## Question

How we can find question mark (?) in this shape:



Let DN=x. Triangles BEM and CEK are similar, because their corresponding angles are equal.

Following this we have:

 $\frac{BM}{CK} = \frac{BE}{CE} = \frac{5}{7} \cdot \text{Let} \frac{BE}{CE} = \frac{5y}{7y}.$ 

BC=BE+EC=5y+7y=12y.

Then AD=BC (as the same opposite sides of the rectangle), hence AD=12y.

Triangles BEM and DNA are similar, because their corresponding angles are equal too.

Following this we have:

$$\frac{BE}{BM} = \frac{DN}{DA}$$
.  $\frac{5y}{5} = \frac{x}{12y}$ .  $y = \sqrt{\frac{x}{12}}$ . AD=12y=12 $\sqrt{\frac{x}{12}} = \sqrt{12x}$ .

By Pythagorean theorem in triangle AND,  $AN = \sqrt{ND^2 - AD^2} = \sqrt{x^2 - 12x}$ .

Triangles NAF and DNA are similar, because their corresponding angles are equal too.

Following this we have:

 $\frac{DN}{AN} = \frac{AN}{AF}.$ 

$$\frac{x}{\sqrt{x^2 - 12x}} = \frac{\sqrt{x^2 - 12x}}{4}.$$

x<sup>2</sup>-12x=4x.

x<sup>2</sup>-16x=0.

x=16.

Answer: 16.

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