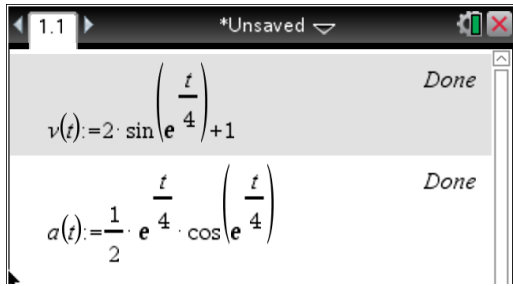1) Make sure to use the NUMBER e and not the letter
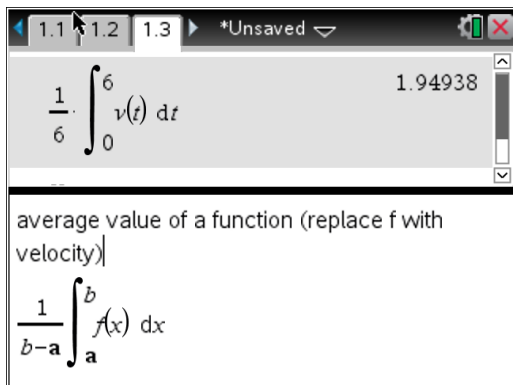
Done

$$v(t):=2 \cdot \sin\left(e^{\frac{t}{4}}\right)+1$$

Done

$$a(t):=\frac{1}{2} \cdot e^{\frac{t}{4}} \cdot \cos\left(e^{\frac{t}{4}}\right)$$

a. . The | can be found using "ctrl =”

-0.45337

$$2 \cdot \sin\left(e^{\frac{t}{4}}\right)+1|t=5.5$$

-1.35851

$$\frac{1}{2} \cdot e^{\frac{t}{4}} \cdot \cos\left(e^{\frac{t}{4}}\right)|t=5.5$$

The speed is increasing at t=5.5 because the veolcity and acceleration have the same sign.

OR

$$v(5.5)$$ -0.45337

$$a(5.5)$$ -1.35851

|

The speed is increasing at t=5.5 because the veolcity and acceleration have the same sign.

b.

1.94938

$$\frac{1}{6} \cdot \int_{0}^{6} v(t)\, dt$$

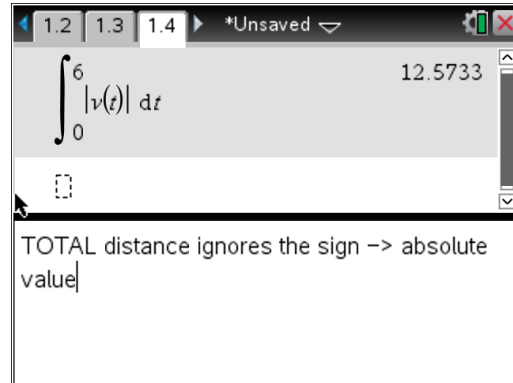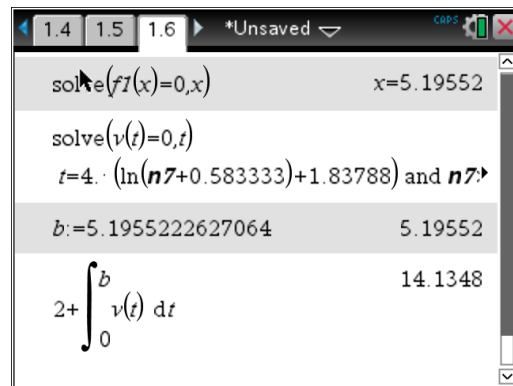average value of a function (replace f with velocity)

$$\frac{1}{b-a}\int_{a}^{b} f(x)\, dx$$
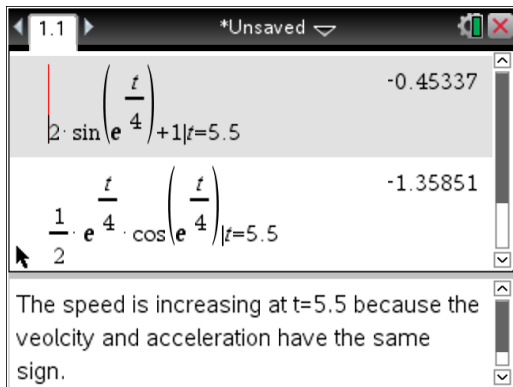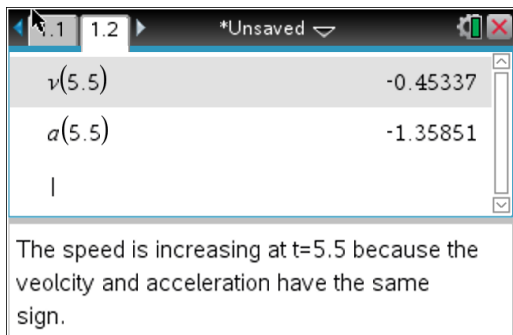
c. Use the absolute value in the templates key

12.5733

$$\int_{0}^{6} |v(t)|\, dt$$

☐

TOTAL distance ignores the sign –> absolute value

d.

☑ $f1(x)=v(x)|0 \leq x \leq 6|$ ≣

$f1(x)=\{v(x), 0 \leq\}$

$$\text{solve}(f1(x)=0,x) \qquad x=5.19552$$

$$\text{solve}(v(t)=0,t)$$
$$t=4 \cdot \left(\ln(n7+0.583333)+1.83788\right) \text{ and } n7\,›$$

$$b:=5.1955222627064 \qquad 5.19552$$

$$2+\int_{0}^{b} v(t)\, dt \qquad 14.1348$$
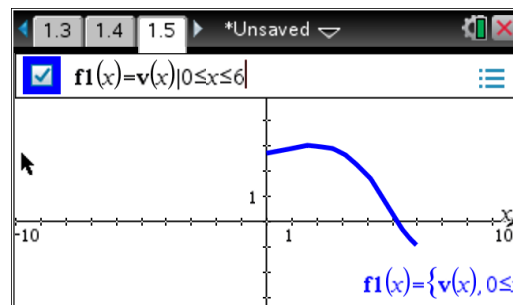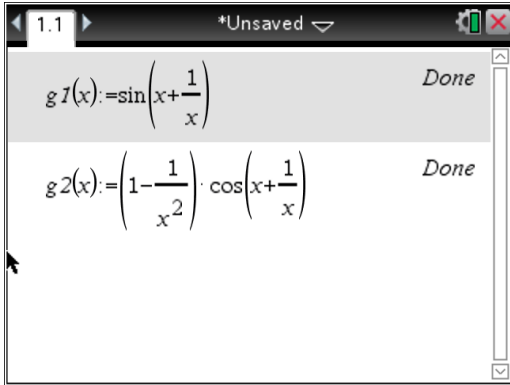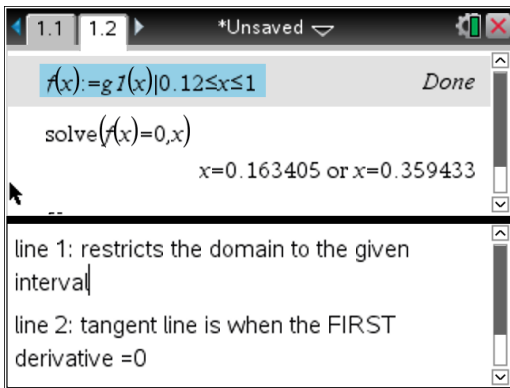
The first line shows the difference between using a restricted domain (line 1) and a non-restricted domain (line 2). The graph shows v(t) changes from positive to negative velocity (i.e. traveling right to left). The last line represents the position

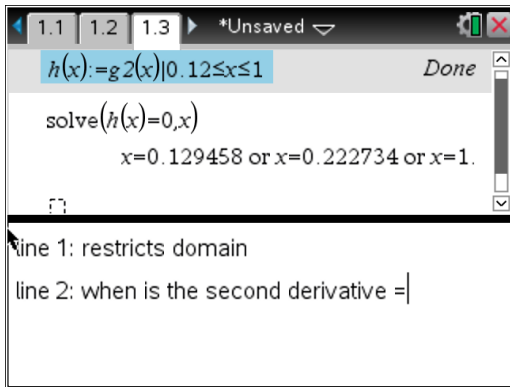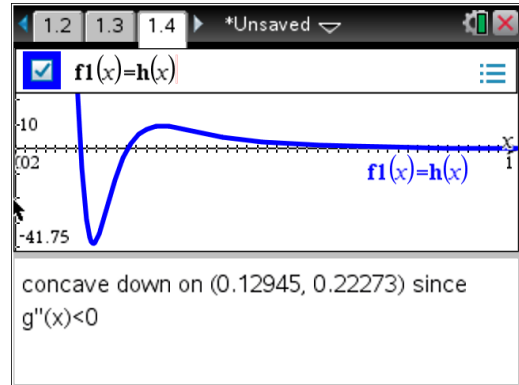$$x(b) = \underbrace{x(2)}_{start\ position} + \underbrace{\int_{0}^{b} v(t)\, dt}_{accumulated\ position}$$
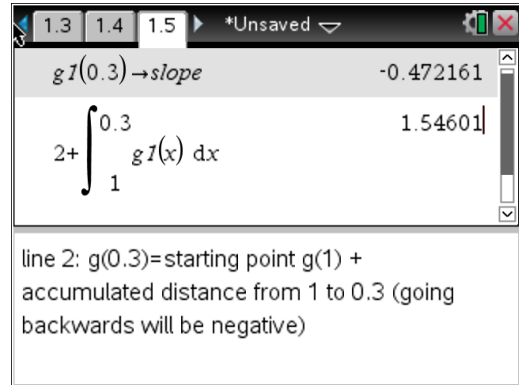
2)

$$g1(x):=\sin\left(x+\frac{1}{x}\right) \qquad Done$$

$$g2(x):=\left(1-\frac{1}{x^2}\right)\cdot\cos\left(x+\frac{1}{x}\right) \qquad Done$$

a.

$$f(x):=g1(x)|0.12\leq x\leq 1 \qquad Done$$

$$solve(f(x)=0,x)$$
$$x=0.163405 \text{ or } x=0.359433$$

line 1: restricts the domain to the given interval

line 2: tangent line is when the FIRST derivative =0

b.

$$h(x):=g2(x)|0.12\leq x\leq 1 \qquad Done$$

$$solve(h(x)=0,x)$$
$$x=0.129458 \text{ or } x=0.222734 \text{ or } x=1.$$

line 1: restricts domain

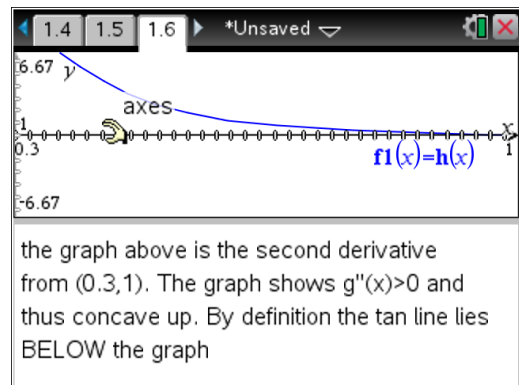line 2: when is the second derivative =|

Menu->zoom->window settings x goes from 0 to 1

concave down on (0.12945, 0.22273) since g"(x)<0

c. Tan line $y=f'(a)(x-a)+f(a)$

$$g1(0.3)\rightarrow slope \qquad -0.472161$$

$$2+\int_{1}^{0.3}g1(x)\,dx \qquad 1.54601$$

line 2: g(0.3)=starting point g(1) + accumulated distance from 1 to 0.3 (going backwards will be negative)

Tan line $y=-.472(x-0.3)+1.546$

d.

the graph above is the second derivative from (0.3,1). The graph shows g"(x)>0 and thus concave up. By definition the tan line lies BELOW the graph

3)

$$\frac{d}{dx}\left(x^{-3}+3\cdot\sqrt{x}+5\cdot\pi-\mathbf{e}^2\right) \qquad \frac{3}{2\cdot\sqrt{x}}-\frac{3}{x^4}$$

4)

$\dfrac{f1(1)+f1(1.25)}{2}\cdot 0.25$	0.820313
$\dfrac{f1(1.25)+f1(1.5)}{2}\cdot 0.25$	0.976563
$\dfrac{f1(1.5)+f1(1.75)}{2}\cdot 0.25$	1.16406
$\dfrac{f1(1.75)+f1(2)}{2}\cdot 0.25$	1.38281

$\dfrac{f1(1.5)+f1(1.75)}{2}\cdot 0.25$	1.16406
$\dfrac{f1(1.75)+f1(2)}{2}\cdot 0.25$	1.38281
$0.8203125+0.9765625+1.1640625+1.38?$	
	4.34375

5)

$$f1(x)=\frac{d}{dx}\left(2\cdot x^3-\frac{21}{2}\cdot x^2+9\cdot x-16\right)$$

$$f2(x)=\frac{d^2}{dx^2}\left(2\cdot x^3-\frac{21}{2}\cdot x^2+9\cdot x-16\right)$$
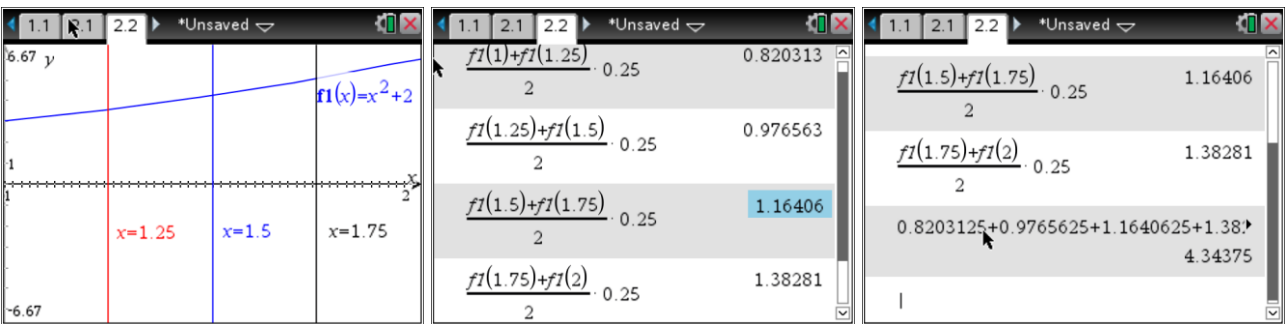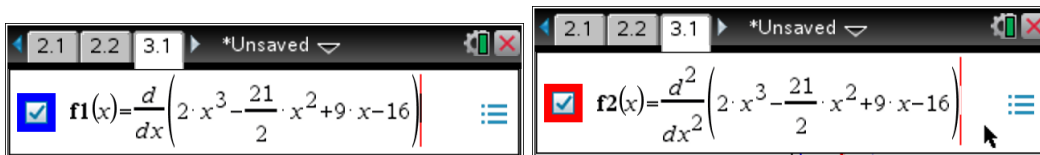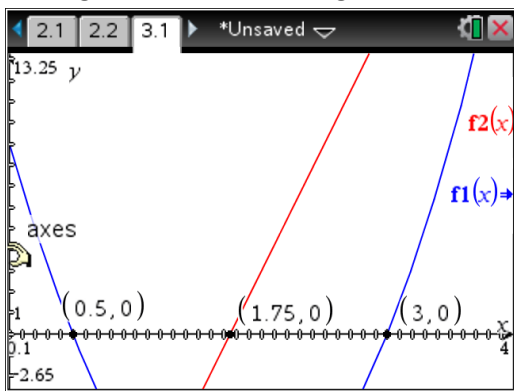
Menu -> zoom -> window settings x from 0 to 4 since largest answer choice is 3)
Menu -> analyze graph -> zero click on the graph and an upper and lower bound to find the zeros
Slowing down is when the signs are DIFFERENT.

Opposite signs on $0<t<\frac{1}{2}$ and $\frac{7}{4}<t<3$