Perimeter of a rectangle

The perimeter of a rectangle is the length of its boundary. We can find the perimeter of a rectangle by finding the sum of the lengths of its four sides. But the lengths of opposite sides of a rectangle are equal, so we'll usually see the formula for the perimeter of a rectangle written as

$$P = 2l + 2w$$

$$P = 2(l + w)$$

where P is the perimeter, l is the length, and w is the width of the rectangle.

$P=2l+2w$

Let's do a few examples.

Example

What is the perimeter of the rectangle?

You can find the perimeter by plugging the length and width that we've been given into the formula for the perimeter.

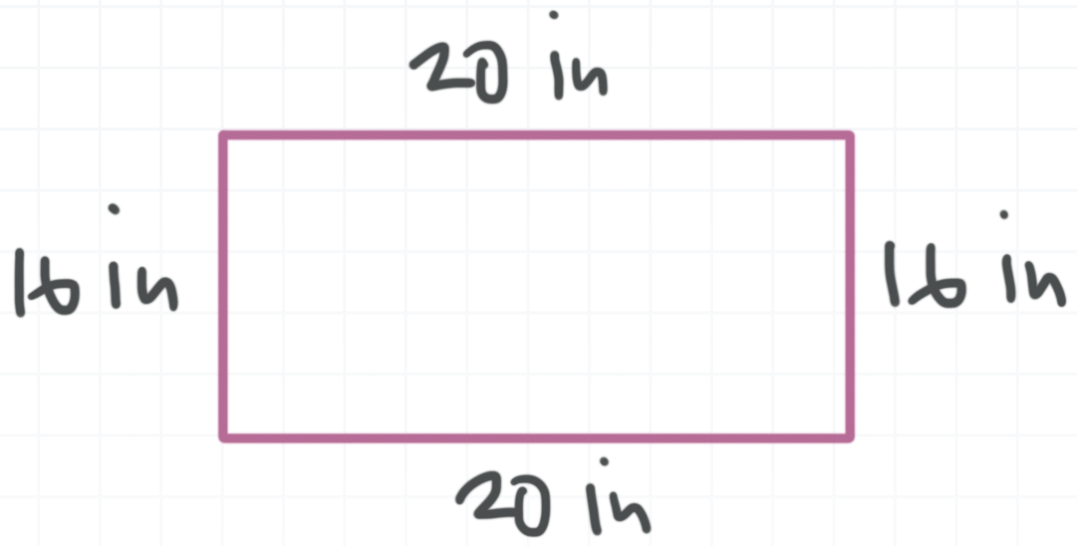
$$P = 2l + 2w$$

$$P = 2(20) + 2(16)$$

$$P = 40 + 32$$

$$P = 72 \text{ in}$$

Remember that opposite sides of a rectangle are equal in length, so you could also find the perimeter by adding the lengths of all four sides.



$$P = 20 + 16 + 20 + 16$$

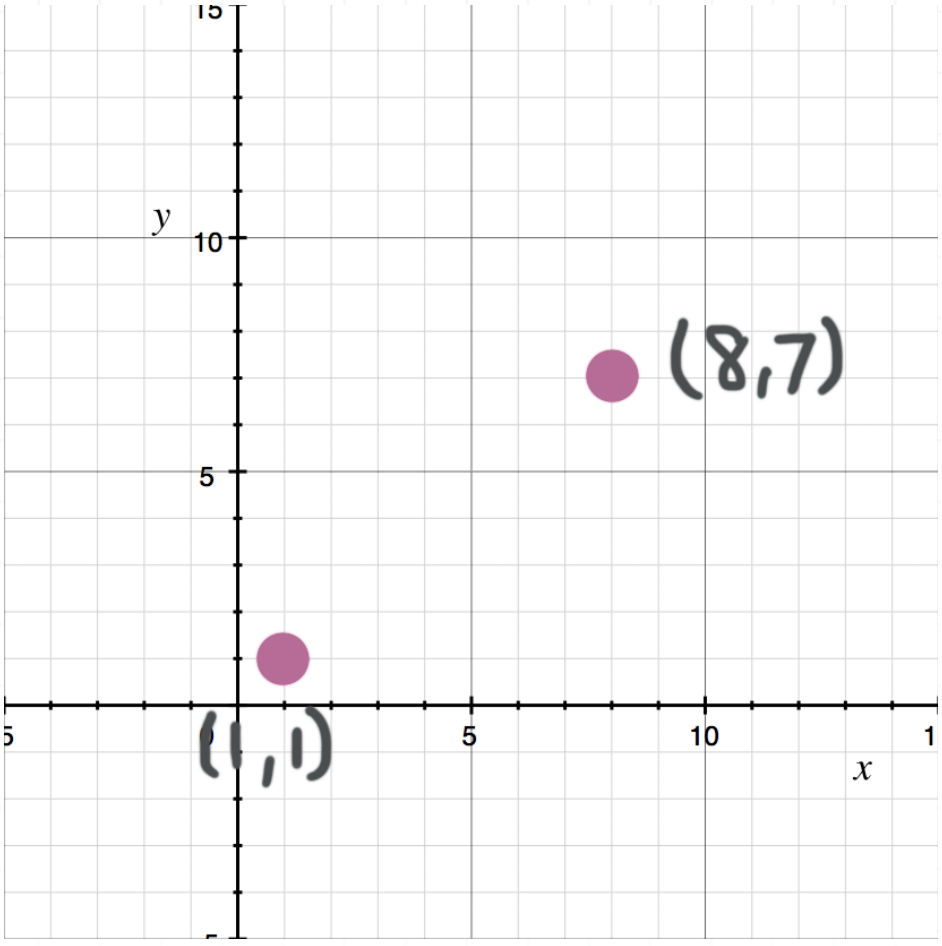
$$P = 72 \text{ in}$$

Sometimes you'll be given the coordinates of some or all of the vertices of a rectangle in a coordinate plane and asked to find the perimeter.

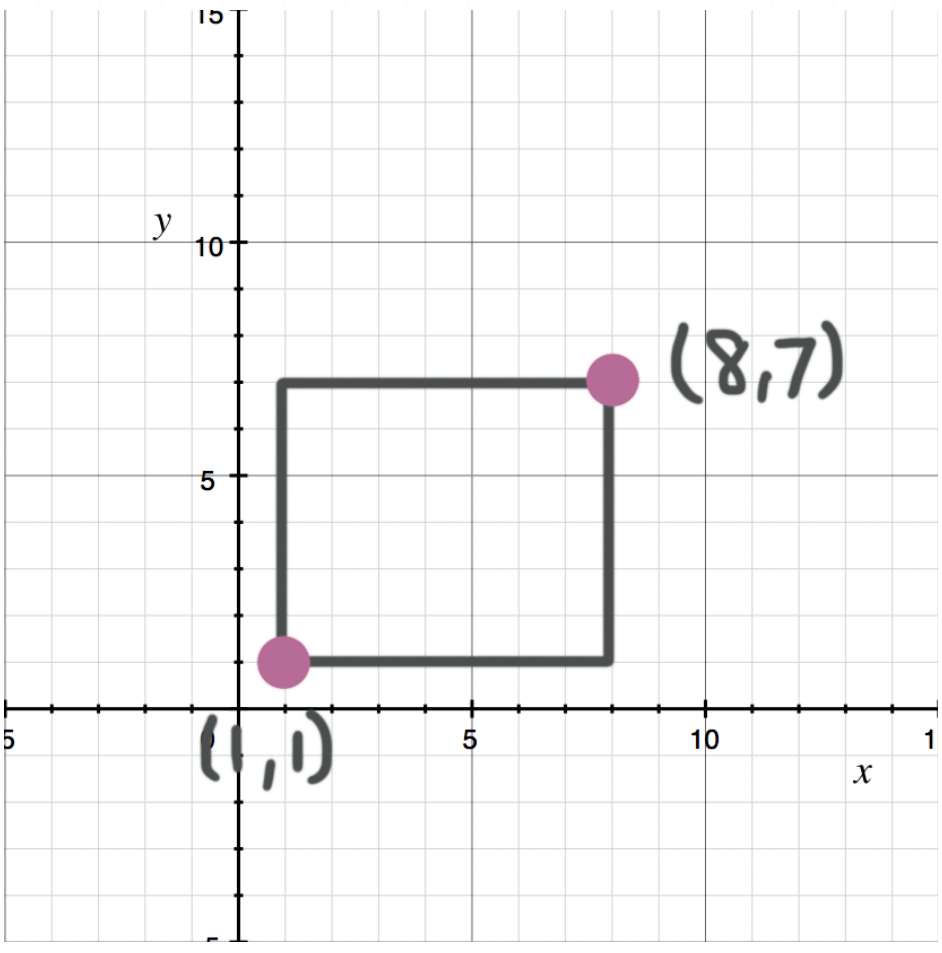
Example

A rectangle has one vertex at $(1,1)$, and the opposite vertex (the vertex that's connected to $(1,1)$ by a diagonal) is at $(8,7)$. If the sides of the rectangle are parallel to the coordinate axes, what is the perimeter of the rectangle?

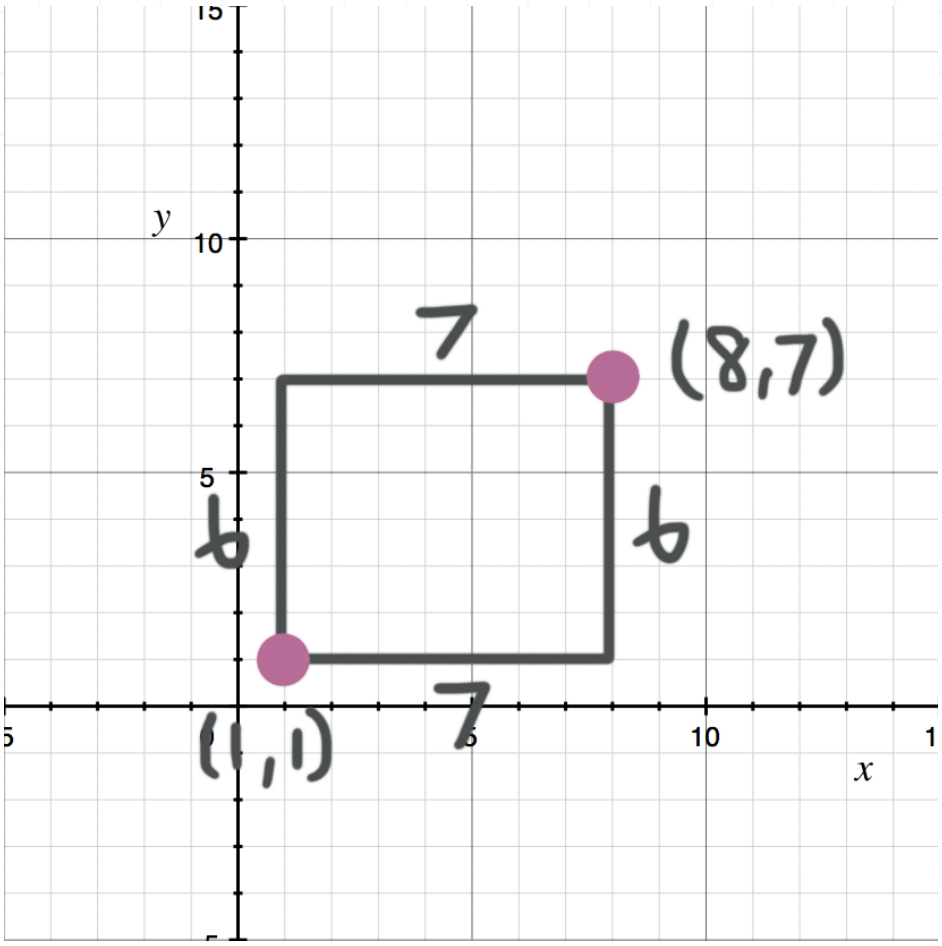
Drawing a sketch of the rectangle on the coordinate plane can help, so start by plotting the points.



Now draw in the rectangle.



Find the length of each side. Since the sides of the rectangle are parallel to the coordinate axes, the length l will be the difference between the x-coordinates of the given points ($l = 8 - 1 = 7$), and the width w will be the difference between their y-coordinates ($w = 7 - 1 = 6$).



Add the lengths of the four sides to find the perimeter.

$$P = 6 + 7 + 6 + 7 = 26$$

Other times we might need to perform some other type of calculation before we can find the perimeter.

Example

What is the perimeter of the rectangle that has an area of 96 and a length of 8?

We need to know the dimensions of the rectangle in order to find its perimeter. We know the area is 96 and the length is 8, so we can use the formula for area of a rectangle and solve for the width.

$$A = lw$$

$$96 = 8w$$

$$w = 12$$

Now we can find the perimeter.

$$P = 2l + 2w$$

$$P = 2(8) + 2(12)$$

$$P = 16 + 24$$

$$P = 40$$