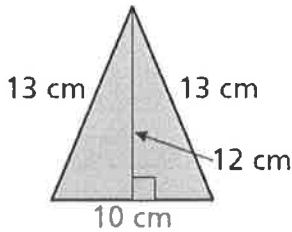


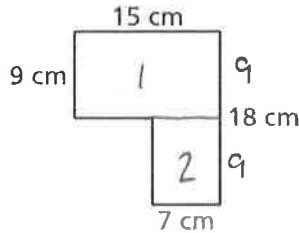
1.4 Perimeter and Area in the Coordinate Plane

Find the perimeter and area of the polygon.



$$P = 13 + 13 + 10 = 36 \text{ cm}$$

$$A = \frac{1}{2}bh = \frac{1}{2}(10)(12) = 60 \text{ cm}^2$$

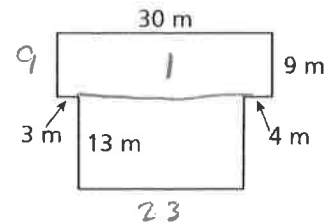


$$P = 9 + 15 + 18 + 7 = 49 \text{ cm}$$

$$A_1 = 9(15) = 135$$

$$A_2 = 7(9) = 63$$

$$A = 135 + 63$$



$$P = 9 + 30 + 9 + 4 + 13 + 23 + 13 + 3 = 104 \text{ m}$$

$$A_1 = 9(30) = 270$$

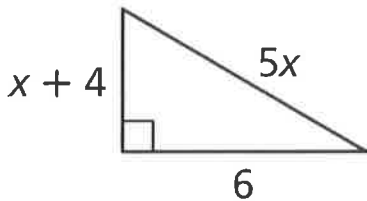
$$A_2 = 13(4) = 52$$

May 23-8:34 AM

$$A = 270 + 52 = 322 \text{ m}^2$$

$$A = 270 + 299 = 569 \text{ m}^2$$

Find the perimeter and area of each figure.



$$P = x + 4 + 5x + 6$$

$$P = 6x + 10 \text{ units}$$

$$A = \frac{1}{2}(6)(x + 4)$$

$$= 3(x + 4)$$

$$A = 3x + 12 \text{ units}^2$$

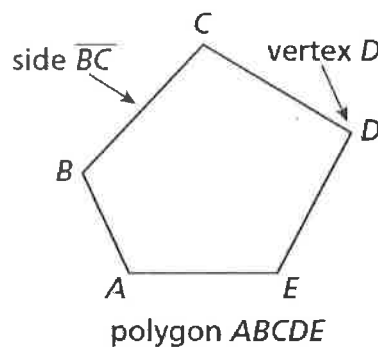
May 23-8:44 AM

* A figure that lies in a plane is a *plane figure*

Polygon - closed plane figure formed by three or more line segments (called sides)

Vertex - where sides intersect

**You can name a polygon by listing vertices in consecutive order



Core Concept

Polygons can be classified by their number of sides:

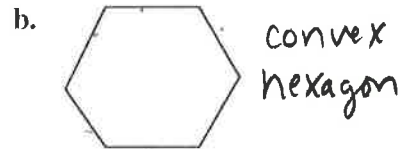
# of sides	Type of Polygon
3	Triangle
4	Quadrilateral
5	Pentagon
6	Hexagon
7	Heptagon or Septagon
8	Octagon
9	nonagon
10	decagon
12	dodecagon
n	n-gon

May 23-8:47 AM

Concave - a diagonal can be drawn in the exterior of a figure (caved in)

Convex - all diagonals are in the interior of a figure

Classify each polygon by the number of sides. Tell whether it is *convex* or *concave*.



Example 1

From WS 1.4 Perimeter and Area in Coordinate Plane

1.

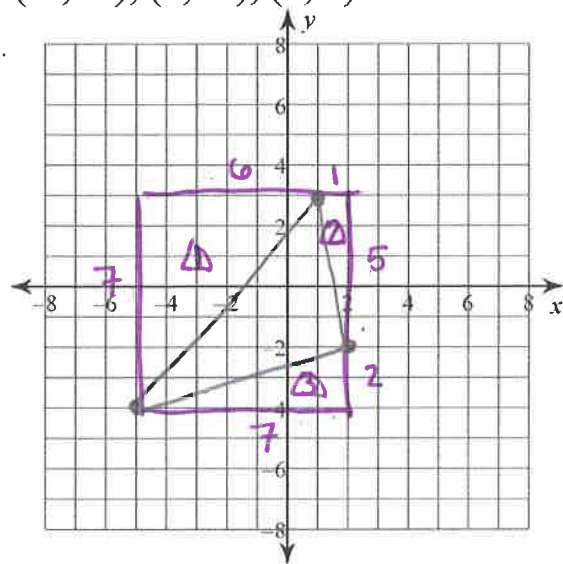
Find the perimeter and area of the polygon.
Leave all answers in simplest radical form.

$(-5, -4), (2, -2), (1, 3)$

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 6^2 + 7^2 &= c^2 \\ 36 + 49 &= c^2 \\ \sqrt{85} &= c^2 \\ \sqrt{85} &= c \end{aligned}$$

$$\begin{aligned} 1^2 + 5^2 &= c^2 \\ 1 + 25 &= c^2 \\ \sqrt{26} &= c^2 \\ \sqrt{26} &= c \end{aligned}$$

$$\begin{aligned} 2^2 + 7^2 &= c^2 \\ 4 + 49 &= c^2 \\ \sqrt{53} &= c^2 \\ \sqrt{53} &= c \end{aligned}$$



$$P = \sqrt{85} + \sqrt{26} + \sqrt{53} \text{ units}$$

$$A_{\text{TOTAL}} = (7)(7) = 49$$

$$A_{\Delta 1} = \frac{1}{2}bh = \frac{1}{2}(6)(7) = 21$$

$$A_{\Delta 2} = \frac{1}{2}(1)(5) = \frac{5}{2}$$

$$A_{\Delta 3} = \frac{1}{2}(2)(7) = 7$$

$$\text{Area} = 49 - (21 + 2.5 + 7)$$

$$A = 49 - 30.5$$

$$A = 18.5 \text{ units}^2$$

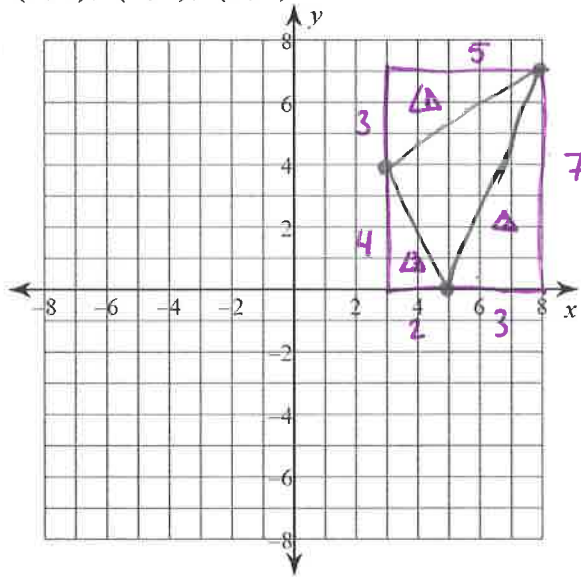
Aug 24-7:55 AM

From WS 1.4 Perimeter and Area in Coordinate Plane

3.

(3,4), (8,7), (5,0)

Find the perimeter and area of the polygon
Leave all answers in simplest radical form.



$$\begin{array}{lll}
 a^2 + b^2 = c^2 & 2^2 + 4^2 = c^2 & 3^2 + 7^2 = c^2 \\
 3^2 + 5^2 = c^2 & 4 + 16 = c^2 & 9 + 49 = c^2 \\
 9 + 25 = c^2 & \sqrt{20} = c & \sqrt{58} = c \\
 \sqrt{34} = c & \sqrt{4} \sqrt{5} & \sqrt{58} = c \\
 \sqrt{34} = c & 2\sqrt{5} = c &
 \end{array}$$

$P = \sqrt{34} + 2\sqrt{5} + \sqrt{58}$ units

Area Total = (7)(5) = 35 $A = 35 - (\frac{15}{2} + \frac{21}{2} + 4)$

$A_{\Delta 1} = \frac{1}{2}(3)(5) = \frac{15}{2}$ $A = 35 - (22)$

$A_{\Delta 2} = \frac{1}{2}(3)(7) = \frac{21}{2}$ $A = 13$ units²

Aug 24-7:55 AM

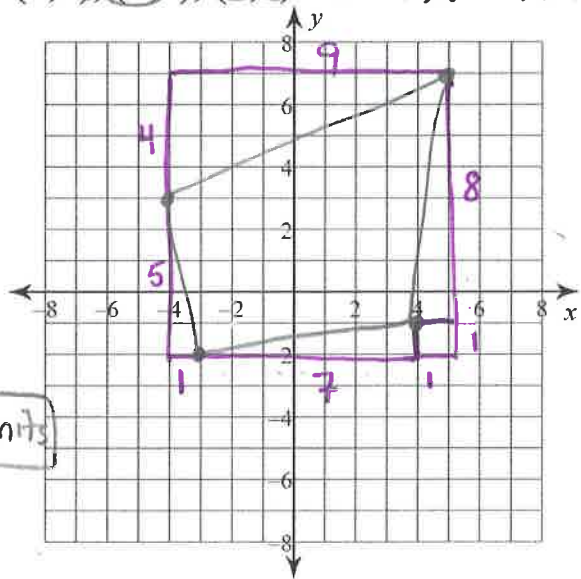
$A_{\Delta 3} = \frac{1}{2}(2)(4) = 4$

From WS 1.4 Perimeter and Area in Coordinate Plane

5.

~~(3,4), (8,7), (5,0)~~ (-4,3), (5,7), (4,-1), (-3,-2)

Find the perimeter and area of the polygon
Leave all answers in simplest radical form.



$$\begin{array}{lll}
 4^2 + 9^2 = c^2 & 1^2 + 8^2 = c^2 & 1^2 + 7^2 = c^2 \\
 16 + 81 = c^2 & 1 + 64 = c^2 & 1 + 49 = c^2 \\
 97 = c^2 & \sqrt{65} = c & \sqrt{50} = c \\
 \sqrt{97} = c & \sqrt{25} \sqrt{2} & 5\sqrt{2} = c \\
 & &
 \end{array}$$

$P = \sqrt{97} + \sqrt{65} + 5\sqrt{2} + \sqrt{20}$ units

$12 + 5^2 = c^2$ $A_{TOTAL} = 9(9) = 81$
 $1 + 25 = c^2$
 $\sqrt{26} = c$
 $\sqrt{26} = c$

$A_{\Delta 1} = \frac{1}{2}(4)(9) = 18$ $A_{\square} = 1(1) = 1$

$A_{\Delta 2} = \frac{1}{2}(1)(8) = 4$

Area = $81 - (18 + 4 + 3.5 + 2.5 + 1)$
 $= 81 - 29$
 Area = 52 units²

$A_{\Delta 3} = \frac{1}{2}(1)(7) = 3.5$

$A_{\Delta 4} = \frac{1}{2}(1)(5) = 2.5$

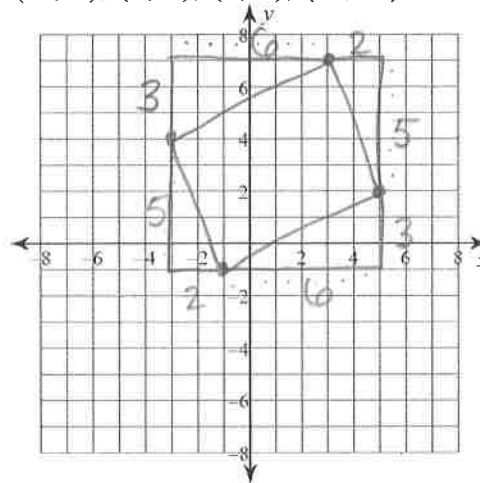
Aug 24-7:55 AM

From WS 1.4 Perimeter and Area in Coordinate Plane

7.

$(-3, 4), (3, 7), (5, 2), (-1, -1)$

Find the perimeter and area of the polygon.
Leave all answers in simplest radical form.



$$3^2 + 6^2 = c^2 \quad 2^2 + 5^2 = c^2$$

$$9 + 36 = c^2 \quad 4 + 25 = c^2$$

$$\sqrt{45} = c \quad \sqrt{29} = c$$

$$3\sqrt{5} = c \quad \sqrt{29} = c$$

$$P = 3\sqrt{5} + 3\sqrt{5} + \sqrt{29} + \sqrt{29}$$

$$P = 6\sqrt{5} + 2\sqrt{29} \text{ units}$$

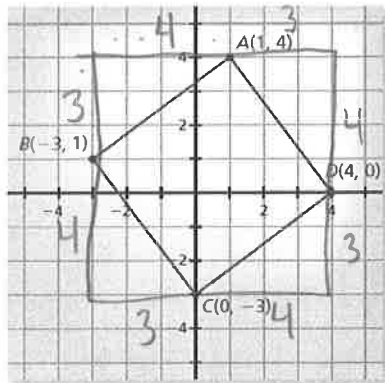
$$A_{\text{TOTAL}} = 8(8) = 64 \quad \text{Area} = 64 - (9 + 5 + 9 + 5)$$

$$A_{\Delta 1} = \frac{1}{2}(3)(6) = 9 \quad = 64 - (28)$$

$$A_{\Delta 2} = \frac{1}{2}(2)(5) = 5 \quad \text{Area} = 32 \text{ units}^2$$

Aug 24-7:55 AM

Find the area of the quadrilateral.



$$\text{Area}_{\text{TOTAL}} = 7(7) = 49$$

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

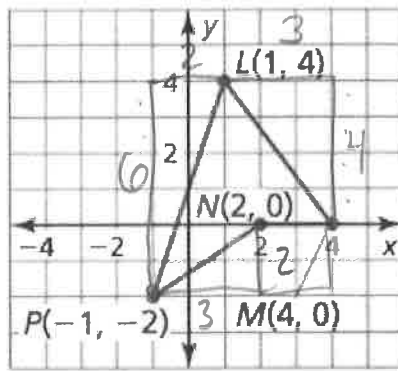
$$A = 49 - (6 + 6 + 6 + 6)$$

$$= 49 - 24$$

$$A = 25 \text{ units}^2$$

Aug 31-9:40 AM

Find the perimeter and area of the figure below.



$$A_{\text{TOTAL}} = 5(6) = 30$$

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

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

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

$$A_{\square} = 2(2) = 4$$

$$A = 30 - (6 + 6 + 3 + 4) = 11 \text{ units}^2$$

$$a^2 + b^2 = c^2$$

$$2^2 + 6^2 = c^2$$

$$4 + 36 = c^2$$

$$\sqrt{40} = \sqrt{c^2}$$

$$\sqrt{4} \sqrt{10}$$

$$2\sqrt{10} = c$$

$$3^2 + 4^2 = c^2$$

$$9 + 16 = c^2$$

$$\sqrt{25} = \sqrt{c^2}$$

$$5 = c$$

$$2^2 + 3^2 = c^2$$

$$4 + 9 = c^2$$

$$\sqrt{13} = \sqrt{c^2}$$

$$\sqrt{13} = c$$

$$P = 2\sqrt{10} + 5 + \sqrt{13} \text{ units}$$

Aug 31-9:56 AM

Homework

WS 1.4B - Perimeter and Area in Coordinate Plane