

Student: _____
Date: _____
Time: _____

Instructor: Dan Yasaki
Course: MAT 120 (Summer 2013)
Book: Barnett: Calculus for Business,
Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

1. Find the indicated derivative for each function.

$$h''(x) \text{ for } h(x) = 2x^{-7} - 9x^{-8}$$

$$h''(x) = \square$$

2. Find the x and y coordinates of all inflection points.

$$f(x) = x^3 + 15x^2$$

What is/are the inflection point(s)? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The inflection point(s) is/are .
(Type an ordered pair. Use a comma to separate answers as needed.)
- B. There are no inflection points.

Student: _____
Date: _____
Time: _____

Instructor: Dan Yasaki
Course: MAT 120 (Summer 2013)
Book: Barnett: Calculus for Business,
Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

3. Find the intervals on which the graph of f is concave upward, the intervals on which the graph of f is concave downward, and the inflection points.

$$f(x) = 20e^x - e^{2x}$$

For what interval(s) of x is the graph of f concave upward? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A.

(Type your answer in interval notation. Type an exact answer. Use a comma to separate answers as needed.)

B. The graph is never concave upward.

For what interval(s) of x is the graph of f concave downward? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A.

(Type your answer in interval notation. Type an exact answer. Use a comma to separate answers as needed.)

B. The graph is never concave downward.

What are the inflection point(s) of f ? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. $x =$ (Type an exact answer. Use a comma to separate answers as needed.)

B. There are no inflection points.

Student: _____
Date: _____
Time: _____

Instructor: Dan Yasaki
Course: MAT 120 (Summer 2013)
Book: Barnett: Calculus for Business,
Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

4. Summarize the pertinent information obtained by applying the graphing strategy and sketch the graph of $y = f(x)$.

$$f(x) = (x - 6)(x^2 - 12x - 72)$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain of f is .
(Type your answer in interval notation. Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)
- B. The domain of f is empty.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The x-intercept(s) of f is $x =$.
- (Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)
- B. The function f has no x-intercepts.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The y-intercept of f is $y =$.
- (Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)
- B. The function f has no y-intercept.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The function f is increasing on the subinterval(s) .
- (Type your answer in interval notation. Use a comma to separate answers as needed.)
- B. The function f is never increasing.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

Student: _____
Date: _____
Time: _____

Instructor: Dan Yasaki
Course: MAT 120 (Summer 2013)
Book: Barnett: Calculus for Business,
Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

4.

(cont.)

A. The function f is decreasing on the subinterval(s) .
(Type your answer in interval notation. Use a comma to separate answers as needed.)

B. The function f is never decreasing.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The function f has a local maximum at $x =$.
(Use a comma to separate answers as needed.)

B. The function f has no local maximum.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The function f has a local minimum at $x =$.
(Use a comma to separate answers as needed.)

B. The function f has no local minimum.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The function f is concave upward on the subinterval(s) .
(Type your answer in interval notation. Use a comma to separate answers as needed.)

B. The function f is never concave upward.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The function f is concave downward on the subinterval(s) .
(Type your answer in interval notation. Use a comma to separate answers as needed.)

B. The function f is never concave downward.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The function f has an inflection point at $x =$.
(Use a comma to separate answers as needed.)

B. The function f has no inflection point.

Choose the correct graph of $y = f(x)$ below.

Student: _____
 Date: _____
 Time: _____

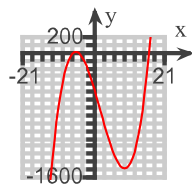
Instructor: Dan Yasaki
 Course: MAT 120 (Summer 2013)
 Book: Barnett: Calculus for Business,
 Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

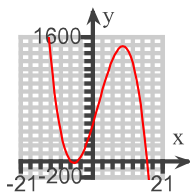
4.

(cont.)

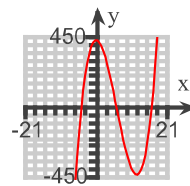
A.



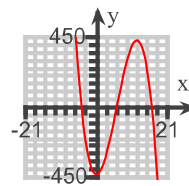
B.



C.



D.



5.

Use the given information to sketch the graph of f .

Domain: All real x , except $x = -2$.

$f(-6) = 0$; $f(-4) = 2$; $f(0) = -6$; $f(2) = -4$.

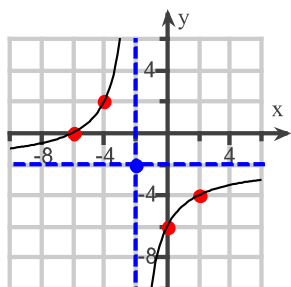
$f'(x) > 0$ on $(-\infty, -2)$ and $(-2, \infty)$.

$f''(x) > 0$ on $(-\infty, -2)$; $f''(x) < 0$ on $(-2, \infty)$.

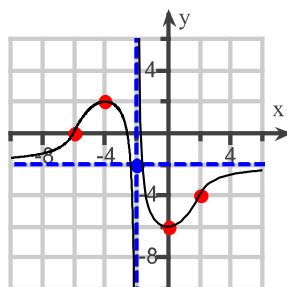
Vertical asymptote: $x = -2$; Horizontal asymptote: $y = -2$.

Choose the correct graph below.

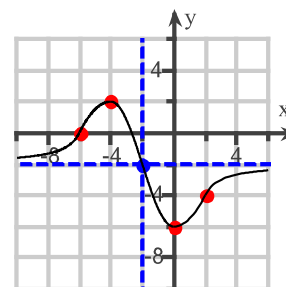
A.



B.



C.



Student: _____
Date: _____
Time: _____

Instructor: Dan Yasaki
Course: MAT 120 (Summer 2013)
Book: Barnett: Calculus for Business,
Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

6. Find the domain and intercepts.

$$f(x) = \sqrt{x + 9}$$

Find the domain. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain of the function $f(x)$ is .
(Type your answer in interval notation.)
- B. The domain is all real numbers.

Find the x-intercept(s). Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The x-intercept(s) of the graph is (are) $x =$.
(Simplify your answer. Type an integer or a decimal. Use a comma to separate answers as needed.)
- B. There is no x-intercept.

Find the y-intercept(s). Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The y-intercept(s) of the graph is (are) $y =$.
(Simplify your answer. Type an integer or a decimal. Use a comma to separate answers as needed.)
- B. There is no y-intercept.

Student: _____
Date: _____
Time: _____

Instructor: Dan Yasaki
Course: MAT 120 (Summer 2013)
Book: Barnett: Calculus for Business,
Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

7. Summarize the pertinent information obtained by applying the graphing strategy and sketch the graph of $f(x) = 6 + 6e^{-0.3x}$.

Summarize the pertinent information obtained by analyzing $f(x)$.

- Domain:
- A. All real x .
 - B. All real x , except $x = 0$.
 - C. All real x , except $x = 6$.
 - D. All real x , except $x = 3$.
- Intercepts:
- A. x-intercept: none; y-intercept: $y = 12$.
 - B. x-intercept: $x = 12$; y-intercept: none.
 - C. x-intercept: $x = 1$; y-intercept: $y = 6$.
 - D. x-intercept: $x = -1$; y-intercept: none.

- Asymptotes:
- A. Horizontal asymptote: $y = 0$; Vertical asymptote: $x = 0$.
 - B. Horizontal asymptote: none; Vertical asymptote: $x = 6$.
 - C. Horizontal asymptote: $y = 6$; Vertical asymptote: $x = 0$.
 - D. Horizontal asymptote: $y = 6$; Vertical asymptote: none.

Summarize the pertinent information obtained by analyzing $f'(x)$.

- A. $f(x)$ is decreasing on $(-\infty, \infty)$.
- B. $f(x)$ is increasing on $(-\infty, \infty)$.
- C. $f(x)$ is increasing on $(-\infty, 0)$ and $(0, \infty)$.
- D. $f(x)$ is decreasing on $(-\infty, 0)$ and $(0, \infty)$.

Student: _____
 Date: _____
 Time: _____

Instructor: Dan Yasaki
 Course: MAT 120 (Summer 2013)
 Book: Barnett: Calculus for Business,
 Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

7. (cont.)
- A. There are no local extrema.
 - B. There is a local maximum at $x = 0$.
 - C. There is a local maximum at $x = 6$.
 - D. There is a local minimum at $x = 0$.
 - E. There is a local minimum at $x = 6$.

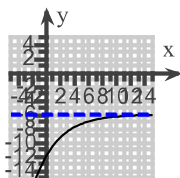
Summarize the pertinent information obtained by analyzing $f''(x)$.

- A. $f(x)$ is concave upward on $(-\infty, 0)$ and concave downward on $(0, \infty)$.
- B. $f(x)$ is concave downward on $(-\infty, \infty)$.
- C. $f(x)$ is concave downward on $(-\infty, 0)$ and concave upward on $(0, \infty)$.
- D. $f(x)$ is concave upward on $(-\infty, \infty)$.

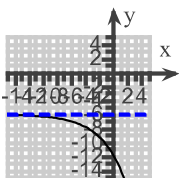
- A. There is an inflection point at $x = 6$.
- B. There is an inflection point at $x = 12$.
- C. There is an inflection point at $x = 0$.
- D. There are no inflection points.

Now sketch the graph. Choose the correct answer below.

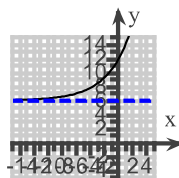
A.



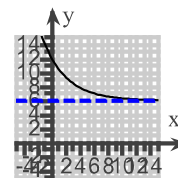
B.



C.



D.



Student: _____
Date: _____
Time: _____

Instructor: Dan Yasaki
Course: MAT 120 (Summer 2013)
Book: Barnett: Calculus for Business,
Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

8. Show that the line $y = x$ is an oblique asymptote for the graph of $f(x) = x + \frac{9}{x}$, summarize the pertinent information obtained by applying the graphing strategy, and sketch the graph of $y = f(x)$.

Is the line $y = x$ an oblique asymptote for the graph of $f(x)$? Choose the correct answer below.

- A. $y = x$ is an oblique asymptote because $\frac{9}{x} \rightarrow 0$ as $x \rightarrow \infty$ or $x \rightarrow -\infty$.
- B. $y = x$ is an oblique asymptote because $f(x)$ is undefined for $x = 0$.
- C. $y = x$ is not an oblique asymptote because $\frac{9}{x}$ is undefined for $x = 0$.
- D. $y = x$ is not an oblique asymptote because $f(x) \rightarrow \infty$ as $x \rightarrow \infty$ and $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$.

Summarize the pertinent information obtained by analyzing $f(x)$.

- Domain: A. The domain of $f(x)$ is all real x , except $x = -9$.
- B. The domain of $f(x)$ is all real x .
- C. The domain of $f(x)$ is all real x , except $x = 0$.
- D. The domain of $f(x)$ is all real x , except $x = 9$.

- Intercepts: A. x-intercept: $x = 0$; y-intercept: $y = 0$.
- B. x-intercept: none; y-intercept: none.
- C. x-intercept: $x = \text{none}$; y-intercept: $y = 0$.
- D. x-intercept: $x = 0$; y-intercept: $y = \text{none}$.

- Asymptotes: A. Horizontal asymptote: $y = 0$; Vertical asymptote: $x = 0$.
- B. Horizontal asymptote: none; Vertical asymptote: none.
- C. Horizontal asymptote: none; Vertical asymptote: $x = 0$.
- D. Horizontal asymptote: $y = 0$; Vertical asymptote: none.

Summarize the pertinent information obtained by analyzing $f'(x)$.

Student: _____
Date: _____
Time: _____

Instructor: Dan Yasaki
Course: MAT 120 (Summer 2013)
Book: Barnett: Calculus for Business,
Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

8. (cont.)
- A. Decreasing on $(-\infty, -3)$ and $(3, \infty)$; Increasing on $(-3, 3)$.
 - B. Increasing on $(-\infty, 0)$; Decreasing on $(0, \infty)$.
 - C. Increasing on $(-\infty, -3)$ and $(3, \infty)$; Decreasing on $(-3, 3)$.
 - D. Increasing on $(-\infty, -3)$ and $(3, \infty)$; Decreasing on $(-3, 0)$ and $(0, 3)$.

- A. There is a local minimum at $x = -3$ and a local maximum at $x = 3$.
- B. There is a local maximum at $x = 0$.
- C. There are no local extrema.
- D. There is a local minimum at $x = 0$.
- E. There is a local maximum at $x = -3$ and a local minimum at $x = 3$.

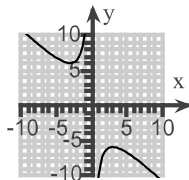
Summarize the pertinent information obtained by analyzing $f''(x)$.

- A. $f(x)$ is concave downward on $(-\infty, 0)$ and concave upward on $(0, \infty)$.
- B. $f(x)$ is concave downward on $(-\infty, \infty)$.
- C. $f(x)$ is concave upward on $(-\infty, 0)$ and concave downward on $(0, \infty)$.
- D. $f(x)$ is concave upward on $(-\infty, \infty)$.

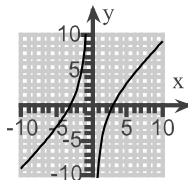
- A. There are no inflection points.
- B. There is an inflection point at $x = 0$.
- C. There is an inflection point at $x = -3$.
- D. There is an inflection point at $x = 3$.

Now sketch the graph. Choose the correct answer below.

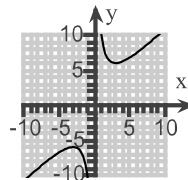
A.



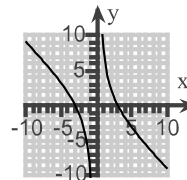
B.



C.



D.



Student: _____
Date: _____
Time: _____

Instructor: Dan Yasaki
Course: MAT 120 (Summer 2013)
Book: Barnett: Calculus for Business,
Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

9. Summarize the pertinent information obtained by applying the graphing strategy and sketch the graph of $f(x) = \frac{x^2 + 4x - 12}{x^2 - 7x + 10}$. [Note: These rational functions are not reduced to lowest terms.]

Summarize the pertinent information obtained by analyzing $f(x)$.

- Domain:
- A. The domain of $f(x)$ is all real x .
 - B. The domain of $f(x)$ is all real x , except $x = 2$.
 - C. The domain of $f(x)$ is all real x , except $x = 5$.
 - D. The domain of $f(x)$ is all real x , except $x = 2$ and $x = 5$.

- Intercepts:
- A. x-intercept: $x = -6$; y-intercept: $y = -\frac{6}{5}$.
 - B. x-intercept: $x = -\frac{6}{5}$; y-intercept: $y = -6$.
 - C. x-intercept: $x = -6$ and $x = 2$; y-intercept: $y = -\frac{6}{5}$.
 - D. x-intercept: $x = -6$ and $x = 2$; y-intercept: none.

- Asymptotes:
- A. Horizontal asymptote: $y = 1$; Vertical asymptote: $x = 2$ and $x = 5$.
 - B. Horizontal asymptote: none; Vertical asymptote: $x = 2$ and $x = 5$.
 - C. Horizontal asymptote: $y = 5$; Vertical asymptote: $x = 1$.
 - D. Horizontal asymptote: $y = 1$; Vertical asymptote: $x = 5$.

Summarize the pertinent information obtained by analyzing $f'(x)$.

- A. $f(x)$ is decreasing on $(-\infty, 5)$ and increasing on $(5, \infty)$.
- B. $f(x)$ is decreasing on $(-\infty, 5)$ and $(5, \infty)$.
- C. $f(x)$ is increasing on $(-\infty, 5)$ and decreasing on $(5, \infty)$.
- D. $f(x)$ is increasing on $(-\infty, 5)$ and $(5, \infty)$.

Student: _____
Date: _____
Time: _____

Instructor: Dan Yasaki
Course: MAT 120 (Summer 2013)
Book: Barnett: Calculus for Business,
Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

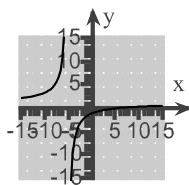
9. (cont.)
- A. There is a local minimum at $x = 5$.
 - B. There are no local extrema.
 - C. There is a local maximum at $x = 5$.
 - D. There is a local maximum at $x = 0$.
 - E. There is a local minimum at $x = 0$.

Summarize the pertinent information obtained by analyzing $f''(x)$.

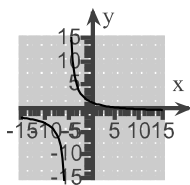
- A. $f(x)$ is concave upward on $(-\infty, 5)$ and concave downward on $(5, \infty)$.
 - B. $f(x)$ is concave downward on $(-\infty, 5)$ and concave upward on $(5, \infty)$.
 - C. $f(x)$ is concave upward on $(-\infty, \infty)$.
 - D. $f(x)$ is concave downward on $(-\infty, \infty)$.
-
- A. There is an inflection point at $x = 0$.
 - B. There are no inflection points.
 - C. There is an inflection point at $x = 5$.
 - D. There is an inflection point at $x = 2$.

Now sketch the graph. Choose the correct answer below.

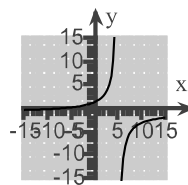
A.



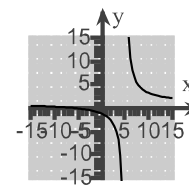
B.



C.



D.



Student: _____
Date: _____
Time: _____

Instructor: Dan Yasaki
Course: MAT 120 (Summer 2013)
Book: Barnett: Calculus for Business,
Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

1. $112x^{-9} - 648x^{-10}$

2. A, $(-5, 250)$

3. A, $(-\infty, \ln 5)$
A, $(\ln 5, \infty)$
A, $\ln 5$

4. A, $(-\infty, \infty)$
A, $6 - 6\sqrt{3}$, 6 , $6 + 6\sqrt{3}$
A, 432
A, $(-\infty, 0)$, $(12, \infty)$
A, $(0, 12)$
A, 0
A, 12
A, $(6, \infty)$
A, $(-\infty, 6)$
A, 6
C

5. A

6. A, $[-9, \infty)$
A, -9
A, 3

7. A
A
D
A
A
D
D
D
D

Student: _____
Date: _____
Time: _____

Instructor: Dan Yasaki
Course: MAT 120 (Summer 2013)
Book: Barnett: Calculus for Business,
Economics, Life/Social Sciences, 12e

Assignment: 5.2-5.4 Quiz (skip 5.3)

8. A
 C
 B
 C
 D
 E
 A
 A
 C

9. D
 A
 D
 B
 B
 B
 B
 D