3.10: Linear Approximations and Differentials (Homework)

INSTRUCTOR
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Texas A&M University at Galveston

Past Due **Due Date:** SUN, APR 12, 2026 11:59 PM CDT

Current Score: 20 / 20 POINTS | 100.0 %

Due date has passed. No changes can be made without an approved extension request.
You may not be granted an extension if you have already viewed the answer key.

VIEW ANSWER KEY

Scoring and Assignment Information

QUESTION	1	2	3	4	5	6	7	8	9	10
POINTS	1 / 1	1 / 1	2 / 2	2 / 2	1 / 1	2 / 2	4 / 4	1 / 1	3 / 3	3 / 3

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 best submission for each question part is used for your score.

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1. **[1 / 1 Points]**

DETAILS | MY NOTES | PREVIOUS ANSWERS | ASK YOUR TEACHER | PRACTICE ANOTHER

SCalcET9 3.10.001.MI.

Find the linearization $L(x)$ of the function at a.

$$f(x) = x^3 - x^2 + 1, \quad a = -2$$

$L(x) =$
$$16x+21

✔ Fantastic job!

Resources

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2. **[1 / 1 Points]**

DETAILS | MY NOTES | PREVIOUS ANSWERS | ASK YOUR TEACHER | PRACTICE ANOTHER

SCalcET9 3.10.014.

Find the differential of the function.

$$y = \theta^4 \sin(12\theta)$$

$dy =$
$$d\theta(4\theta 3(sin(12\theta)+3\theta cos(12\theta)))

✔ That's great!

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3. **[2 / 2 Points]**

DETAILS | MY NOTES | PREVIOUS ANSWERS | ASK YOUR TEACHER | PRACTICE ANOTHER

SCalcET9 3.10.020.

(a) Find the differential dy.

$y = \cos(\pi x)$

$dy =$

$$dx(-\pi sin(\pi x))$$

✔ Awesome!

(b) Evaluate dy for the given values of x and dx. (Round your answer to three decimal places.)

$x = \frac{1}{3}$, $dx = 0.01$.

$dy =$ -0.027 ✔ Awesome!

Resources

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4. **[2 / 2 Points]**

DETAILS | MY NOTES | PREVIOUS ANSWERS | ASK YOUR TEACHER | PRACTICE ANOTHER

SCalcET9 3.10.019.

(a) Find the differential dy.

$$y = e^{x/2}$$

$dy =$
$$12ex2dx

✔ That's it!

(b) Evaluate dy for the given values of x and dx.

$x = 0, \quad dx = 0.1$

$dy =$ 0.05 ✔ You got it!

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5. **[1 / 1 Points]**

DETAILS | MY NOTES | PREVIOUS ANSWERS | ASK YOUR TEACHER | PRACTICE ANOTHER

SCalcET9 3.10.016.

Find the differential of the function.

$$y = \sqrt{3 + \cos(\theta)}$$

$dy =$
$$-sin(\theta)2\sqrt{3+cos(\theta)}d\theta

✔ Great job.

Resources

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6. **[2 / 2 Points]**

DETAILS | MY NOTES | PREVIOUS ANSWERS | ASK YOUR TEACHER

PRACTICE ANOTHER

SCalcET9 3.10.017.

Find the differential of the function.

$$y = \ln(\sin(8\theta))$$

$dy =$

$$8\cot(8\theta)d\theta$$

Amazing work.

Resources

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7. **[4 / 4 Points]**

DETAILS | MY NOTES | PREVIOUS ANSWERS | ASK YOUR TEACHER

PRACTICE ANOTHER

SCalcET9 3.10.006.MI.

Find the linear approximation $L(x)$ of the function $g(x) = \sqrt[3]{1 + x}$ at $a = 0$.

$L(x) \approx$

$$1+13x

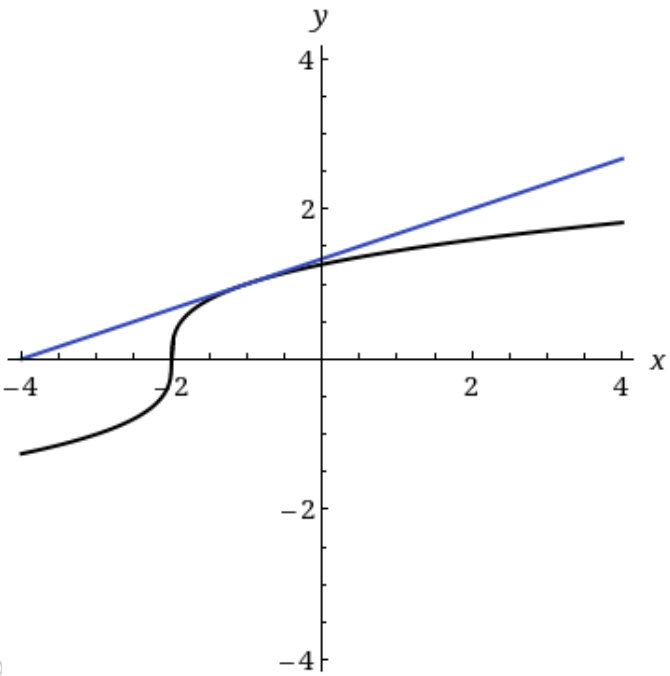
✔ Nice!

Use it to approximate the numbers $\sqrt[3]{0.95}$ and $\sqrt[3]{1.1}$. (Round your answers to three decimal places.)

$\sqrt[3]{0.95} \approx$ 0.983 ✔ That's right!

$\sqrt[3]{1.1} \approx$ 1.033 ✔ Nice!

Use technology to graph g and the tangent line in the same viewing window.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2
x
−4
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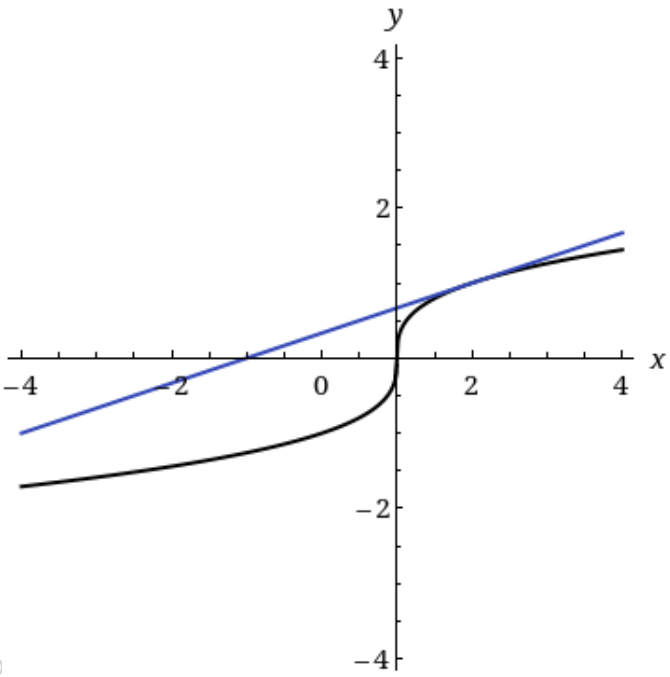
2
4
−2
−4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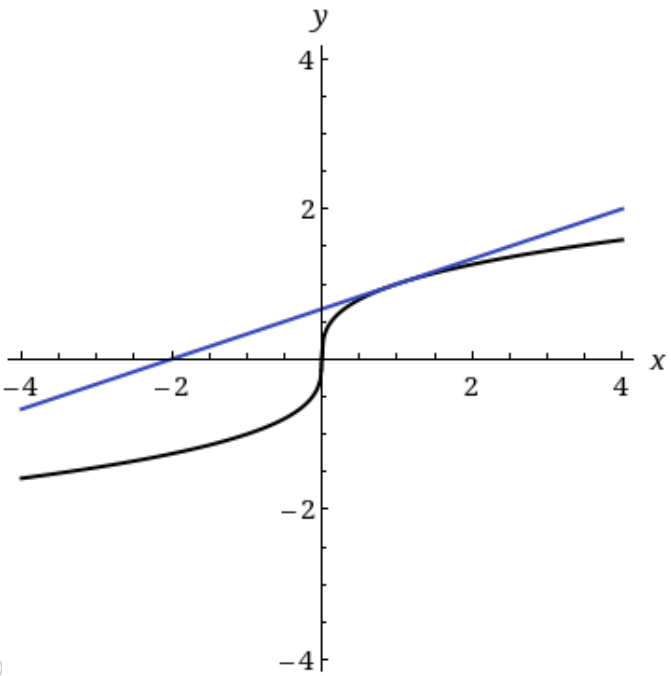

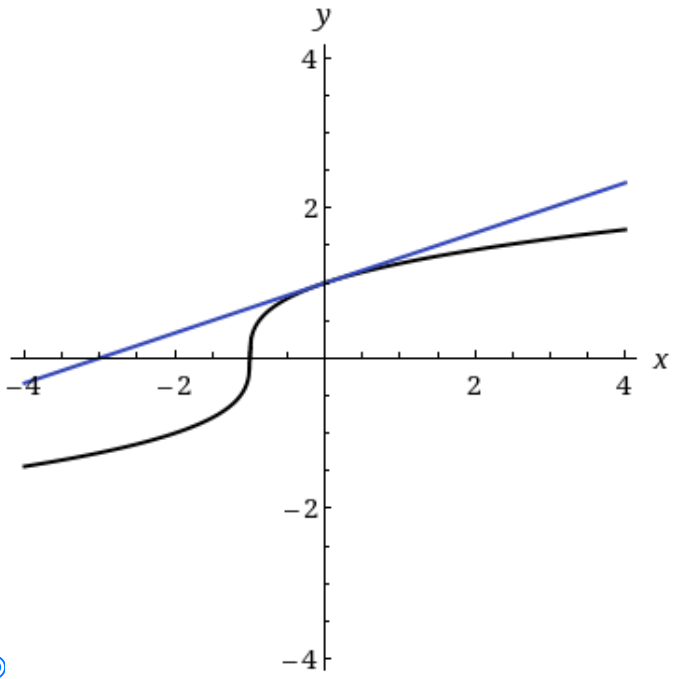

✔ Nice!

Resources

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8. **[1 / 1 Points]**

DETAILS | MY NOTES | PREVIOUS ANSWERS | ASK YOUR TEACHER

PRACTICE ANOTHER

SCalcET9 3.10.002.

Find the linearization $L(x)$ of the function at a.

$$f(x) = e^{9x}, \quad a = 0$$

$L(x) =$
$$1+9x

✔ Nice job!

Resources

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9. **[3 / 3 Points]**

DETAILS | MY NOTES | PREVIOUS ANSWERS | ASK YOUR TEACHER

PRACTICE ANOTHER

SCalcET9 3.10.025.

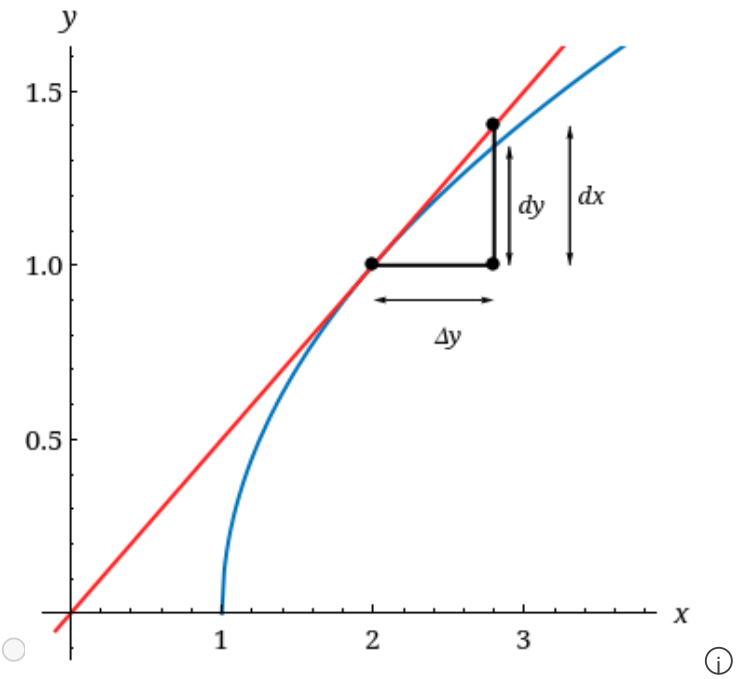
Compute Δy and dy for the given values of x and $dx = \Delta x$. (Round your answers to three decimal places.)

$$y = \sqrt{x - 1}, \quad x = 2, \quad \Delta x = 0.8$$

Δy = 0.342 ✓ Excellent!

dy = 0.400 ✓ Excellent job!

Sketch a diagram showing the line segments with lengths dx, dy, and Δy.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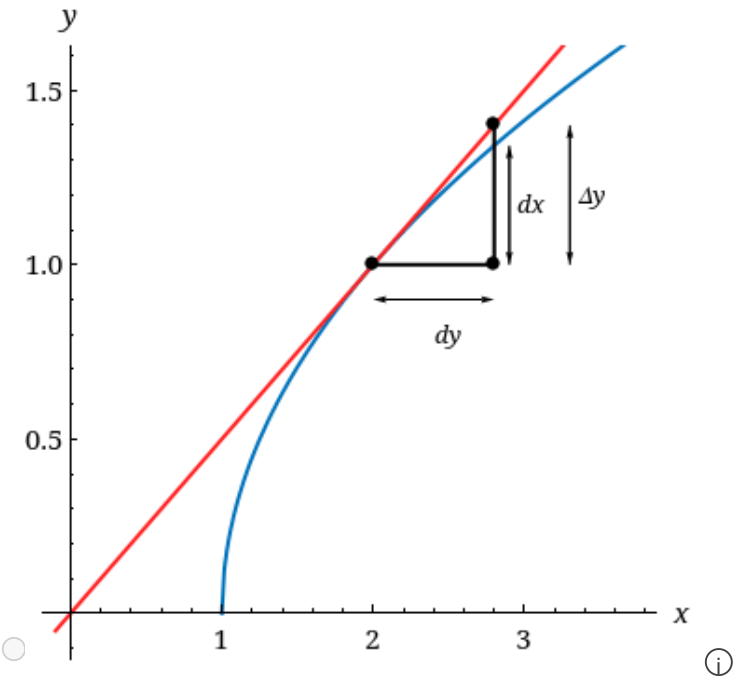
0.5
1
2
3
x
dy
dx
Δy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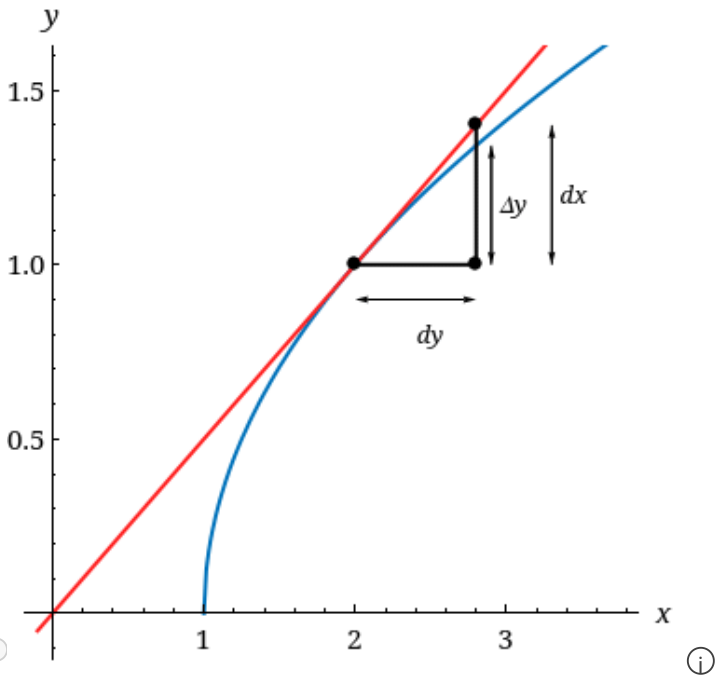

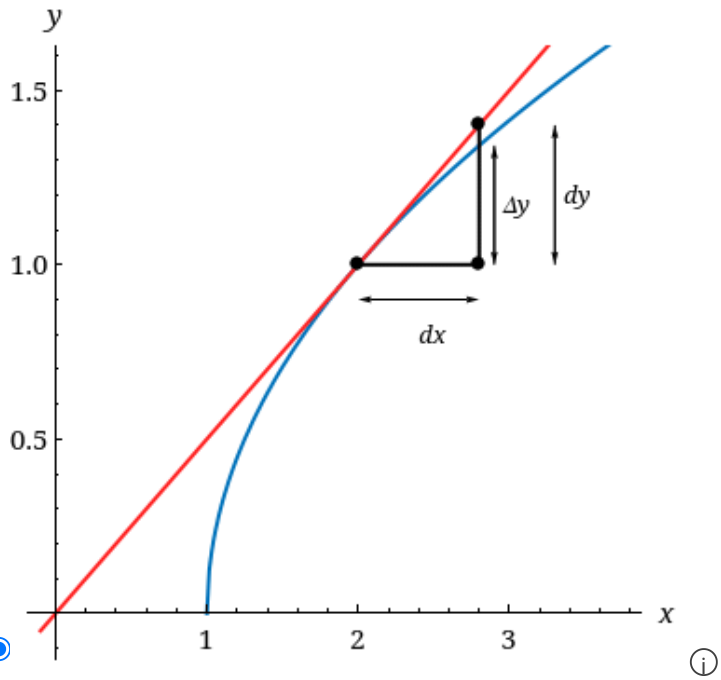

✔ Great work.

Resources

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10. **[3 / 3 Points]**

DETAILS | MY NOTES | PREVIOUS ANSWERS | ASK YOUR TEACHER

PRACTICE ANOTHER

SCalcET9 3.10.026.

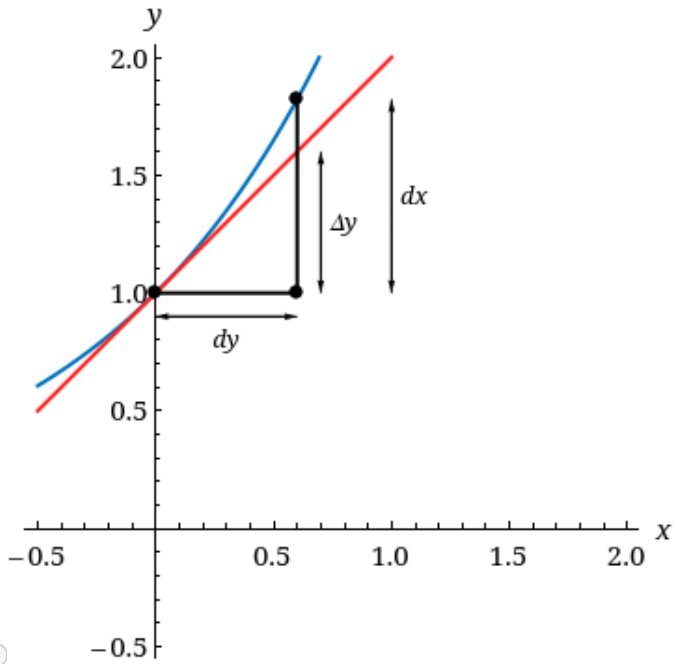
Compute Δy and dy for the given values of x and $dx = \Delta x$. (Round your answers to three decimal places.)

$$y = e^x, \quad x = 0, \quad \Delta x = 0.6$$

Δy = 0.822 ✓ Impressive work!

dy = 0.600 ✓ Impressive work.

Sketch a diagram showing the line segments with lengths dx, dy, and Δy.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x
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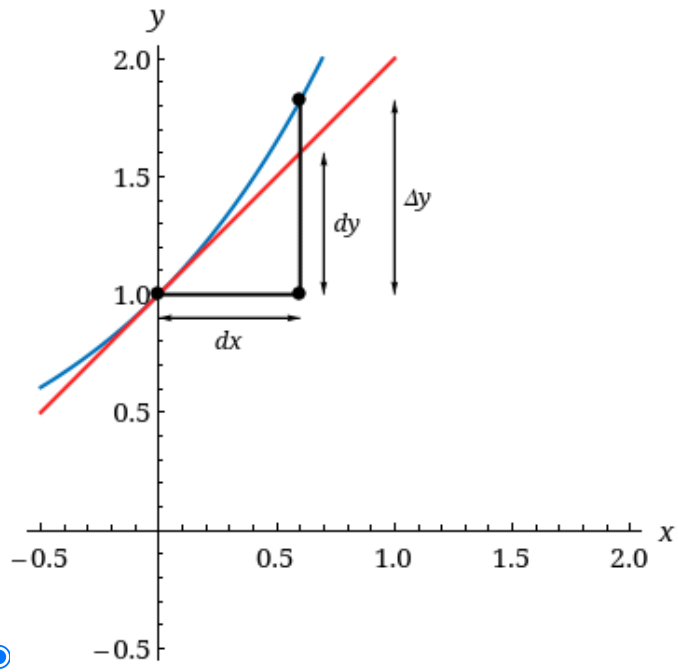
Δy
dx
dy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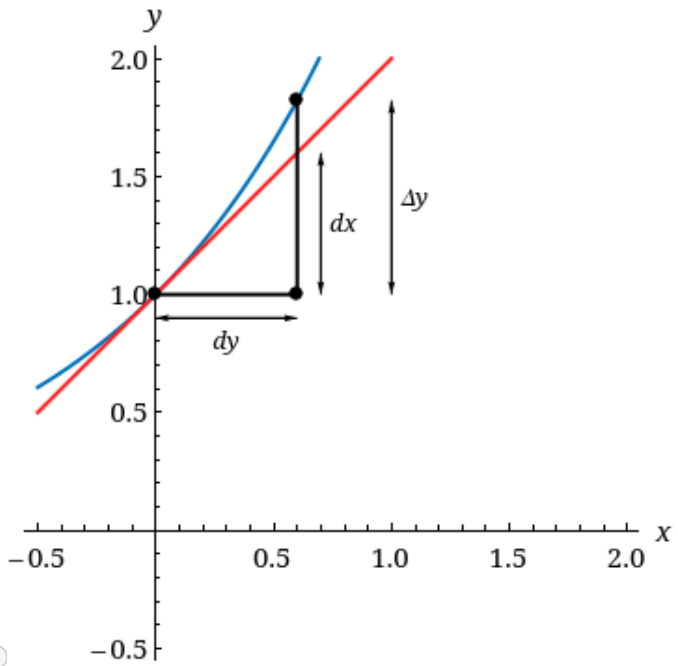
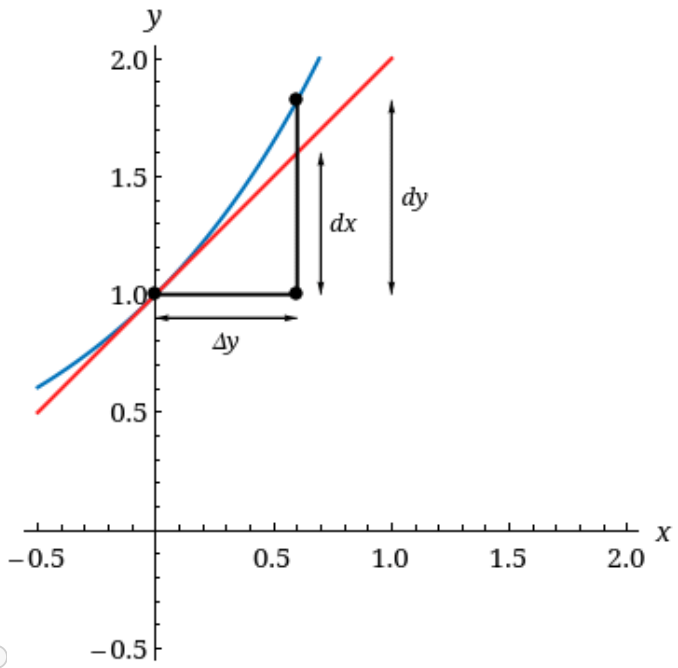
dy
Δy
dx





✔ Nice work.

Resources

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