

DERIVATIVES AND THE GRAPHING CALCULATOR

1. Find the Value of a Derivative, f' , Using f :

Enter the function, f , [not f']. Use the following features to find the value of the derivative of f at a given value of x .

Example 1:

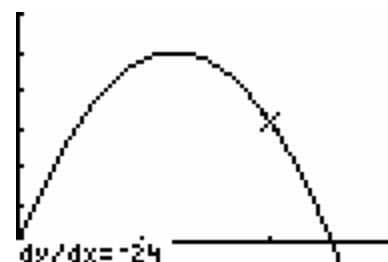
If a ball is thrown into the air with a velocity of 40 ft/s, its height (in feet) after t seconds is given by $s(t) = 40t - 16t^2$. Find the velocity at 2 s, $v(2)$.

Method 1:

- ① $\boxed{Y=}$ and enter the function.
- ② Press 2nd TRACE
- ③ 6 ENTER $\left(\frac{dy}{dx}\right)$
- ④ Input the x value (2 in this example)
- ⑤ Press ENTER

```
Plot1 Plot2 Plot3
\Y1=40X-16X^2
\Y2=
\Y3=
\Y4=
\Y5=
\Y6=
\Y7=
```

```
1:value
2:zero
3:minimum
4:maximum
5:intersect
6:dy/dx
7:∫f(x)dx
```



Method 2:

- ① Press MATH at home screen
- ② Press 8: nDeriv(
- ③ Type expression or enter Y_1 if function is stored in Y_1
To enter Y_n :
VARS
Y-VARS
1: Function
1: Y_1

```
NUM CPX PRB
3↑3
4:∫(
5:∫
6:fMin(
7:fMax(
8:nDeriv(
9:fnInt(
```

```
nDeriv(Y1,X,2)
-24
```

- ④ nDeriv(Y_1 , X , 2) (Always enter x , the independent variable)
- ⑤ ENTER






We found the velocity at 2 seconds, $v(2) = \left. \frac{ds}{dt} \right|_{t=2}$, by entering $s(t)$ in our calculator and using the derivative feature.

You try:

- a. Given $f(x) = 2e^{3x} \sin x$, find $f'(2)$. Round to the nearest hundredth.
- b. Given $y = 3x^2 e^x$, find $\left. \frac{dy}{dx} \right|_{x=-4}$. Round to the nearest hundredth.

- a. 1865.25
- b. 0.44

2. Draw Tangent Lines

- ① Press  and enter the function.
- ② Press . You may need to adjust your [window](#) to see the graph.
- ③ From the graph screen, press   to access the draw menu.
- ④ Choose **5:Tangent(**
- ⑤ Input the x value where the tangent line is to be drawn and press . The tangent line will be drawn and the equation of the tangent line is displayed at the bottom of the screen.

