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a) (i)   AC is common

$\theta = \angle BCA$ = alternate angles are equal

(ii)   $a^2 + b^2 = c^2$

$a \times a = x$                    $a^2 = x$

$x \times x = ay$                   $x^2 = ay$

$x^2 = a^2$

$x^2 = a^2 + ay$

(iii)   $y = a(1 - 2\cos\theta)$

(iv)   $y \le 3a$

$\dfrac{y}{3} \le a$        $\dfrac{y}{9} \le 3$

b) (i)   ~~vertex~~

$V = \dfrac{\pi r^3}{3} (2 - 3\sin\theta + \sin^3\theta)$

(ii)   $\theta = \dfrac{x}{2}$   ①

$= 45°$

(iii)   $\dfrac{1}{3}$