

1. +6 points SCalc8 1.4.001.MI. My Notes

A tank holds 1000 gallons of water, which drains from the bottom of the tank in half an hour. The values in the table show the volume V of water remaining in the tank (in gallons) after t minutes.

t (min)	5	10	15	20	25	30
V (gal)	680	441	245	102	25	0

(a) If P is the point $(15, 245)$ on the graph of V , find the slopes of the secant lines PQ when Q is the point on the graph with the following values. (Round your answers to one decimal place.)

Q	slope
$(5, 680)$	<input type="text"/>
$(10, 441)$	<input type="text"/>
$(20, 102)$	<input type="text"/>
$(25, 25)$	<input type="text"/>
$(30, 0)$	<input type="text"/>

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{V_2 - V_1}{t_2 - t_1}$

$= \frac{V_2 - 245}{t_2 - 15}$

A	B	C	D	E	F	G	H	I
1	#1	t	V	m	$P = (15, 245)$			
2		5	680	-43.5	We find the slope from P to each of			
3		10	441	-39.2	the points Q , in the table.			
4		15	245	Newp				
5		20	102	-28.6				
6		25	25	-22				
7		30	0	-16.333				
8	Data seems sorta linear, definitely decreases							

2. +10 points SCalc8 1.4.003.

My Notes Ask Your Teacher

The point $P(7, -3)$ lies on the curve $y = 3/(6 - x)$.

(a) If Q is the point $(x, 3/(6 - x))$, use your calculator to find the slope m_{PQ} of the secant line PQ (correct to six decimal places) for the following values of x .

- (i) 6.9
- (ii) 6.99
- (iii) 6.999
- (iv) 6.9999
- (v) 7.1
- (vi) 7.01
- (vii) 7.001
- (viii) 7.0001

(b) Using the results of part (a), guess the value of the slope m of the tangent line to the curve at $P(7, -3)$.

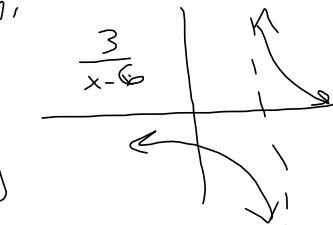
(c) Using the slope from part (b), find an equation of the tangent line to the curve at $P(7, -3)$.

2

	A	B	C	D
14				
15	#2	x	f(x)	m
16		7	-3	
17		6.9	-3.3333	3.33333333
18		6.99	-3.0303	3.03030303
19		6.999	-3.003	3.003003
20		6.9999	-3.0003	3.00030003
21		7.0001	-2.9997	2.99970003
22		7.001	-2.997	2.997003
23		7.01	-2.9703	2.97029703
24		7.1	-2.7273	2.72727273

b) $m_{\tan} = 3$, I'm guessing,

c) $y = m(x - x_0) + y_0$,
 $= 3(x - 7) - 3$
 $= 3x - 21 - 3$
 $\boxed{y = 3x - 24}$



$$\frac{-3}{x-6} = \frac{3}{6-x}$$

$\hookrightarrow y = 3x - 24$
 is tangent line.

3. +/-5 points SCalc8 1.4.005.[My Notes](#) [Ask Your Teacher](#)

If a ball is thrown into the air with a velocity of 34 ft/s, its height in feet t seconds later is given by $y = 34t - 16t^2$.

(a) Find the average velocity for the time period beginning when $t = 2$ and lasting for each of the following.

- (i) 0.5 seconds
- (ii) 0.1 seconds
- (iii) 0.05 seconds
- (iv) 0.01 seconds

(b) Estimate the instantaneous velocity when $t = 2$.

$$\boxed{v(2) = -30}$$

22	A	B	C	D
23	#3	t	$y = f(t)$	m
24		2	4	DNE
25		2.5	-15	-38
26		2.1	0.84	-31.6
27		2.01	3.6984	-30.16
28		2.001	3.96998	-30.016
29		2.0001	3.997	-30.002
30		2.00001	3.9997	-30