Question	Scheme	Marks	AOs
6(a)	$$A = \pi r^2 \rightarrow \frac{\mathrm{d}A}{\mathrm{d}r} = 2\pi r$$	M1	3.1b
	$$\frac{\mathrm{d}r}{\mathrm{d}t} = 2 \Rightarrow \frac{\mathrm{d}A}{\mathrm{d}t} = 2\pi r \times 2 = 4\pi r \text{ *}$$	A1*	1.1b
		(2)	
(b)	$126\,\mathrm{cm}^2\,\mathrm{s}^{-1}$	B1	3.4
		(1)	
(c)	e.g. Include the thickness of the puddle e.g. as a cylinder rather than a circle. Model the shape of the puddle more accurately. Model the shape of the puddle as something other than a circle. Use a variable rate for the increase of the radius.	B1	3.5c
		(1)	
		(4 marks)	

Notes:

(a)

M1: Sets up the model with $A = \pi r^2$ and differentiates to $\frac{\mathrm{d}A}{\mathrm{d}r} = 2\pi r$ but do not be concerned with the notation for the LHS.

A1*: Multiplies $\frac{\mathrm{d}r}{\mathrm{d}t} = 2$ (which must be seen) and their $\frac{\mathrm{d}A}{\mathrm{d}r} = 2\pi r$ to achieve $\frac{\mathrm{d}A}{\mathrm{d}t} = 4\pi r$

(b)

B1: awrt $126\,\mathrm{cm}^2\,\mathrm{s}^{-1}$ cm Units required.

(c)
B1: See main scheme.