CENGAGE | WEBASSIGN

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8.1 Longitud de Arco (Homework)

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Current Score

QUESTION	1	2	3	4	5	6	7	8	9
POINTS	3/3 ✓	3/3 ✓	3/3 ✓	3/3 ✓	3/3 ✓	3/3 ✓	3/3 ✓	3/3 ✓	3/3 ✓

TOTAL SCORE

27/27 100.0%

Due Date

DECEMBER 21
11:59 PM CST

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Assignment Submission & Scoring

Assignment Submission

For this assignment, you submit answers by question parts. The number of submissions remaining for each question part only changes if you submit or change the answer.

Assignment Scoring

Your last submission is used for your score

Your last submission is used for your score.

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1. 3/3 points Previous Answers SCalcET8 8.1.001. My Notes Ask Your Teacher

Use the arc length formula to find the length of the curve $y = 5x - 1, \quad -1 \le x \le 3$. Check your answer by noting that the curve is a line segment and calculating its length by the distance formula.

$4\sqrt{26}$

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2. 3/3 points Previous Answers SCalcET8 8.1.002. My Notes Ask Your Teacher

Use the arc length formula to find the length of the curve $y = \sqrt{2 - x^2}, \ 0 \le x \le 1$. Check your answer by noting that the curve is part of a circle.

$n2\sqrt{2}$

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3. 3/3 points Previous Answers SCalcET8 8.1.015. My Notes Ask Your Teacher

Find the exact length of the curve.

$y = \ln(\sec(x)), \quad 0 \le x \le \pi/4$

$ln(|2\sqrt{2}+1|)$

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4. 3/3 points Previous Answers SCalcET8 8.1.016. My Notes Ask Your Teacher

Find the exact length of the curve.

$y = 8 + \frac{1}{2}\cosh(2x), \quad 0 \le x \le 2$

$12sinh(4)$

5. 3/3 points Previous Answers SCalcET8 8.1.019. My Notes Ask Your Teacher

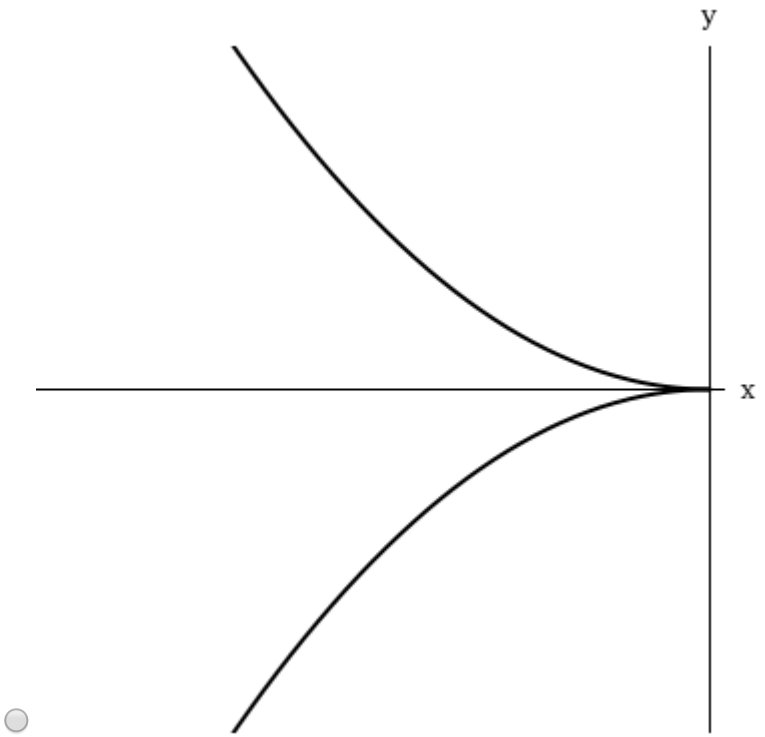
Find the exact length of the curve.

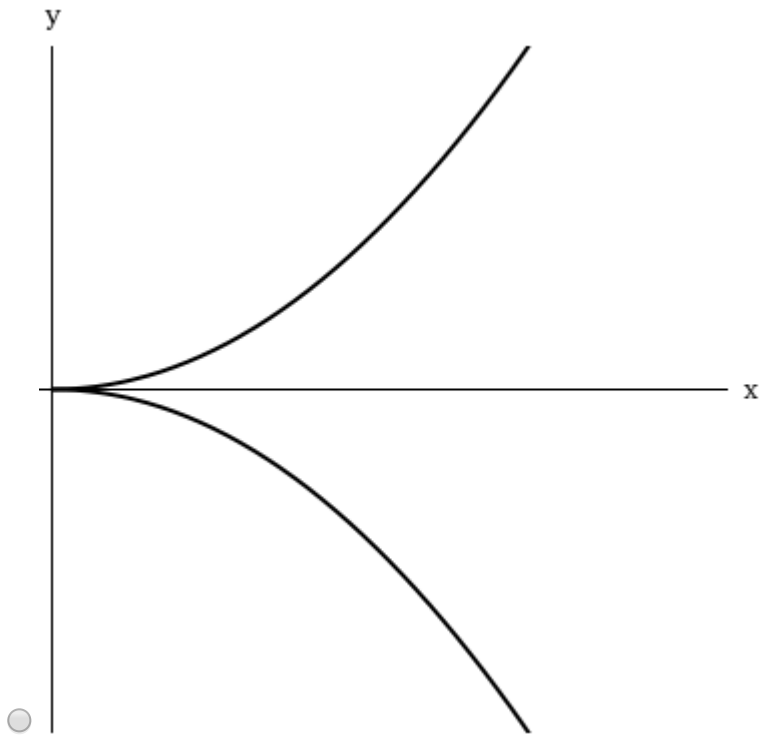
$$y = \ln\left(1 - x^2\right), \quad 0 \le x \le \frac{1}{8}$$

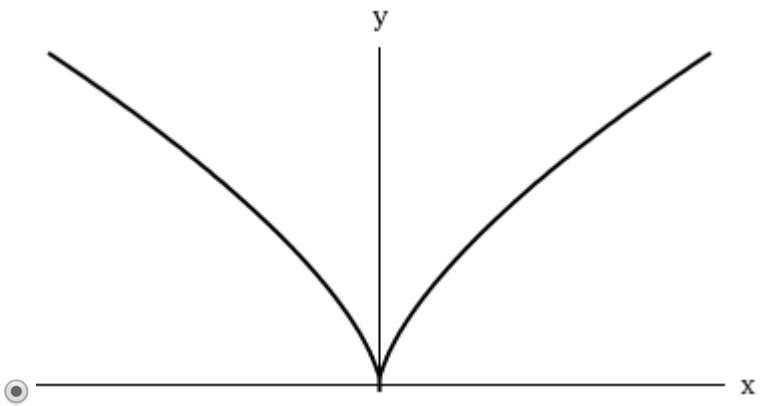
$ln(98)-ln(78)-18$

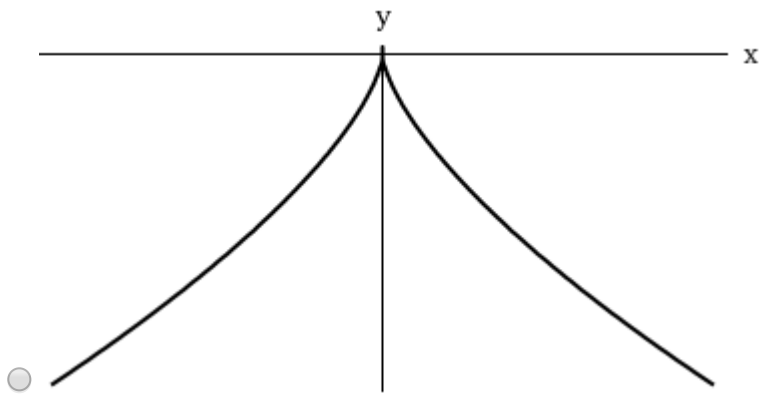
6. 3/3 points Previous Answers SCalcET8 8.1.034. My Notes Ask Your Teacher

(a) Sketch the curve $y^3 = x^2$.









(b) Use the following formulas to set up two integrals for the arc length from (0, 0) to (1, 1). Observe that one of these is an improper integral.

$$\text{(I)}\quad L = \int_a^b \sqrt{1 + \left(\frac{dy}{dx}\right)^2}\, dx$$

$$\text{(II)}\quad L = \int_c^d \sqrt{1 + \left(\frac{dx}{dy}\right)^2}\, dy$$

$L = \int_0^1$ [ ] $\sqrt{1+49x(23)}$ [ ] $= 13(32)-827$ [ ]

[ ] dx

$L = \int_0^1$ [ ] $\sqrt{1+94y}$ [ ] $= 13(32)-827$ [ ]

[ ] dy

(c) Find the length of the arc of this curve from $(-27, 9)$ to $(8, 4)$.

[ ] $127(80\cdot\sqrt{10}+85\cdot\sqrt{85}-16)$

[ ]

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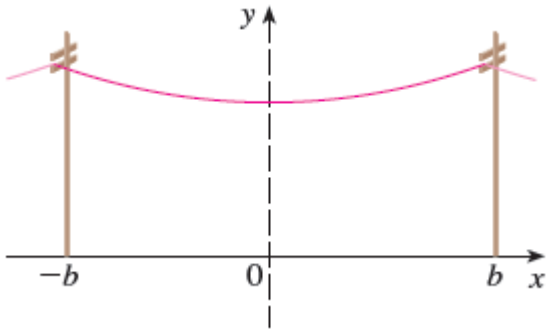
7. 3/3 points Previous Answers SCalcET8 8.1.044. My Notes Ask Your Teacher

Consider the following.



(a) The figure shows a telephone wire hanging between two poles at $x = -b$ and $x = b$. It takes the shape of a catenary with the equation $y = c + a\cosh(x/a)$. Find the length of the wire.

$a(sinh(ba)-sinh(-ba))$

(b) Suppose two telephone poles are 60 ft apart and the length of the wire between the poles is 61 ft. If the lowest point of the wire must be 25 ft above the ground, how high up on each pole should the wire be attached? (Round your answer to two decimal places.)

29.77 ft

8. 3/3 points Previous Answers SCalcET8 8.1.045. My Notes Ask Your Teacher

Find the length of the curve

$$y = \int_1^x \sqrt{t^3 - 1}\, dt, \quad 1 \le x \le 4.$$

62/5

9. 3/3 points Previous Answers SCalcET8 8.1.AE.004. My Notes Ask Your Teacher

Video Example

EXAMPLE 4 Find the arc length for the curve $y = 4x^2 - \frac{1}{32}\ln(x)$ taking $P_0(1, 4)$ as the starting point.

SOLUTION If $f(x) = 4x^2 - \frac{1}{32}\ln(x)$, then

$f'(x) =$ [ ] $8x-132x$ [ ]

✔

$1 + [f'(x)]^2 =$ $1 + ($ [ ] $8x-132x$ [ ] $)^2$

✔ ✔

$= 1 + 64x^2 - 0.5 +$ [ ] $11024x2$ [ ]

✔

$= 64x^2 + 0.5 +$ [ ] $11024x2$ [ ]

✔

$= ($ [ ] $8x+132x$ [ ] $)^2$

✔ ✔

$\sqrt{1 + [f'(x)]^2} =$ [ ] $8x+132x$ [ ]

✔ .

Thus the arc length is given by

$$s(x) = \int_1^x \sqrt{1 + [f'(t)]^2}\, dt$$

$$= \int_1^x \left(\square 8t+132t \right) dt$$

$$= \square 4t2+132ln(t) \Big]_1^x$$

$$= \square 4x2+132ln(x)-4 .$$

For instance, the arc length along the curve from $(1, 4)$ to $(3, f(3))$ is

$$s(3) = 36 + \frac{1}{32}\ln(3) - 4$$

$$= 32 + \frac{\ln(3)}{32}$$

$$\approx 32.0343 \quad \text{(rounded to four decimal places).}$$

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