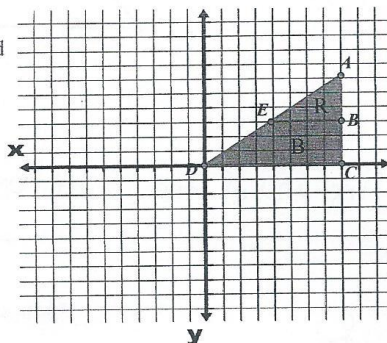


11.2: Areas of Triangles, Trapezoids, and Rhombi: Day 2

Find the area of the blue and red figure.
 B = blue figure
 R = red figure



A(8,6)
 B(8,3)
 C(8,0)
 D(0,0)
 E(4,3)

$$A_{\triangle ABC} = \frac{1}{2} \text{ leg} \cdot \text{leg}$$

$$= \frac{1}{2} (8)(6)$$

$$= 24$$

$$A_{\triangle ABE} = \frac{1}{2} (4)(3)$$

$$= 6$$

$$A_{\text{red}} = 6$$

$$A_{\text{blue}} = 24 - 6$$

$$= 18$$

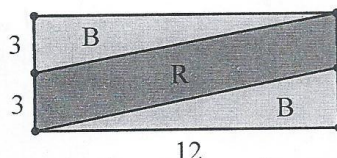
OR Notice $A_{\text{blue}} = A_{\text{trapezoid}}$

$$= \frac{1}{2} (3)(4+8)$$

$$= 18$$

Find the area of the blue and red figure.

B = blue figures
 R = red figure



$$A_{\text{rect}} = 6(12)$$

$$= 72$$

$$A_{\triangle} = \frac{1}{2} (3)(12)$$

$$= 18$$

$$A_{\text{blue}} = 2(18) \text{ (two } \triangle\text{s)}$$

$$= 36$$

$$A_{\text{red}} = 72 - 36$$

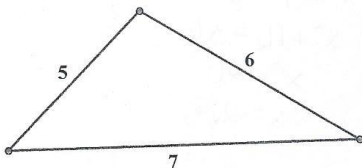
$$= 36$$

or $A_{\text{red}} = A_{\square} = b \cdot h$

$$= 3 \cdot 12$$

$$= 36$$

What is the area of this triangle?



Far too difficult to calculate area using $A = b \cdot h$

Heron's Formula:

$$A_{\triangle} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$= \sqrt{9(9-5)(9-6)(9-7)}$$

$$= 6\sqrt{6} \text{ or } 14.69$$

where s = semi-perimeter
 or half the perimeter.

$$P_{\triangle} = 5+6+7$$

$$= 18$$

so $s = 9$

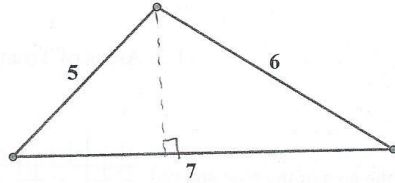
Once the area is known, then the altitude can be found!

$$A = \frac{1}{2} b \cdot h$$

$$6\sqrt{6} = \frac{1}{2} (7) h$$

$$12\sqrt{6} = 7h$$

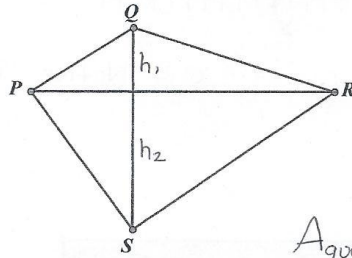
$$h = \frac{12\sqrt{6}}{7} \approx 4.199$$



We can find any of the 3 alt. using any side as the base.

Quadrilateral with \perp Diagonals

Find the area of the quadrilateral PQRS.



$$A_{\text{quad}} = A_{\Delta PQR} + A_{\Delta PSR}$$

$$= \frac{1}{2} (PR) h_1 + \frac{1}{2} (PR) h_2$$

$$= \frac{1}{2} (PR) (h_1 + h_2)$$

$$= \frac{1}{2} (PR) (QS)$$

$$A_{\text{quad w/ } \perp \text{ diagonals}} = \frac{1}{2} d_1 \cdot d_2$$

Find the area and the perimeter of the given quadrilateral.

$$P = 5 + 5 + 6 + 6$$

$$= 22 \text{ units}$$

$$A = \frac{1}{2} (8) d_2$$

$$A = \frac{1}{2} (8) (2\sqrt{5} + 3)$$

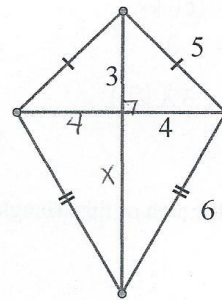
$$\approx 29.89 \text{ units}^2$$

$$x^2 + 4^2 = 6^2$$

$$x^2 + 16 = 36$$

$$x^2 = 20$$

$$x = 2\sqrt{5}$$



Find x if the area of the quadrilateral is 136 units^2

$$136 = \frac{1}{2} (19) (x)$$

$$272 = 19x$$

$$x \approx 14.3 \text{ units}$$

