

GMAT solution

Resource: 13 edition GMAT official guide, page 64

My approach is easier and less complicated.

See next page

48. If p is the perimeter of rectangle Q , what is the value of p ?

- (1) Each diagonal of rectangle Q has length 10.
- (2) The area of rectangle Q is 48.

Geometry Rectangles; Perimeter; Area

The perimeter of a rectangle is equal to 2 times the rectangle's length plus 2 times the rectangle's width, or $p = 2l + 2w$. The diagonals of a rectangle are equal. In a rectangle, because a diagonal forms a right triangle, the length of a diagonal is equal to the square root of the length squared plus the width squared, or $d = \sqrt{l^2 + w^2}$.

(1) If a diagonal = 10, then $10 = \sqrt{l^2 + w^2}$, or, by squaring both sides, $100 = l^2 + w^2$. Without knowing the value or the relationship between the other two sides of the right triangle, it is impossible to solve for l or w , and thus for the perimeter of the rectangle; NOT sufficient.

(2) If the area of the rectangle is 48, then it can be stated that $lw = 48$. However, without further information, the perimeter cannot be determined. For example, l could be 6 and w could be 8, and the perimeter would then be $12 + 16 = 28$. However, it could also be that l is 4 and w is 12, and in that case the perimeter would be $8 + 24 = 32$; NOT sufficient.

Using (1) and (2) together, it is possible to solve this problem. Since from (2) $lw = 48$, then $w = \frac{48}{l}$. Substituting this into $100 = l^2 + w^2$ from (1) the equation can be solved as follows:

$$100 = l^2 + \left(\frac{48}{l}\right)^2 \quad \text{substitution}$$

$$100l^2 = l^4 + 2,304 \quad \text{multiply both sides by } l^2$$

$$l^4 - 100l^2 + 2,304 = 0 \quad \text{move all terms to one side}$$

$$(l^2 - 64)(l^2 - 36) = 0 \quad \text{factor like a quadratic}$$

$$l^2 = 64, l^2 = 36 \quad \text{solve for } l^2$$

Since l is a length, it must be positive, so l is either 8 or 6. When $l = 8$, $w = \frac{48}{8} = 6$, and when $l = 6$, $w = \frac{48}{6} = 8$, both of which give the same perimeter.

The correct answer is C;
both statements together are sufficient.

We need two variables l and w to express the perimeter $2(l + w)$

$$(1) \sqrt{l^2 + w^2} = 10$$

$$(2) lw = 48$$

If you have two equations with two variables, then you can find those two values l and w .

so (C) is the answer

 You don't need to find the exact answer because this is the data sufficiency problem. It wastes your time.

If you want to find the perimeter, use following formula

$$(l + w)^2 = l^2 + w^2 + 2lw$$

