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Version C

Follow the directions on the previous page.

The part of the function $f(x)$ from the point A to the point B has formula $y = x^2 - 8x + 15$.

The part of the function $f(x)$ from the point B to the point C has formula $y = e^{(x-6)/6} + 2$.

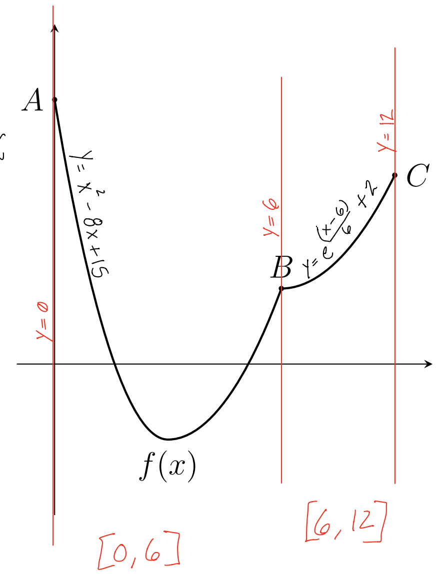
The points labeled in the figure are as follows:

$A = (0, 15)$

$B = (6, 3)$

$C = (12, e + 2)$

Arc length $= \int_a^b \sqrt{1 + (f'(x))^2}\, dx$



1

$Y_{AB} = x^2 - 8x + 15$

$Y_{AB}' = 2x - 8$

$Y_{BC} = e^{\frac{(x-6)}{6}} + 2$

$\frac{1}{6}x - \frac{6}{6}$

$Y_{BC}' = \frac{1}{6}e^{\left(\frac{x-6}{6}\right)}$

2

$\int_0^6 \sqrt{1 + (2x - 8)^2}\, dx + \int_6^{12} \sqrt{1 + \left(\frac{1}{6}e^{\left(\frac{x-6}{6}\right)}\right)^2}\, dx$

3

$= 4x^2 - 32x + 64$

$= 4(x^2 - 8x + 16)$

$= 4(x - 4)^2$

$= \left(\frac{1}{6}e^{\left(\frac{x-6}{6}\right)}\right)\left(\frac{1}{6}e^{\left(\frac{x-6}{6}\right)}\right)$

$+$

$= \left(\frac{1}{36}e^{\frac{2x-12}{6}}\right)$

$\int_0^6 \sqrt{1 + 4(x - 4)^2}\, dx + \int_6^{12} \sqrt{1 + \frac{1}{36}e^{\frac{2x-12}{6}}}\, dx$

$$\boxed{\int_0^6 \sqrt{1 + 4(x-4)^2}\, dx + \int_6^{12} \sqrt{1 + \frac{1}{36}e^{\frac{2x-12}{6}}}\, dx}$$ ✓