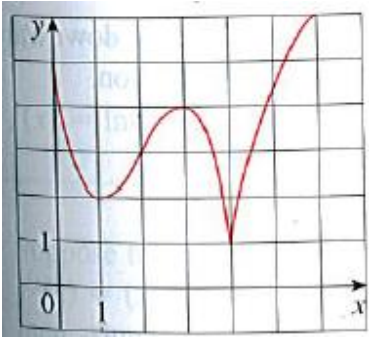
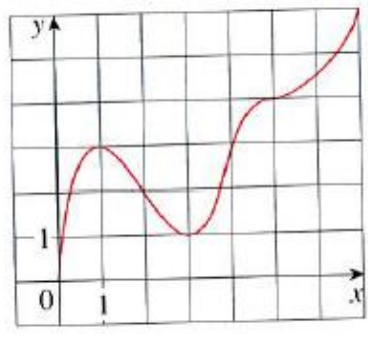


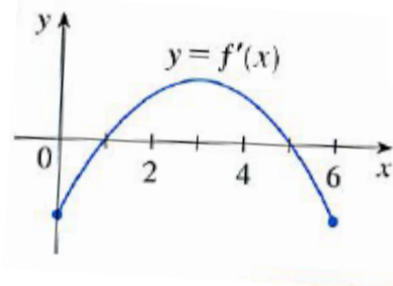
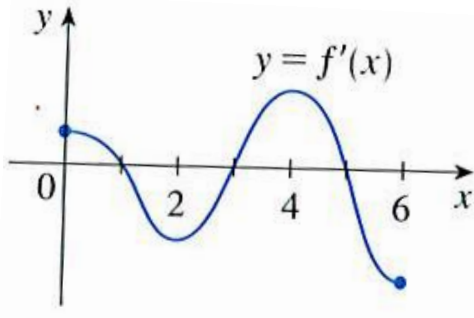
Intervals of Inc/Dec & Concavity (1)

Day 2 Curve Sketching

1-2: Use the given graph of  $f$  to find the following

<p>1.</p> 	<p>2.</p> 
<p>a.) The open intervals of which <math>f</math> is increasing.</p> <p>b.) The open intervals of which <math>f</math> is decreasing.</p> <p>c.) The open intervals of which <math>f</math> is concave upward.</p> <p>d.) The open intervals of which <math>f</math> is concave downward.</p> <p>e.) The coordinates of the points of inflection.</p>	<p>a.) The open intervals of which <math>f</math> is increasing.</p> <p>b.) The open intervals of which <math>f</math> is decreasing.</p> <p>c.) The open intervals of which <math>f</math> is concave upward.</p> <p>d.) The open intervals of which <math>f</math> is concave downward.</p> <p>e.) The coordinates of the points of inflection.</p>

3-4: The graph of the derivative  $f'$  of a function  $f$  is shown.

<p>3.</p> 	<p>4.</p> 
<p>a.) On what intervals is <math>f</math> increasing or decreasing?</p> <p>b.) At what values of <math>x</math> does <math>f</math> have a local maximum or minimum?</p>	<p>a.) On what intervals is <math>f</math> increasing or decreasing?</p> <p>b.) At what values of <math>x</math> does <math>f</math> have a local maximum or minimum?</p>

## Intervals of Inc/Dec &amp; Concavity (1)

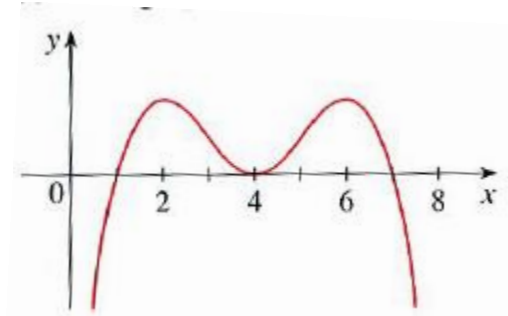
## Day 2 Curve Sketching

5. In each part state the x-coordinate of the inflection points of  $f$ . Give a reason for your answers.

a.) The curve is the graph of  $f$ .

b.) The curve is the graph of  $f'$ .

c.) The curve is the graph of  $f''$ .



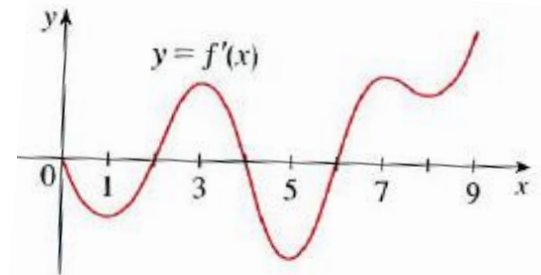
6. The graph of the first derivative  $f'$  of a function  $f$  is shown.

a.) On what intervals is  $f$  increasing or decreasing? Explain.

b.) At what values of  $x$  does  $f$  have a local maximum or minimum? Explain.

c.) On what intervals is  $f$  concave upward or concave downward? Explain.

d.) What are the x-coordinates of the inflection points of  $f$ ? Why?



7-10: Find a)-c) for each of the following:

7.  $f(x) = 2x^3 + 3x^2 - 36x$

a.) Find the intervals on which  $f$  is increasing or decreasing.

b.) Find the local maximum and minimum values of  $f$ .

c.) Find the intervals of concavity and the inflection points.

8.  $f(x) = 4x^3 + 3x^2 - 6x + 1$

- a.) Find the intervals on which  $f$  is increasing or decreasing.
- b.) Find the local maximum and minimum values of  $f$ .
- c.) Find the intervals of concavity and the inflection points.

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9.  $f(x) = x^4 - 2x^2 + 3$

- a.) Find the intervals on which  $f$  is increasing or decreasing.
- b.) Find the local maximum and minimum values of  $f$ .
- c.) Find the intervals of concavity and the inflection points.

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10.  $f(x) = x^3 - 12x^2 + 36x$

- a.) Find the intervals on which  $f$  is increasing or decreasing.
- b.) Find the local maximum and minimum values of  $f$ .
- c.) Find the intervals of concavity and the inflection points.

## Intervals of Inc/Dec &amp; Concavity (1)

## Day 2 Curve Sketching

**Answers:**

- 1 a (1,3) & (4,6) b (0,1) & (3,4) c (0,2) d (2,4) & (4,6) e (2,3)
- 2 a (0,1) & (3,7) b (1,3) c (2,4) & (5,7) d (2,4) & (5,7) e (2,2),(4,3) & (5,4)
- 3 a Increasing: (1,5)  
Decreasing: (0,1) & (5,6) b Minimum:  $x = 1$   
Maximum:  $x = 5$
- 4 a Increasing: (0,1) & (3,5)  
Decreasing: (1,3) & (5,6) b Minimum:  $x = 3$   
Maximum:  $x = 1$  &  $x = 5$
- 5 a  $x = 3$  &  $x = 5$  b  $x = 2, 4, & 6$  c  $x = 1$  &  $x = 7$
- 6 a Increasing: (2,4) & (6,9)  
Decreasing: (0,2) & (4,6) b Minimum:  $x = 4$   
Maximum:  $x = 2$  &  $6$   
d  $x = 1, 3, 5, 7, & 8$   
Because at those x-values  $f''(x)$  changes signs.
- 7 a Increasing:  $(-\infty, -3)$  &  $(2, \infty)$   
Decreasing:  $(-3, 2)$  b Minimum: (where, minimum value)  $(2, -44)$   
Maximum: (where, maximum value)  $(-3, 81)$   
Point of Inflection  
 $(-\frac{1}{2}, \frac{37}{2})$
- c Concave Up:  $(-\frac{1}{2}, \infty)$   
Concave Down:  $(-\infty, \frac{1}{2})$
- 8 a Increasing:  $(-\infty, -1)$  &  $(\frac{1}{2}, \infty)$   
Decreasing:  $(-1, \frac{1}{2})$  b Minimum: (where, minimum value)  $(\frac{1}{2}, -\frac{3}{4})$   
Maximum: (where, maximum value)  $(-1, 6)$   
Point of Inflection  
 $(-\frac{1}{4}, \frac{21}{8})$
- c Concave Up:  $(-\frac{1}{4}, \infty)$   
Concave Down:  $(-\infty, -\frac{1}{4})$
- 9 a Increasing:  $(-1, 0)$  &  $(1, \infty)$   
Decreasing:  $(-\infty, -1)$  &  $(0, 1)$  b Minimum: (where, minimum value)  $(\pm 1, 2)$   
Maximum: (where, maximum value)  $(0, 3)$   
Point of Inflection  
 $(\pm\sqrt{\frac{1}{3}}, \frac{22}{9})$
- c Concave Up:  $(-\infty, -\sqrt{\frac{1}{3}})$  &  $(\sqrt{\frac{1}{3}}, \infty)$   
Concave Down:  $(-\sqrt{\frac{1}{3}}, \sqrt{\frac{1}{3}})$
- 10 a Increasing:  $(-\infty, 2)$  &  $(6, \infty)$   
Decreasing:  $(2, 6)$  b Minimum: (where, minimum value)  $(6, 0)$   
Maximum: (where, maximum value)  $(2, 32)$   
Point of Inflection  
 $(4, 16)$
- c Concave Up:  $(4, \infty)$   
Concave Down:  $(-\infty, 4)$