Topic: Perimeter of a triangle

Question: Find the perimeter of a right triangle with leg lengths 8 and 15.

Answer choices:

A $P = 38$

B $P = 40$

C $P = 42$

D $P = 44$

Solution: B

We can substitute the leg lengths into the Pythagorean theorem to find the length of the triangle's hypotenuse. Given $a = 8$ and $b = 15$, we get

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

$$8^2 + 15^2 = c^2$$

$$64 + 225 = c^2$$

$$289 = c^2$$

$$c = \sqrt{289}$$

$$c = 17$$

Now that we know all three side lengths, we can add them together to find the triangle's perimeter.

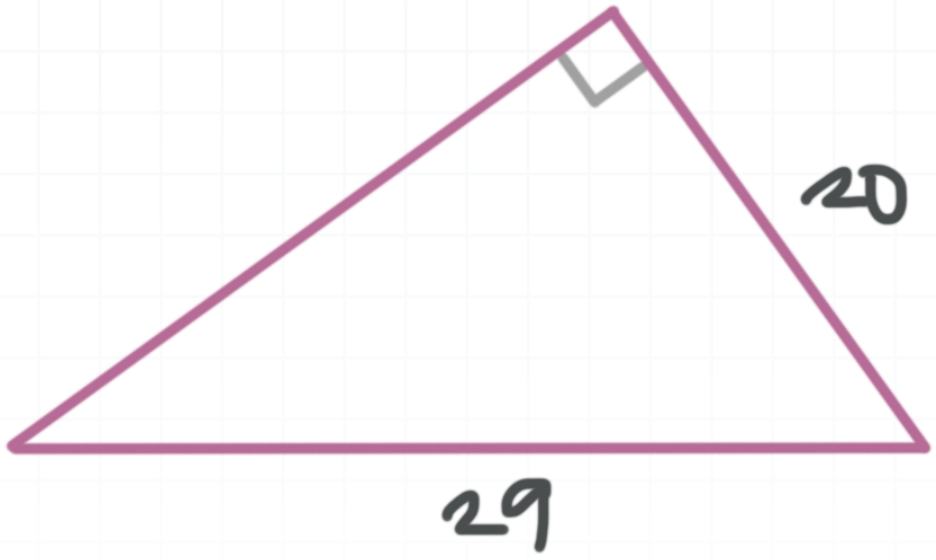
$$P = a + b + c$$

$$P = 8 + 15 + 17$$

$$P = 40$$

Topic: Perimeter of a triangle

Question: What is the sum of the side lengths of the triangle?



Answer choices:

A $P = 29$

B $P = 30$

C $P = 49$

D $P = 70$

Solution: D

The triangle is right, which means we can use the Pythagorean theorem to find the length of the unknown leg. The hypotenuse is always opposite of the right angle, so $a = 20$, $c = 29$, and we get

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

$$20^2 + b^2 = 29^2$$

$$400 + b^2 = 841$$

$$b^2 = 441$$

$$b = \sqrt{441}$$

$$b = 21$$

Then the perimeter of the triangle is

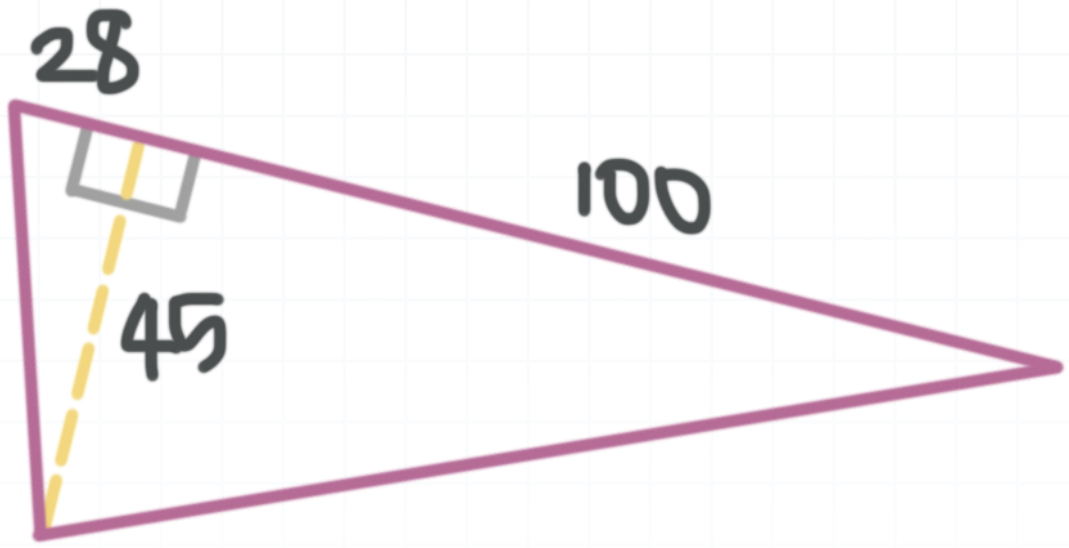
$$P = a + b + c$$

$$P = 20 + 21 + 29$$

$$P = 70$$

Topic: Perimeter of a triangle

Question: Find the perimeter of the oblique triangle.



Answer choices:

A $P = 181 + 5\sqrt{481}$

B $P = 191 + 5\sqrt{481}$

C $P = 201 + 5\sqrt{481}$

D $P = 211 + 5\sqrt{481}$

Solution: A

The oblique triangle can be split into two right triangles. The right triangle on the left has legs 28 and 45, so its hypotenuse is

$$28^2 + 45^2 = c^2$$

$$784 + 2{,}025 = c^2$$

$$2{,}809 = c^2$$

$$c = \sqrt{2{,}809}$$

$$c = 53$$

and the right triangle on the right has legs 45 and 100, so its hypotenuse is

$$45^2 + 100^2 = c^2$$

$$2{,}025 + 10{,}000 = c^2$$

$$12{,}025 = c^2$$

$$c = \sqrt{12{,}025}$$

$$c = 5\sqrt{481}$$

Therefore, the perimeter of the oblique triangle is

$$P = 53 + 5\sqrt{481} + 28 + 100$$

$$P = 181 + 5\sqrt{481}$$