

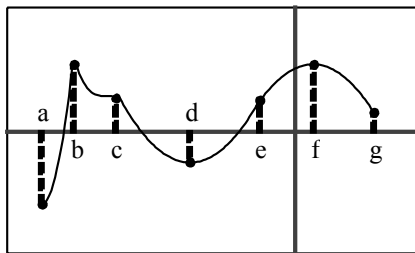
Student: _____
 Date: _____
 Time: _____

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

Assignment: 5.2-5.4 Homework (skip 5.3)

1.

- Use the graph of $y = f(x)$ to identify
- (A) Intervals on which the graph of $f(x)$ is concave downward.
 - (B) Intervals on which $f''(x) > 0$.
 - (C) Intervals on which $f'(x)$ is decreasing.
 - (D) The x-coordinates of inflection points.
 - (E) The x-coordinates of local extrema for $f'(x)$.



(A) Identify all intervals on which the graph of $f(x)$ is concave downward. Choose the correct answer below.

- A. (b,c), (e, g)
- B. (b,c), (f, g)
- C. (a, b), (b, c), (c, e)
- D. (e, g)

(B) Which of the following shows every interval on which $f''(x) > 0$?

- A. (e, g)
- B. (a, b), (c, e)
- C. (a, b), (b, d), (d, f)
- D. (a, b), (b, c), (c, e)

(C) Which of the following shows every interval on which $f'(x)$ is decreasing?

- A. (e, g)
- B. (a, b), (b, c), (c, e)
- C. (b,c), (f, g)
- D. (b,c), (e, g)

(D) What are the x-coordinates of every inflection point? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $x = \blacksquare$
- B. There are no inflection points.

(E) What are the x-coordinates of local extrema for $f'(x)$?

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

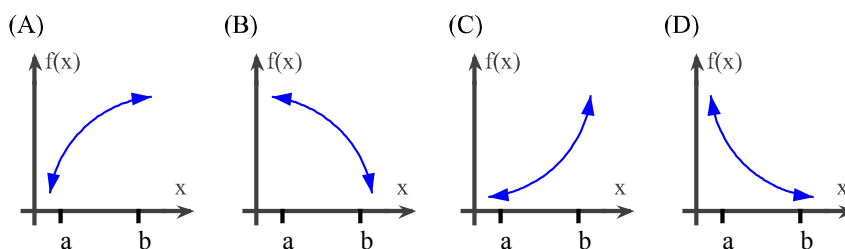
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Assignment: 5.2-5.4 Homework (skip
5.3)

1. A. $x = \square$ (Use a comma to separate answers as needed.)
(cont.) B. There are no local extrema.

2. Match the conditions $f'(x) > 0$ and $f'' < 0$ on (a,b) with one of the graphs (A) - (D).



Graph correctly displays the conditions $f'(x) > 0$ and $f'' < 0$ on (a,b) .
(Type A, B, C, or D.)

3. Find the indicated derivative for each function.

$$h''(x) \text{ for } h(x) = 5x^{-2} - 4x^{-7}$$

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

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

$$f(x) = x^3 + 33x^2$$

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 \square .
(Type an ordered pair. Use a comma to separate answers as needed.)
- B. There are no inflection points.

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5.3)

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

$$f(x) = 4x^{\frac{9}{5}} + 5$$

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.

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5.3)

6. 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.

$$f(x) = x^{12} + 2x^2$$

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.

Determine the x coordinates of any inflection points of the graph of $f(x)$. 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. There are no inflection points.

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Assignment: 5.2-5.4 Homework (skip
5.3)

7. 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.

$$f(x) = \ln(x^2 - 2x + 5)$$

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.

Determine the x coordinates of any inflection points of the graph of $f(x)$. 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.

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Assignment: 5.2-5.4 Homework (skip
5.3)

8. 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.

$$f(x) = 16e^x - e^{2x}$$

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.)

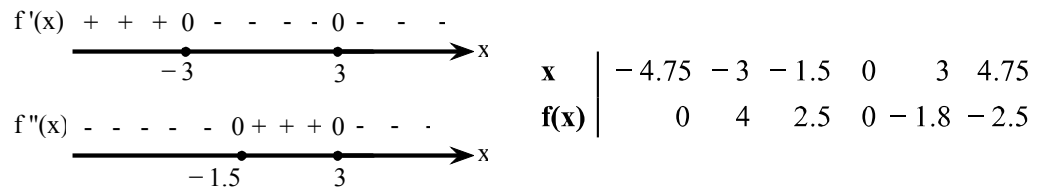
B. There are no inflection points.

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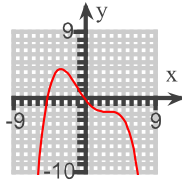
Assignment: 5.2-5.4 Homework (skip
 5.3)

9. $f(x)$ is continuous on $(-\infty, \infty)$. Use the given information to sketch the graph of f .

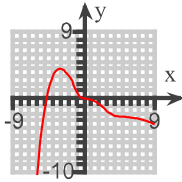


Choose the correct graph of f below.

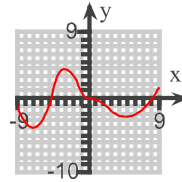
A.



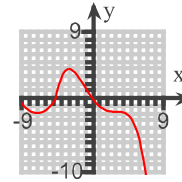
B.



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Assignment: 5.2-5.4 Homework (skip
5.3)

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

$$f(x) = (x - 5)(x^2 - 10x - 50)$$

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.

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5.3)

10.
(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.

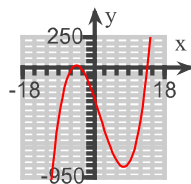
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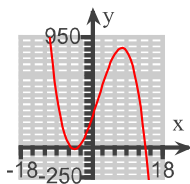
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10.
(cont.)

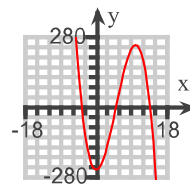
A.



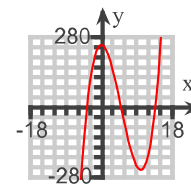
B.



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5.3)

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

$$f(x) = \ln(x + 3) - 1$$

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. 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. 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. 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.

- 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.

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5.3)

11.

(cont.)

- A. The function f has a local maximum at $x = \square$.
(Type an exact answer. 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 $x = \square$.
(Type an exact answer. 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) \square .
(Type your answer in interval notation. Type an exact answer. 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) \square .
(Type your answer in interval notation. Type an exact answer. 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 $x = \square$.
(Type an exact answer. 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.

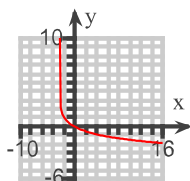
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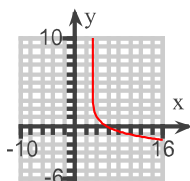
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11.
 (cont.)

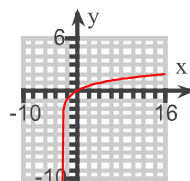
A.



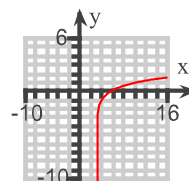
B.



C.



D.



12.

A T-shirt manufacturer is planning to expand its workforce. It estimates that the number of T-shirts produced by hiring x new workers is given by

$$T(x) = -0.5x^4 + 10x^3 \quad 0 \leq x \leq 15$$

When is the rate of change of T-shirt production increasing and when is it decreasing? What is the point of diminishing returns and the maximum rate of change for T-shirt production? Graph T and T' on the same coordinate system.

The rate of change of T-shirt production is increasing on .

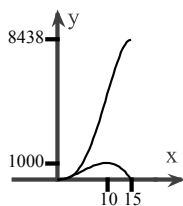
The rate of change of T-shirt production is decreasing on .

The point of diminishing returns is $x =$ workers.

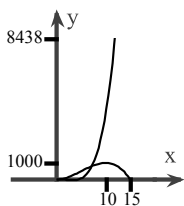
The maximum rate of change for T-shirt production is T-shirts per worker.

Graph T and T' on the same coordinate system.

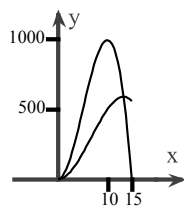
A.



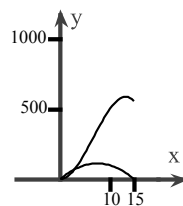
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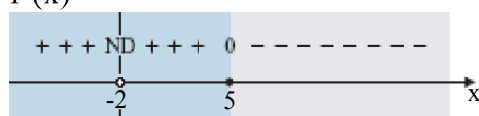
13. Use the given information to sketch the graph of f .

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

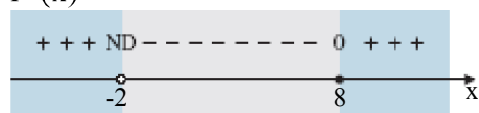
$$\lim_{x \rightarrow -2^-} f(x) = \infty; \quad \lim_{x \rightarrow -2^+} f(x) = -\infty; \quad \lim_{x \rightarrow \infty} f(x) = 1$$

x	-4	0	5	8
$f(x)$	0	0	7	4

$f'(x)$

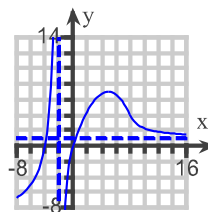


$f''(x)$

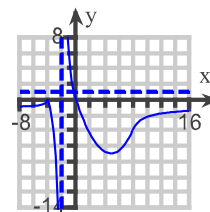


Choose the correct graph below.

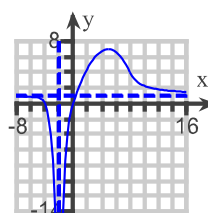
A.



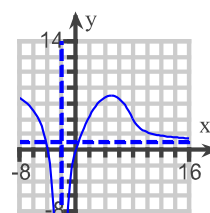
B.



C.



D.



14. Use the given information to sketch the graph of f .

Domain: All real x , except $x = -1$.

$$f(-3) = -1; \quad f(-2) = 0; \quad f(0) = -4; \quad f(1) = -3.$$

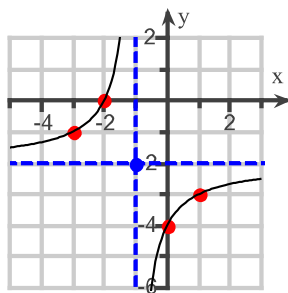
$$f'(x) > 0 \text{ on } (-\infty, -1) \text{ and } (-1, \infty).$$

$$f''(x) > 0 \text{ on } (-\infty, -1); \quad f''(x) < 0 \text{ on } (-1, \infty).$$

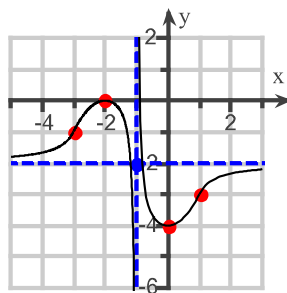
Vertical asymptote: $x = -1$; Horizontal asymptote: $y = -2$.

Choose the correct graph below.

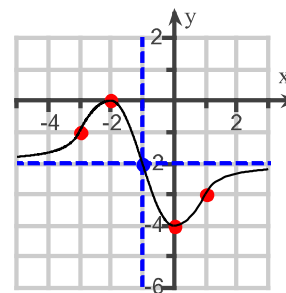
A.



B.



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15. Find the domain and intercepts.

$$f(x) = \sqrt{x + 4}$$

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.

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16. Find the domain and intercepts.

$$f(x) = \frac{39}{x - 3}$$

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

- A. The domain is all real x , except $x = \square$.
- 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) $x = \square$.
(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) $y = \square$.
(Simplify your answer. Type an integer or a decimal. Use a comma to separate answers as needed.)
- B. There is no y -intercept.

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

Assignment: 5.2-5.4 Homework (skip
5.3)

17. Summarize the pertinent information obtained by applying the graphing strategy and sketch the graph of $f(x) = \frac{x+5}{x-5}$.

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

- Domain: A. All real x , except $x = 5$.
 B. All real x .
 C. All real x , except $x = 0$.
 D. All real x , except $x = -5$.

- Intercepts: A. x -intercept: $x = 5$; y -intercept: $y = -1$.
 B. x -intercept: $x = -5$; y -intercept: $y = -1$.
 C. x -intercept: $x = 5$; y -intercept: $y = 1$.
 D. x -intercept: $x = -5$; y -intercept: $y = 1$.

- Asymptotes: A. Horizontal asymptote: $y = 1$; Vertical asymptote: $x = 5$.
 B. Horizontal asymptote: $y = -1$; Vertical asymptote: $x = 5$.
 C. Horizontal asymptote: $y = 1$; Vertical asymptote: $x = -5$.
 D. Horizontal asymptote: $y = -1$; Vertical asymptote:
 $x = -5$.

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

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

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Assignment: 5.2-5.4 Homework (skip 5.3)

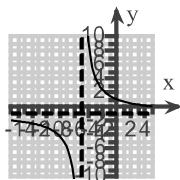
17. (cont.)
- A. There is a local minimum at $x = 5$.
 - B. There is a local maximum at $x = -5$.
 - C. There is a local maximum at $x = 5$.
 - D. There is a local minimum at $x = -5$.
 - E. There are no local extrema.

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

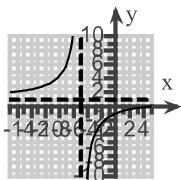
- A. $f(x)$ is concave downward on $(-\infty, -5)$ and concave upward on $(-5, \infty)$.
 - B. $f(x)$ is concave upward on $(-\infty, -5)$ and concave downward on $(-5, \infty)$.
 - C. $f(x)$ is concave downward on $(-\infty, 5)$ and concave upward on $(5, \infty)$.
 - D. $f(x)$ is concave upward on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

Sketch the graph. Choose the correct answer below.

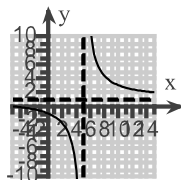
A.



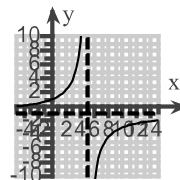
B.



C.



D.



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Assignment: 5.2-5.4 Homework (skip
5.3)

18. Summarize the pertinent information obtained by applying the graphing strategy and sketch the graph of $f(x) = 2 + 2e^{-0.1x}$.

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

- Domain:
- A. All real x .
 - B. All real x , except $x = 1$.
 - C. All real x , except $x = 0$.
 - D. All real x , except $x = 2$.

- Intercepts:
- A. x-intercept: $x = 1$; y-intercept: $y = 2$.
 - B. x-intercept: $x = 4$; y-intercept: none.
 - C. x-intercept: none; y-intercept: $y = 4$.
 - D. x-intercept: $x = -1$; y-intercept: none.

- Asymptotes:
- A. Horizontal asymptote: none; Vertical asymptote: $x = 2$.
 - B. Horizontal asymptote: $y = 2$; Vertical asymptote: $x = 0$.
 - C. Horizontal asymptote: $y = 0$; Vertical asymptote: $x = 0$.
 - D. Horizontal asymptote: $y = 2$; Vertical asymptote: none.

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

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

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18.

(cont.)

- A. There are no local extrema.
- B. There is a local maximum at $x = 0$.
- C. There is a local minimum at $x = 0$.
- D. There is a local maximum at $x = 2$.
- E. There is a local minimum at $x = 2$.

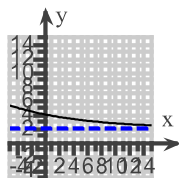
Summarize the pertinent information obtained by analyzing $f''(x)$.

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

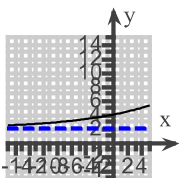
- A. There is an inflection point at $x = 4$.
- B. There are no inflection points.
- C. There is an inflection point at $x = 0$.
- D. There is an inflection point at $x = 2$.

Now sketch the graph. Choose the correct answer below.

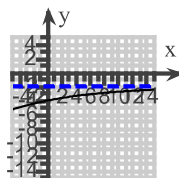
A.



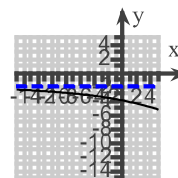
B.



C.



D.



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Assignment: 5.2-5.4 Homework (skip
5.3)

19. Summarize the pertinent information obtained by applying the graphing strategy and sketch the graph of $f(x) = \ln(x^2 + 100)$.

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

- A. The domain is all real x , except $x = \square$.
(Use a comma to separate answers as needed.)
- 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) is (are) $x = \square$.
(Round to one decimal place as needed. Use a comma to separate answers as needed.)
- B. There are no x -intercepts.

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) is (are) $y = \square$.
(Round to one decimal place as needed. Use a comma to separate answers as needed.)
- B. There are no y -intercepts.

Find vertical asymptote(s), if any. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The vertical asymptote(s) is (are) $x = \square$.
(Use a comma to separate answers as needed.)
- B. There are no vertical asymptotes.

Find horizontal asymptote(s), if any. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

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Assignment: 5.2-5.4 Homework (skip
5.3)

19. (cont.) A. The horizontal asymptote(s) is (are) $y = \square$.
(Use a comma to separate answers as needed.)

B. There are no horizontal asymptotes.

Summarize the pertinent information obtained by analyzing $f'(x)$. Select the correct choice below and fill in the answer box(es) to complete your choice.

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

A. $f(x)$ is increasing on \square and decreasing on \square .

B. $f(x)$ is increasing on \square .

C. $f(x)$ is decreasing on \square .

$f(x)$ has a local

maximum.
minimum.

Summarize the pertinent information obtained by analyzing $f''(x)$. Select the correct choice below and fill in the answer box(es) to complete your choice.

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

A. $f(x)$ is concave upward on \square and concave downward on \square .

B. $f(x)$ is concave upward on \square .

C. $f(x)$ is concave downward on \square .

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

A. The inflection point(s) is(are) $x = \square$.
(Use a comma to separate answers as needed.)

B. There are no inflection points.

Choose the correct graph below.

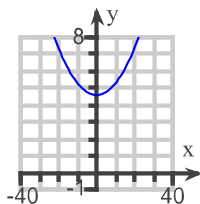
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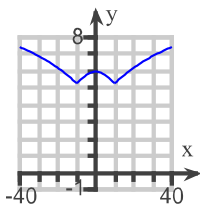
Assignment: 5.2-5.4 Homework (skip
5.3)

19.
(cont.)

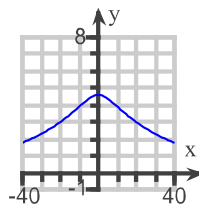
A.



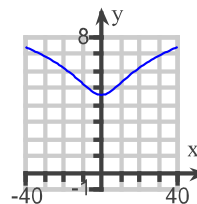
B.



C.



D.



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Assignment: 5.2-5.4 Homework (skip
5.3)

20.

Show that the line $y = x$ is an oblique asymptote for the graph of $f(x) = x + \frac{8}{x}$, 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 not an oblique asymptote because $f(x) \rightarrow \infty$ as $x \rightarrow \infty$ and $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$.
- B. $y = x$ is an oblique asymptote because $\frac{8}{x} \rightarrow 0$ as $x \rightarrow \infty$ or $x \rightarrow -\infty$.
- C. $y = x$ is an oblique asymptote because $f(x)$ is undefined for $x = 0$.
- D. $y = x$ is not an oblique asymptote because $\frac{8}{x}$ is undefined for $x = 0$.

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

- Domain:
- A. The domain of $f(x)$ is all real x , except $x = 8$.
- B. The domain of $f(x)$ is all real x , except $x = 0$.
- C. The domain of $f(x)$ is all real x .
- D. The domain of $f(x)$ is all real x , except $x = -8$.

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

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

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

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Assignment: 5.2-5.4 Homework (skip 5.3)

20.
 (cont.)

- A. Increasing on $(-\infty, -2\sqrt{2})$ and $(2\sqrt{2}, \infty)$; Decreasing on $(-2\sqrt{2}, 0)$ and $(0, 2\sqrt{2})$.
- B. Increasing on $(-\infty, -2\sqrt{2})$ and $(2\sqrt{2}, \infty)$; Decreasing on $(-2\sqrt{2}, 2\sqrt{2})$.
- C. Decreasing on $(-\infty, -2\sqrt{2})$ and $(2\sqrt{2}, \infty)$; Increasing on $(-2\sqrt{2}, 2\sqrt{2})$.
- D. Increasing on $(-\infty, 0)$; Decreasing on $(0, \infty)$.

- A. There are no local extrema.
- B. There is a local maximum at $x = 0$.
- C. There is a local maximum at $x = -2\sqrt{2}$ and a local minimum at $x = 2\sqrt{2}$.
- D. There is a local minimum at $x = 0$.
- E. There is a local minimum at $x = -2\sqrt{2}$ and a local maximum at $x = 2\sqrt{2}$.

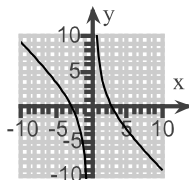
Summarize the pertinent information obtained by analyzing $f''(x)$.

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

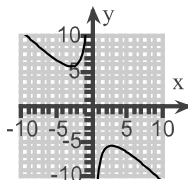
- A. There are no inflection points.
- B. There is an inflection point at $x = 2\sqrt{2}$.
- C. There is an inflection point at $x = 0$.
- D. There is an inflection point at $x = -2\sqrt{2}$.

Now sketch the graph. Choose the correct answer below.

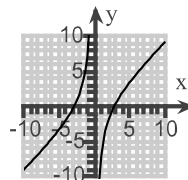
A.



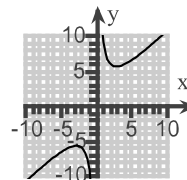
B.



C.



D.



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Assignment: 5.2-5.4 Homework (skip
5.3)

21. Summarize the pertinent information obtained by applying the graphing strategy and sketch the graph of $f(x) = \frac{x^2 + 4x - 21}{x^2 - 9x + 18}$. [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 $x = 3$ and $x = 6$.
 - C. The domain of $f(x)$ is all real x , except $x = 6$.
 - D. The domain of $f(x)$ is all real x , except $x = 3$.

- Intercepts:
- A. x-intercept: $x = -7$ and $x = 3$; y-intercept: $y = -\frac{7}{6}$.
 - B. x-intercept: $x = -7$; y-intercept: $y = -\frac{7}{6}$.
 - C. x-intercept: $x = -7$ and $x = 3$; y-intercept: none.
 - D. x-intercept: $x = -\frac{7}{6}$; y-intercept: $y = -7$.

- Asymptotes:
- A. Horizontal asymptote: $y = 1$; Vertical asymptote: $x = 6$.
 - B. Horizontal asymptote: none; Vertical asymptote: $x = 3$ and $x = 6$.
 - C. Horizontal asymptote: $y = 1$; Vertical asymptote: $x = 3$ and $x = 6$.
 - D. Horizontal asymptote: $y = 6$; Vertical asymptote: $x = 1$.

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

- A. $f(x)$ is decreasing on $(-\infty, 6)$ and increasing on $(6, \infty)$.
- B. $f(x)$ is increasing on $(-\infty, 6)$ and decreasing on $(6, \infty)$.
- C. $f(x)$ is decreasing on $(-\infty, 6)$ and $(6, \infty)$.
- D. $f(x)$ is increasing on $(-\infty, 6)$ and $(6, \infty)$.

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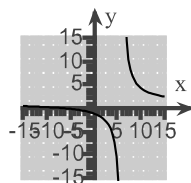
21. (cont.)
- A. There is a local maximum at $x = 0$.
 - B. There is a local minimum at $x = 0$.
 - C. There is a local minimum at $x = 6$.
 - D. There is a local maximum at $x = 6$.
 - E. There are no local extrema.

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

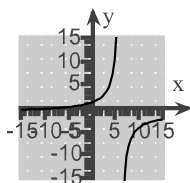
- A. $f(x)$ is concave upward on $(-\infty, \infty)$.
 - B. $f(x)$ is concave upward on $(-\infty, 6)$ and concave downward on $(6, \infty)$.
 - C. $f(x)$ is concave downward on $(-\infty, \infty)$.
 - D. $f(x)$ is concave downward on $(-\infty, 6)$ and concave upward on $(6, \infty)$.
-
- A. There is an inflection point at $x = 6$.
 - B. There is an inflection point at $x = 0$.
 - C. There are no inflection points.
 - D. There is an inflection point at $x = 3$.

Now sketch the graph. Choose the correct answer below.

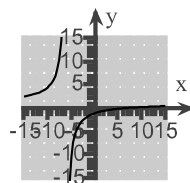
A.



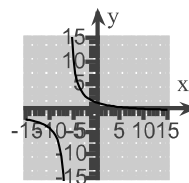
B.



C.



D.



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5.3)

22. The total daily cost (in dollars) of producing x park benches is given by

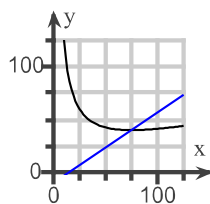
$$C(x) = 1125 + 10x + 0.2x^2$$

A. Sketch the graphs of the average cost function and the marginal cost function on the same set of coordinate axes.

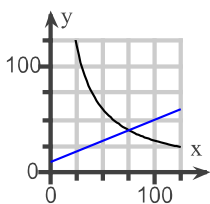
B. Find the minimum average cost.

A. Choose the correct graph below.

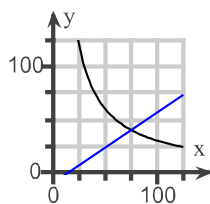
A.



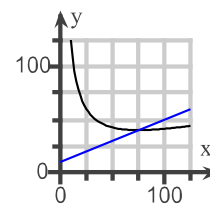
B.



C.



D.



B. The minimum average cost is \$.

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5.3)

1. D
D
A
A, e
A, e

2. A

3. $30x^{-4} - 224x^{-9}$

4. A, (-11,2662)

5. A, (0,5)

6. A, $(-\infty, \infty)$
B
B

7. A, (-1,3)
A, $(-\infty, -1), (3, \infty)$
A, -1,3

8. A, $(-\infty, \ln 4)$
A, $(\ln 4, \infty)$
A, $\ln 4$

9. A

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10. A, $(-\infty, \infty)$
A, $5 - 5\sqrt{3}, 5, 5 + 5\sqrt{3}$
A, 250
A, $(-\infty, 0), (10, \infty)$
A, $(0, 10)$
A, 0
A, 10
A, $(5, \infty)$
A, $(-\infty, 5)$
A, 5
D

11. A, $(-3, \infty)$
A, $e - 3$
A, $\ln 3 - 1$
A, $(-3, \infty)$
B
B
B
B
A, $(-3, \infty)$
B
C

12. $(0, 10)$
 $(10, 15)$
10
1000
A

13. A

14. A

15. A, $[-4, \infty)$
A, -4
A, 2

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5.3)

16. A, 3
B
A, -13

17. A
B
A
D
E
C
A
C

18. A
C
D
D
A
B
B
A

19. B
B
A, 4.6
B
B
A, $(0, \infty)$, $(-\infty, 0)$
minimum.
A, $(-10, 10)$, $(-\infty, -10)$, $(10, \infty)$
A, -10, 10
D

20. B
B
B
D
A
C
C
A
D

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5.3)

21. B
 B
 A
 C
 E
 D
 C
 A

22. D
 40