The change in crankcase volume A is the volume between the two piston displacements and is a function of d the phase angle between the pistons.Assuming identical cylinder bore diameters then

$$A(d) = \int_l^u (\sin x - \sin(x+d))dx$$

where l and u are the two solutions of $\sin x = \sin(x+d)$ when $\sin(x+d) \geq \sin(x)$ over the range d ($0 \leq d \leq \pi$)
The solution is

$$A := \cos(a) - \cos(a+d) - \cos(b) + \cos(b+d)$$

where $a = -\arctan(\sin(d)/(-1+\cos(d)))$ and $b = \pi - \arctan(\sin(d)/(-1+\cos(d)))$ are the lower and upper limits that satisfy $\sin(a+d) = \sin(a)$ and $\sin(b+d) = \sin(b)$.

This evaluates to

$$A(d) = 2\,\frac{1}{\sqrt{1+\frac{(\sin(d))^2}{(-1+\cos(d))^2}}} - 2\,\cos\left(-\arctan\left(\frac{\sin(d)}{-1+\cos(d)}\right)+d\right)$$

Thanks to John Kinsella and *MAPLE* for the solution.