

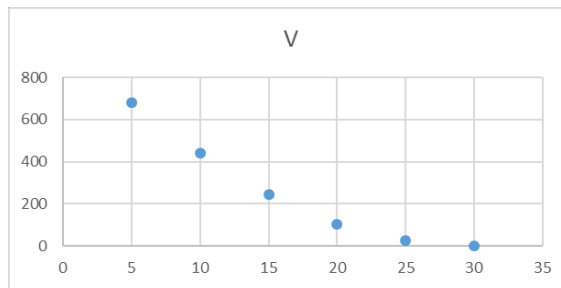
1. -6 points SCalc8 1.4.001.MI. My Notes Ask Your Teacher

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

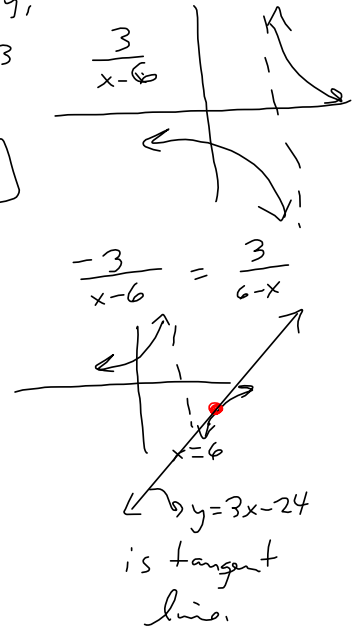
(b) Using the results of part (a), guess the value of the slope  $m$  of the tangent line to the curve at  $P(7, -3)$ .

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

	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)  $y = m(x - x_1) + y_1$   
 $= 3(x - 7) - 3$   
 $= 3x - 21 - 3$   
 $y = 3x - 24$



3. + -5 points SCalc8 1.4.005. My Notes + Ask Your

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  $t = 2$ .

$$V(2) = -30$$

	A	B	C	D
22				
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