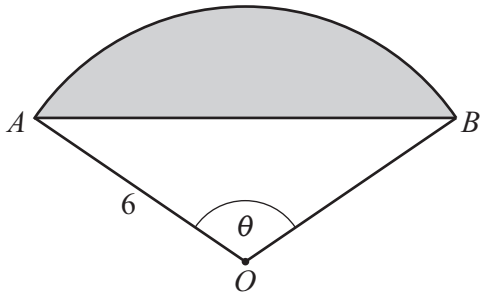
7 In this question, all lengths are in centimetres and all angles are in radians.



The diagram shows a sector of a circle with centre O and radius 6.

(a) It is given that the area of triangle AOB is $9\,\text{cm}^2$.

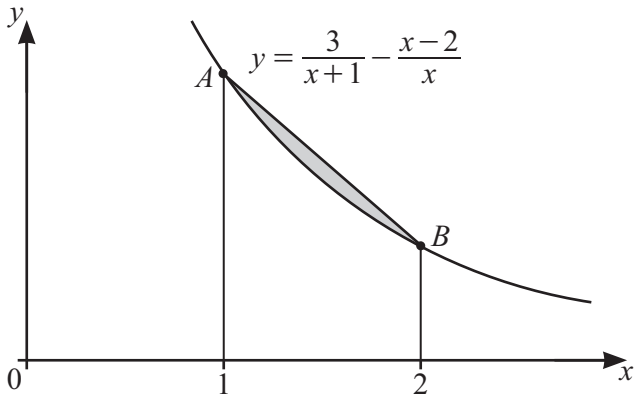
Find the value of $\sin\theta$. [2]

(b) It is also given that the exact area of the shaded segment is $(15\pi - 9)\,\text{cm}^2$.

Find the exact length of the arc AB. [4]

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The diagram shows part of the curve $y = \frac{3}{x+1} - \frac{x-2}{x}$.

The points A and B lie on the curve such that the x-coordinate of A is 1 and the x-coordinate of B is 2.

(a) Find the y-coordinates of A and B. [1]

(b) Show that the area of the shaded region enclosed by the line AB and the curve is $\frac{a}{4} - \ln\frac{b}{2}$, where a and b are integers to be found. [7]

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