

1.– Find the length of the indicated arcs:

- a) $y = x^{3/2}$, between $x = 0$ and $x = 5$.
 - b) $x = 3y^{3/2} - 1$, between $y = 0$ and $y = 4$.
 - c) $24xy = x^4 + 48$, between $x = 2$ and $x = 4$.
 - d) $y = \frac{1}{2}a(e^{\frac{x}{a}} + e^{-\frac{x}{a}})$, between $x = 0$ and $x = a$.
 - e) $y = \ln \cos x$, between $x = 0$ and $x = a$, being $a < \frac{\pi}{2}$.
 - f) $y = \ln x$, between $x = 1$ and $x = 2\sqrt{2}$.
 - g) $x = \frac{1}{2}y^2 - \frac{1}{4}\ln y$, between $y = 1$ and $y = e$.
 - h) $y = a \ln \frac{a^2}{a^2 - x^2}$, between $x = 0$ and $x = b$, being $b < a$.
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2.– Find the length of the following arcs:

- a) $x = t^2$; $y = t^3$; between $t = 0$ and $t = 4$.
 - b) $x = t - \sin t$; $y = 1 - \cos t$; between $t = 0$ and $t = 2\pi$.
 - c) $x = e^t \cos t$; $y = e^t \sin t$; between $t = 0$ and $t = 4$.
 - d) $x = a(\cos t + t \sin t)$; $y = a(\sin t - t \cos t)$; between $t = 0$ and $t = 2\pi$.
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3.– Obtain the area of the surface generated by rotating the indicated arc about the given axis:

- a) $y^2 = 12x$, between $x = 0$ and $x = 3$, about the x -axis.
 - b) $x = y^3$, between $y = 0$ and $y = 1$, about the y -axis.
 - c) $y = a \cosh \frac{x}{a}$, between $x = -a$ and $x = a$, about the x -axis.
 - d) $x + y^2 - 3 = 0$, for $x \geq 0$, about the x -axis.
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4.– Find the area of the surface generated by rotating the indicated arc about the given axis:

- a) $x = a \cos^3 t$; $y = a \sin^3 t$; about the x -axis.
 - b) $x = a(t - \sin t)$; $y = a(1 - \cos t)$; between $t = 0$ and $t = 2\pi$ about the x -axis.
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5.– Find the length of the circumference and the surface area of the sphere:

- a) Using explicit cartesian coordinates.
 - b) Using parametric cartesian coordinates.
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