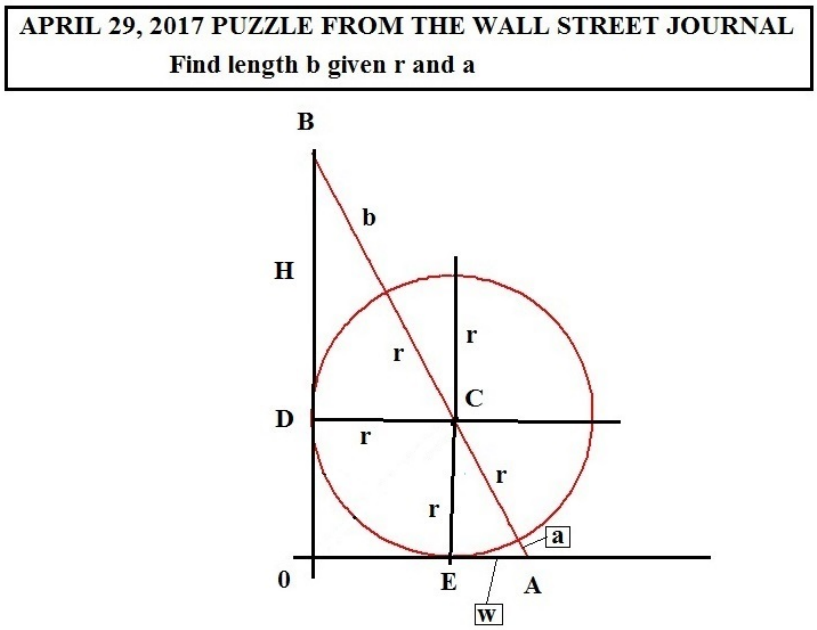
SOLUTION TO THE WSJ PUZZLE PAGE FOR APRIL 29, 2017

In the latest issue of the Wall Street Journal one finds a mathematical puzzle involving a right triangle and a circle centered along the diagonal of this triangle. A schematic of the problem looks as follows-



We have here three distinct right triangles designated by BDC, CEA, and BOA. Applying the Pythagorean Theorem to triangle BDC we have-

$$H^2 = b(b+2r)$$

From triangle CEA we get-

$$w^2 = a(a+2r)$$

Since BDC and CEA ara similar triangles, we can also say that-

$$Hw=r^2$$

On combining the last three equations, we find-

$$b(b+2r)a(a+2r)=r^4$$

We can rewrite this last expression as the generic result for b given r and a –

$$b = r\{-1+\sqrt{1+\frac{r^2}{a(2r+a)}}\}$$

If we now take r=120 and a=16, as given in the puzzle, we find-

b=135

Also we can go back to find w=64 and H=225. Thus if we take the largest right triangle BOA we have the Pythagorean Triple-

$(H+r)^2+(r+w)^2=(b+a+2r)^2$

In terms of the numbers used, it reads-

$(345)^2 + (184)^2=(391)^2$

April 30, 2017