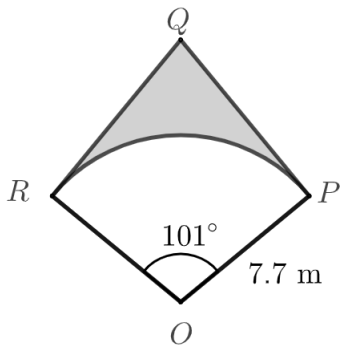
Question 1

OPR is a sector of a circle with centre O and radius 7.7 m.
QR and QP are tangent to the circle at points R and P.
Find the shaded area, correct to
3 significant figures.



Question 2

The first three terms of a geometric sequence are:

$x+1, \quad 2, \quad x+4$,...

Find the possible values of x.

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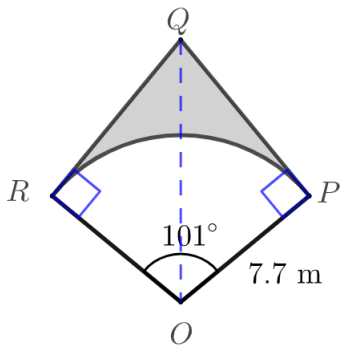

ORQ and OPQ are congruent right-angled triangles with base 7.7 m and height

$7.7\tan(50.5°) = 9.3408$ m

The kite $OPQR$ therefore has area

$2 \times \dfrac{7.7 \times\ 9.3408}{2} \times = 71.9245$ m^2.

Sector OPR has area $\dfrac{101}{360} \times \pi \times 7.7^2$

$= 52.2577$ cm^2

So shaded area $=\ 71.9245\ - 52.2577\ =\ 19.7$ cm^2 (to 3 s.f.)

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Find the possible values of x.

$$\frac{2}{x+1} = \frac{x+4}{2} \implies 4 = (x+1)(x+4)$$

$$\implies 4 = x^2 + 5x + 4$$

$$\implies 0 = x^2 + 5\,x$$

Solving, we see $x = 0$, $x = -5$