Nederlandse Wiskunde Olympiade voor Bedrijven

Friday, 27 January 2023

- Available time: 20 minutes.
- For this "uitsmijter" only an answer is required, no calculation or proof. A correct and complete answer is worth 10 points. For an answer that is not complete or not completely correct you may also get some points.
- All answers should be given in exact and simplified form, like $\frac{11}{81}$, $2 + \frac{1}{2}\sqrt{5}$, $\frac{1}{4}\pi + 1$, or 3^{100}.
- Formula sheets and calculators are not allowed. You can only use a pen, compass, ruler or set square and of course your mental skills.
- Good luck!

For the contest managers: | Score first round: | Score uitsmijter:

Name:

Company:

Uitsmijter

The circle c_1 has radius 4 and is tangent to the line ℓ with point of tangency R.
The circle c_2 has radius 9, is tangent to c_1, and is tangent to ℓ with point of tangency S.
The circle c_3 is tangent to the circles c_1 and c_2, and is tangent to ℓ with point of tangency T, with T in between R and S.
See the picture on the right. (It is not drawn to scale.)

Let r be the radius of the circle c_3. In this problem, we are going to compute r.
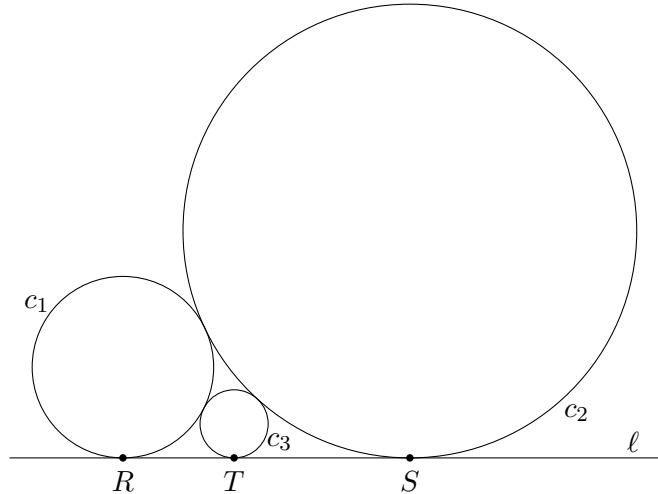
Answer:

a) Compute $|RS|$ (the length of RS).

a)

b) There exists a number c such that $|RT|^2 = c \cdot r$.

Compute c.

b)

c) Compute r.

c)