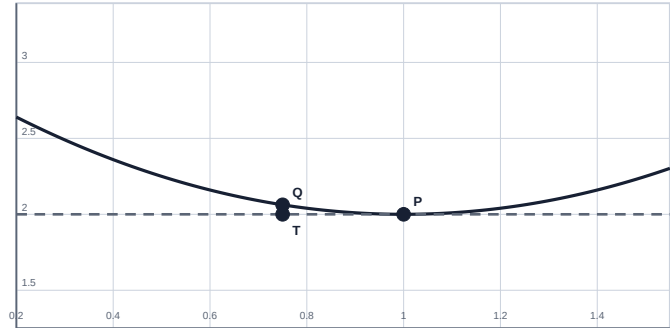


Graphing Differentials

Use the supplied graph and exact function values to find $\Delta y = f(b) - f(a)$ and $dy = f'(a)(b - a)$.

1. Find exact Δy and dy .

$f(x) = -2 \cdot x + x^2 + 3$



$a = 1$

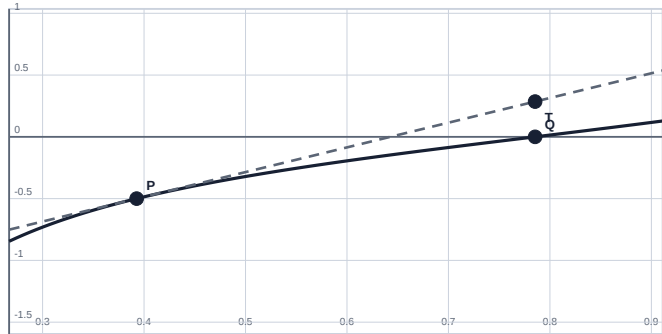
$b = \frac{3}{4}$

$\Delta y = \underline{\hspace{2cm}}$

$dy = \underline{\hspace{2cm}}$

2. Find exact Δy and dy .

$f(x) = \frac{-1}{2} \cdot \cot(2 \cdot x)$



$a = \frac{1}{8} \cdot \pi$

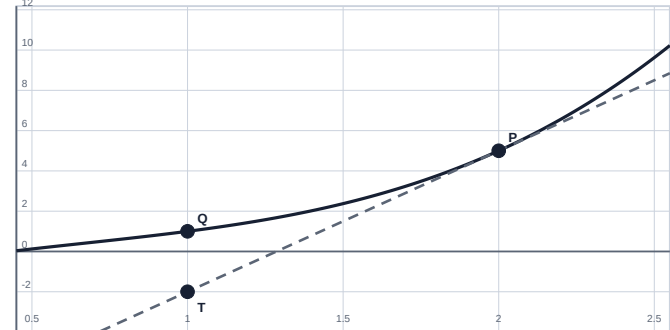
$b = \frac{1}{4} \cdot \pi$

$\Delta y = \underline{\hspace{2cm}}$

$dy = \underline{\hspace{2cm}}$

3. Find exact Δy and dy .

$f(x) = 3 \cdot x - 2 \cdot x^2 + x^3 - 1$



$a = 2$

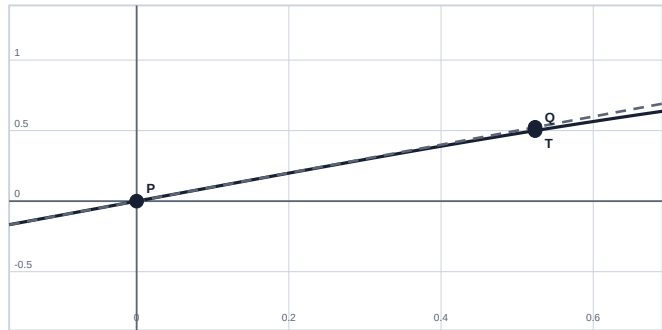
$b = 1$

$\Delta y = \underline{\hspace{2cm}}$

$dy = \underline{\hspace{2cm}}$

4. Find exact Δy and dy .

$f(x) = \sin(x)$



$a = 0$

$b = \frac{1}{6} \cdot \pi$

$\Delta y = \underline{\hspace{2cm}}$

$dy = \underline{\hspace{2cm}}$

Graphing Differentials

Worked Answer Key

Use the supplied graph and exact function values to find $\Delta y = f(b) - f(a)$ and $dy = f'(a)(b - a)$.

1. Actual curve change and tangent change

$f(x) = -2 \cdot x + x^2 + 3$
 $f'(x) = 2 \cdot x - 2$
 $a = 1$
 $b = \frac{3}{4}$
 $\Delta x = b - a = \frac{-1}{4}$
 $f(a) = 2$
 $f(b) = \frac{33}{16}$
 $f'(a) = 0$
 $\Delta y = f(b) - f(a) = \frac{1}{16}$
 $dy = f'(a) \Delta x = 0$
 $L(b) = f(a) + dy = 2$
Q shows the signed actual change from $f(a)$; T shows the signed tangent change. All real x .

2. Actual curve change and tangent change

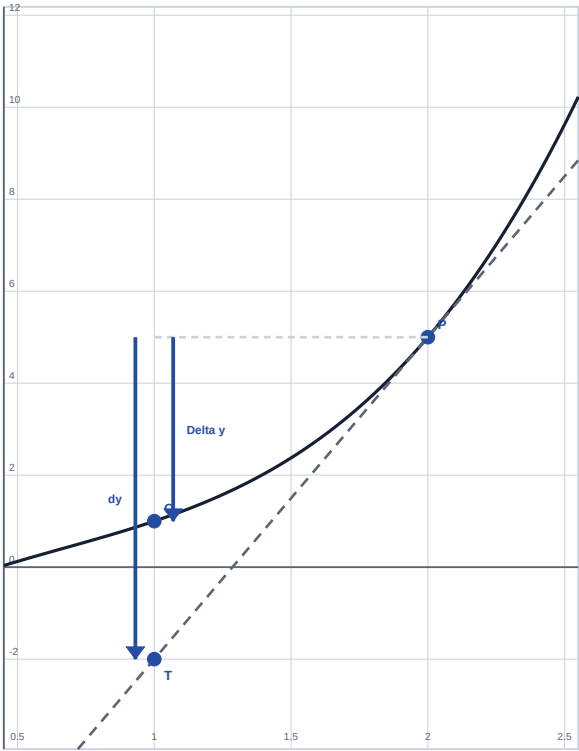
$f(x) = \frac{-1}{2} \cdot \cot(2 \cdot x)$
 $f'(x) = \csc(2 \cdot x)^2$
 $a = \frac{1}{8} \cdot \pi$
 $b = \frac{1}{4} \cdot \pi$
 $\Delta x = b - a = \frac{1}{8} \cdot \pi$
 $f(a) = \frac{-1}{2}$
 $f(b) = 0$
 $f'(a) = 2$
 $\Delta y = f(b) - f(a) = \frac{1}{2}$
 $dy = f'(a) \Delta x = \frac{1}{4} \cdot \pi$
 $L(b) = f(a) + dy = \frac{1}{4} \cdot \pi - \frac{1}{2}$
Q shows the signed actual change from $f(a)$; T shows the signed tangent change. $\sin(2 \cdot x) \neq 0$.

Graphing Differentials

Worked Answer Key

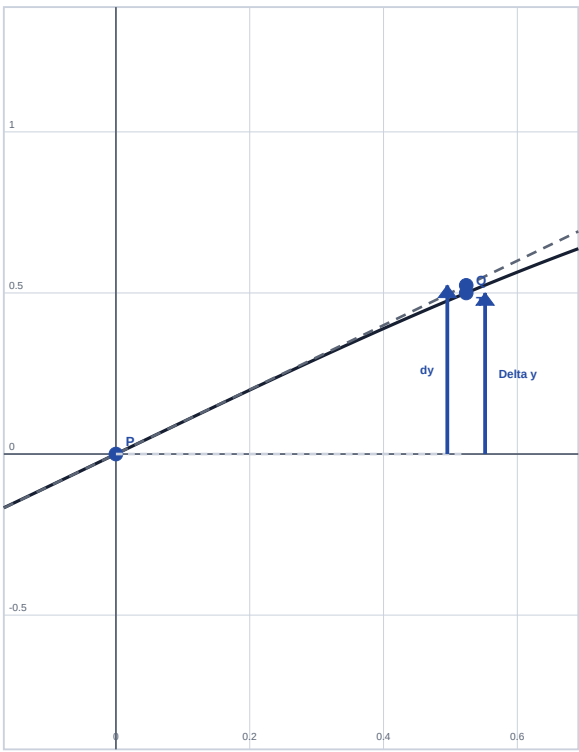
Use the supplied graph and exact function values to find $\Delta y = f(b) - f(a)$ and $dy = f'(a)(b - a)$.

3. Actual curve change and tangent change



$f(x) = 3 \cdot x - 2 \cdot x^2 + x^3 - 1$
 $f'(x) = -4 \cdot x + 3 \cdot x^2 + 3$
 $a = 2$
 $b = 1$
 $\Delta x = b - a = -1$
 $f(a) = 5$
 $f(b) = 1$
 $f'(a) = 7$
 $\Delta y = f(b) - f(a) = -4$
 $dy = f'(a) \Delta x = -7$
 $L(b) = f(a) + dy = -2$
Q shows the signed actual change from $f(a)$; T shows the signed tangent change. All real x .

4. Actual curve change and tangent change



$f(x) = \sin(x)$
 $f'(x) = \cos(x)$
 $a = 0$
 $b = \frac{1}{6} \cdot \pi$
 $\Delta x = b - a = \frac{1}{6} \cdot \pi$
 $f(a) = 0$
 $f(b) = \frac{1}{2}$
 $f'(a) = 1$
 $\Delta y = f(b) - f(a) = \frac{1}{2}$
 $dy = f'(a) \Delta x = \frac{1}{6} \cdot \pi$
 $L(b) = f(a) + dy = \frac{1}{6} \cdot \pi$
Q shows the signed actual change from $f(a)$; T shows the signed tangent change. All real x .