Name: _____ Date: _____

Period: ____ Mr. Valentino

Aim: What is the shoelace theorem?

Do Now: What is the area of the green shaded region?

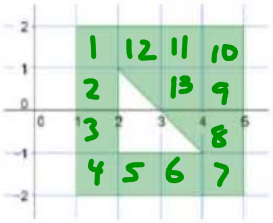
$A_{square} = 4 \times 4$

$= 16 \text{ units}^2$ $16 - 2$

14

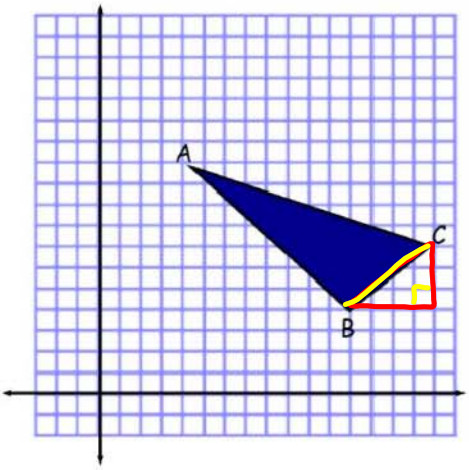
$A_{triangle} = \frac{1}{2}bh$

$= \frac{1}{2}(2)(2) = 2 \text{ units}^2$



14

How can we find the area of the shaded region?



Shoelace Theorem

A (4, 11) $(4 \cdot 4) + (12 \cdot 7) + (16 \cdot 11)$

B (12, 4) 276

C (16, 7) $(11 \cdot 12) + (4 \cdot 16) + (7 \cdot 4)$

A (4, 11) 224

$\frac{276 - 224}{2} = \frac{52}{2}$

$= 26 \text{ units}^2$

1. Consider a triangle with coordinates (2, 5), (1, 2), (5, 1) . What is the area of the triangle?

(2, 5)

(1, 2)

(5, 1)

(2, 5)

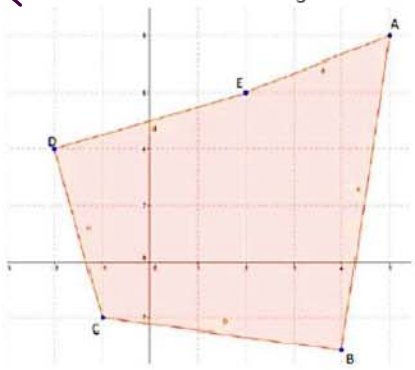
$(2 \cdot 2) + (1 \cdot 1) + (5 \cdot 5) = 30$

$(5 \cdot 1) + (2 \cdot 5) + (1 \cdot 2) = 17$

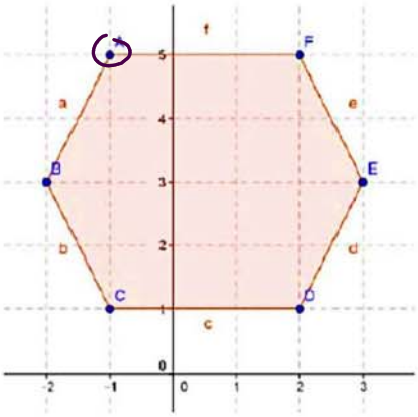
$\frac{17 - 30}{2} = \frac{-13}{2}$ $\frac{30 - 17}{2} =$ 6.5 units^2

$= |-6.5| = 6.5$

2. Find the area of the shaded region



3. Find the area of the shaded region



(-1,5)
(-2,3)
(-1,1)
(2,1)
(3,3)
(2,5)
(-1,5)

GREEN SHOELACE

$(-1\cdot3)+(-2\cdot1)+(-1\cdot1)+(2\cdot3)+(3\cdot5)+(2\cdot5)=25$

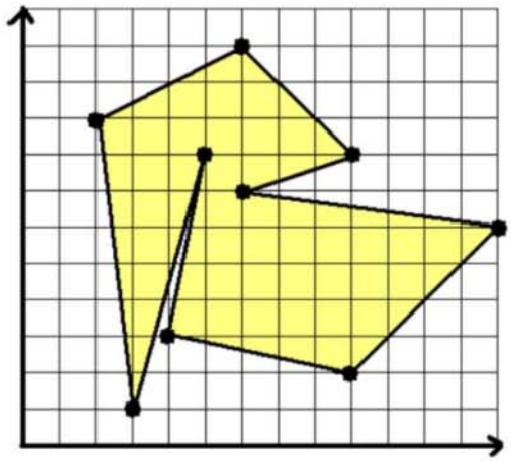
RED SHOELACE

$(5\cdot-2)+(3\cdot-1)+(1\cdot2)+(1\cdot3)+(3\cdot2)+(5\cdot-1)=-7$

$\frac{25-(-7)}{2}=\frac{32}{2}$

$=16 \text{ units}^2$

4. ***CHALLENGING*** Find the area of the shaded region



5. Find the area of pentagon $\boldsymbol{ABCDE}$ with vertices $(\mathbf{2}, \mathbf{6})$, $\boldsymbol{B}(\mathbf{7}, \mathbf{2})$, $\boldsymbol{C}(\mathbf{3}, -\mathbf{4})$, $\boldsymbol{D}(-\mathbf{3}, -\mathbf{2})$, and $\boldsymbol{E}(-\mathbf{2}, \mathbf{4})$.

6. Find the area of quadrilateral $\boldsymbol{ABCD}$ with vertices $(\mathbf{6}, \mathbf{5})$, $\boldsymbol{B}(\mathbf{2}, -\mathbf{4})$, $\boldsymbol{C}(-\mathbf{5}, \mathbf{2})$, and $\boldsymbol{D}(-\mathbf{3}, \mathbf{6})$.