

# INTRODUCTION TO CALCULUS

MATH 1A

## UNIT 7: WORKSHEET

**Problem 1:** Take the following derivatives by using the rule you know  
a)  $9x^7$

**Solution:**

$$63x^6$$

b)  $12\sqrt{x}$

**Solution:**

$$6/\sqrt{x}$$

c)  $7x^{11} + x^{3/2}$

**Solution:**

$$77x^{10} + (3/2)\sqrt{x}$$

d)  $8 + 2x + x^2$

**Solution:**

$$2 + 2x$$

e)  $1 + x + x^2 + x^3 + x^4 + x^5 + x^6$

**Solution:**

$$1 + 2x + 3x^2 + 4x^3 + 5x^4 + 6x^5$$

**Problem 2:** Take the derivative by using the rules you know:

a)  $5e^x + 2e^{3x}$

**Solution:**

$$5e^x + 6e^{3x}$$

b)  $3 \sin(5x) + 7 \cos(11x)$

**Solution:**

$$15 \cos(5x) - 77 \sin(11x)$$

c)  $\ln(8x) + 8 \ln(29x)$ .

**Solution:**

$$1/x + 8/x$$

d)  $\frac{1}{x} + \ln(x) + e^{5x}$

**Solution:**

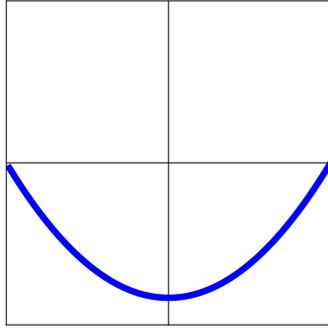
$$-1/x^2 + 1/x + 5e^{5x}$$

e)  $x^{8/11} + x^{11/8}$

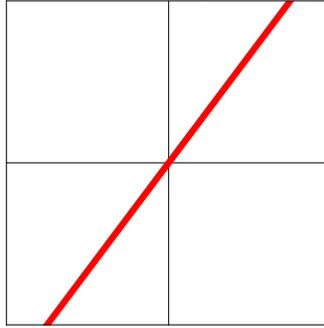
**Solution:**

$$(8/11)x^{-3/11} + (11/8)x^{3/8}.$$

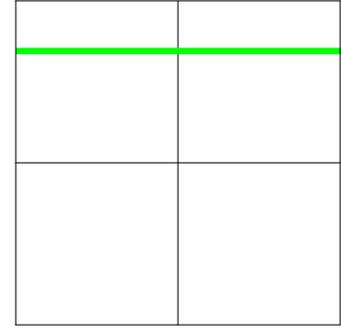
Here we see an example, where to the left we have the function  $f$ , then see  $f'$  which gives the slope of  $f$  at  $x$  and then see  $f''$  which gives the concavity of  $f$  at  $x$ .



$f$



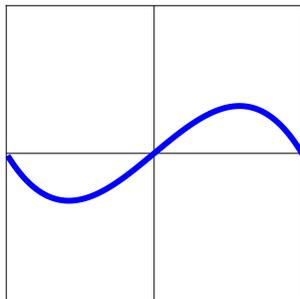
$f'$



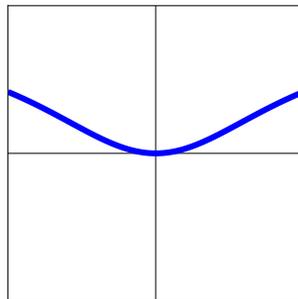
$f''$

Now it is your turn:

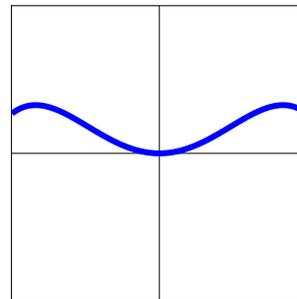
**Problem 3:** Match the functions with their derivative. First we show the functions  $f$



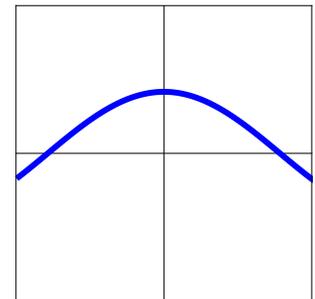
a)



b)

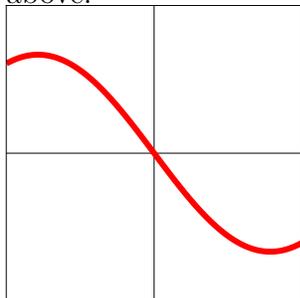


c)

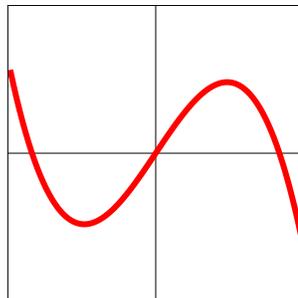


d)

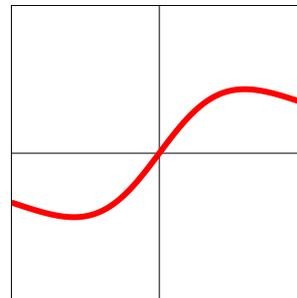
And now we show the functions  $f'$ . Match their graphs with the graphs of  $f$  seen above.



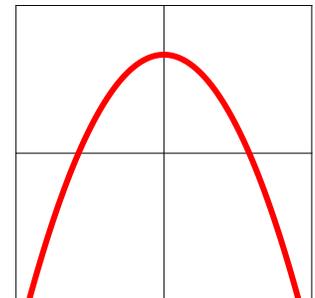
1)



2)



3)



4)

**Solution:**

Always look at the slope in the upper part. Determine the slopes at the very left, the center and very right.

a) matches with 4) (negative slope, then positive slope, then negative slope) b) matches with 3) (negative slope, then zero slope then positive slope) c) matches with 2) (negative slope, then zero slope, then negative slope) d) matches with 1) (positive slope, then zero slope then negative slope)