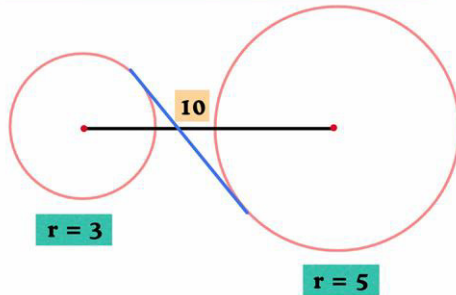


Tangent to Circles Problem

21 September 2026

Jim Stevenson

What's The Length Of Blue Line?



This is a Harvard University geometry puzzle¹ from BL's Math Games.

These are two circles of radii 3 and 5. The black line of length 10 connects the centres of the two circles. The blue line is a common tangent to both circles. The question is: what's the length of the blue line?

Solution

Since the tangents to circles are perpendicular to their radii, we have the (solid) right triangles shown in Figure 1. Since the two radii are parallel to each other, we can extend the 3 unit radius to meet a parallel version of the blue line to form a rectangle.

From this we have a large 3-4-5 right triangle with hypotenuse 10 and long leg 8. Which means the short blue leg is 6, the length of the desired blue line.

Comment. I admit I didn't think of this solution at first. It was only as I was considering similar triangles and drawing pictures that the approach jumped out at me.

(Barry Leung's solution is behind a subscription wall, but I infer from the one comment that his solution is probably the same as this one.)

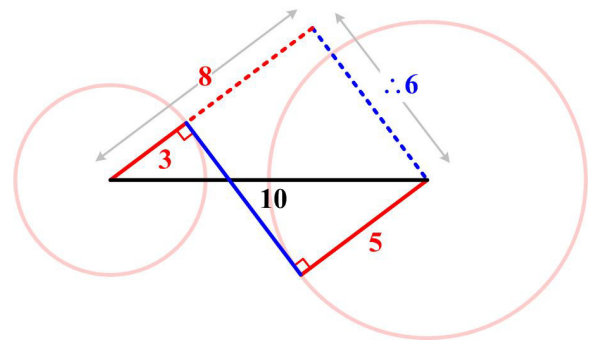


Figure 1

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¹ 20 September 2026 (<https://medium.com/math-games/can-you-solve-this-viral-harvard-university-geometry-puzzle-in-7-seconds-587a675151ef>)