DO NOW

Rhombus $STAR$ has vertices $S(-1,2)$, $T(2,3)$, $A(3,0)$, and $R(0,-1)$. What is the perimeter of rhombus $STAR$?

1) $\sqrt{34}$
2) $4\sqrt{34}$
3) $\sqrt{10}$
4) $4\sqrt{10}$

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

$ST = \sqrt{10}$

$4\sqrt{10}$

Area of Polygons in the Coordinate Plane

"Box Out" the shape, creating a rectangle and right Δ's

Find the area of the rectangle and each right Δ

Subtract:
Area of Rect - Area of Right Δ's

1) Triangle RST is graphed on the set of axes below.

$A_{rect} = 12 \cdot 12$

$A = 144$

$A_{\Delta I} = \frac{1}{2}(3 \cdot 6)$

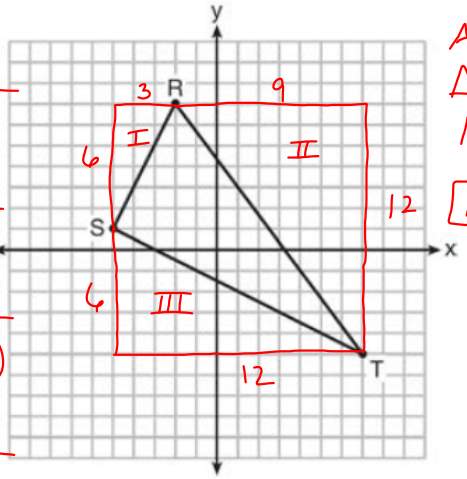
$\Delta I = 9$

$A_{\Delta II} = \frac{1}{2}(9 \cdot 12)$

$\Delta II = 54$

$A_{\Delta III} = \frac{1}{2}(6 \cdot 12)$

$\Delta III = 36$



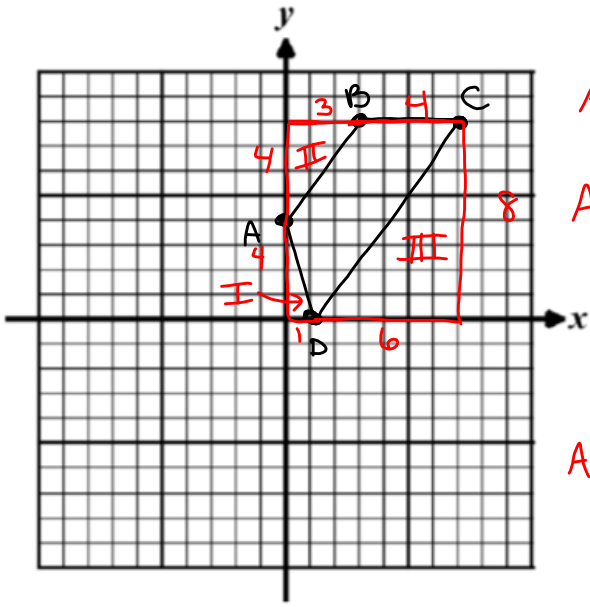
Area of ΔRST = $144 - 99$

$\Delta RST = 45$

How many square units are in the area of ΔRST?

1) $9\sqrt{3} + 15$
2) $9\sqrt{5} + 15$
3) 45
4) 90

2) Find the area of trapezoid $ABCD$ with vertices $A(0,4)$, $B(3,8)$, $C(7,8)$ and $D(1,0)$



$A_{rect} = 7 \cdot 8 = 56$

$A_{\Delta I} = \frac{1}{2}(1 \cdot 4) = 2$

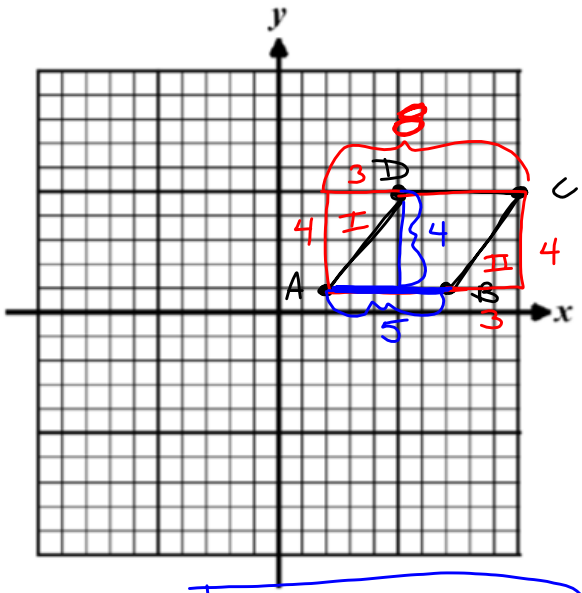
$A_{\Delta II} = \frac{1}{2}(3 \cdot 4) = 6$

$A_{\Delta III} = \frac{1}{2}(6 \cdot 8) = 24$

Area of $ABCD = 56 - 32$

$= 24$

3) Find the area of parallelogram $ABCD$ with vertices $A(2, 1)$, $B(7, 1)$ and $C(10, 5)$ and $D(5, 5)$



$A_{rect} = 8 \cdot 4 = 32$

$A_{\Delta I} = \frac{1}{2}(3 \cdot 4) = 6$

$A_{\Delta II} = \frac{1}{2}(3 \cdot 4) = 6$

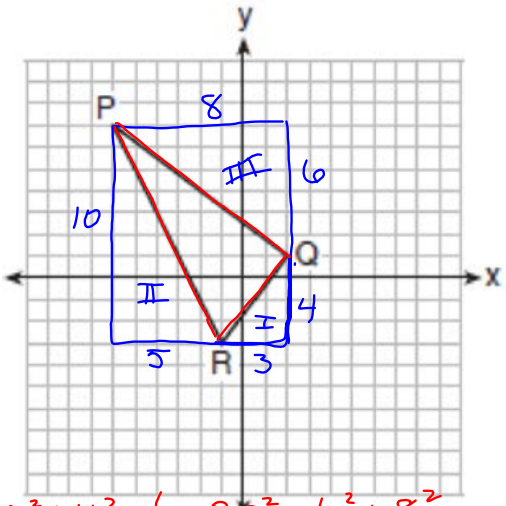
$32 - 12$

$\boxed{20}$

$A = 5 \cdot 4 = 20$

4) On the set of axes below, the vertices of ΔPQR have coordinates $P(-6, 7)$, $Q(2, 1)$, and $R(-1, -3)$.

(a) What is the area of ΔPQR?



$A_{rect} = 8 \cdot 10 = 80$

$A_{\Delta I} = \frac{1}{2}(3 \cdot 4) = 6$

$A_{\Delta II} = \frac{1}{2}(5 \cdot 10) = 25$

$A_{\Delta III} = \frac{1}{2}(6 \cdot 8) = 24$

55

Area of $\Delta PQR = 80 - 55$

$= \boxed{25}$

(b) What is the perimeter of ΔPQR?

$PR^2 = 5^2 + 10^2$

$PR = \sqrt{125}$

$\sqrt{25} \cdot \sqrt{5}$

$5\sqrt{5}$

$RQ^2 = 3^2 + 4^2$

$RQ = 5$

$PQ^2 = 6^2 + 8^2$

$PQ = 10$

$P \text{ of } \Delta PQR = 15 + 5\sqrt{5}$