

Bellwork 9/8

If a tennis ball on Earth is launched upward with a velocity of $19.6 \frac{m}{s}$, the height of the ball from its initial position can be modeled by the equation:

$$h(t) = 19.6t - 4.9t^2$$

① Find its average velocity over the given time intervals:

① $[0.9, 1]$

② $[0.99, 1]$

③ $[1, 1.01]$

④ $[1, 1.1]$

② Estimate the instantaneous velocity of the ball at $t = 1$.

reset

Bellwork 9/8 - Solutions

1

1 $0.49 \frac{m}{s}$
2 $0.049 \frac{m}{s}$

3 $-0.049 \frac{m}{s}$
4 $-0.49 \frac{m}{s}$

2 $0 \frac{m}{s}$

Exercise 1

① Graph $f(x) = \frac{1-\cos(x)}{x}$ on a calculator.

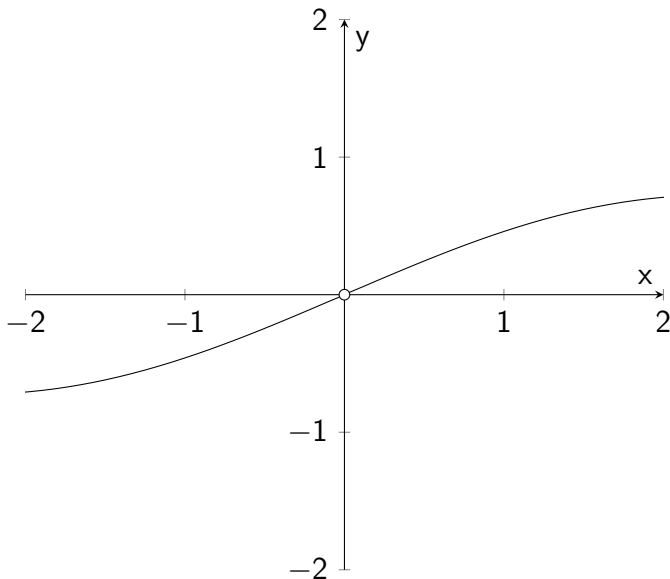
② Fill in the table:

x	$f(x)$
0.5	
0.1	
0.01	
0.001	

③ Estimate: $\lim_{x \rightarrow 0} \left[\frac{1 - \cos(x)}{x} \right]$

reset

Exercise 1 - Solutions



Exercise 1 - Solutions

2

x	$f(x)$
-0.1	-0.05
-0.01	-0.005
0.01	0.005
0.1	0.05

3 From the table,

$$\lim_{x \rightarrow 0} \left[\frac{1 - \cos(x)}{x} \right] \approx \boxed{0}$$

Exercise 2

1 Graph $f(x) = \frac{x^2-9}{x+3}$ on a calculator.

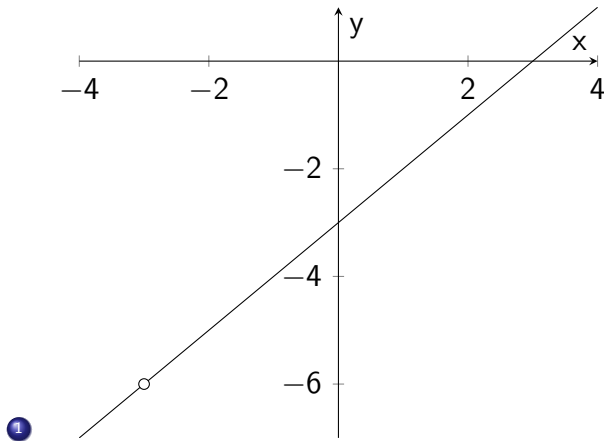
2 Fill in the table:

x	$f(x)$
-3.1	
-3.01	
-2.99	
-2.9	

3 Estimate: $\lim_{x \rightarrow -3} \left(\frac{x^2 - 9}{x + 3} \right)$

reset

Exercise 2 - Solutions



Exercise 2 - Solutions

	x	$f(x)$
	-3.1	-6.1
2	-3.01	-6.01
	-2.99	-5.99
	-2.90.1	-5.9

3 From the table,

$$\lim_{x \rightarrow -3} \left(\frac{x^2 - 9}{x + 3} \right) \approx \boxed{-6}$$