1. File: antiderivative-indefinite-simple-mixed-1.tex
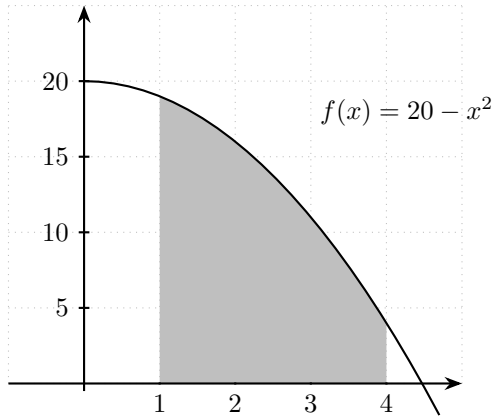
   Find the antiderivative of the function $f(x) = -5\sqrt[4]{x} - 9x^2 - 8e^x + 4\sec^2(x) - 3 - \dfrac{6}{x}$

2. File: area-exact_geometry-1.tex
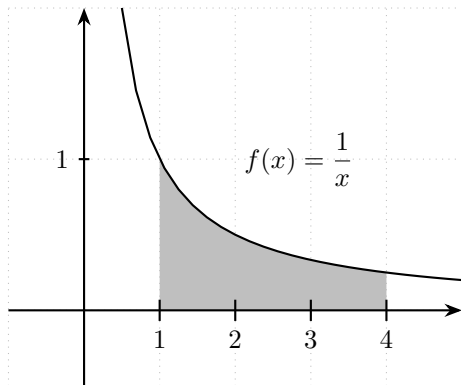   Calculate the exact area under the curve of $f(x) = 4 - |x|$ on $[-4, 4]$.

3. File: area_rectangle_approximation-graph_provided-1.tex
   Approximate the area of the shaded region using 4 left endpoint rectangles.
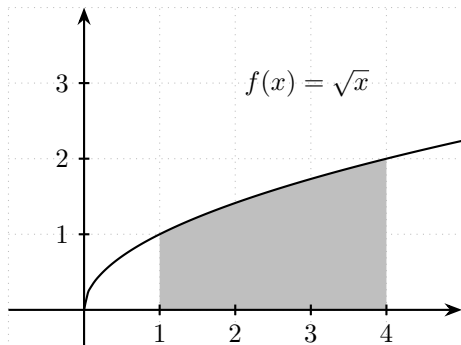

4. File: area_rectangle_approximation-graph_provided-2.tex
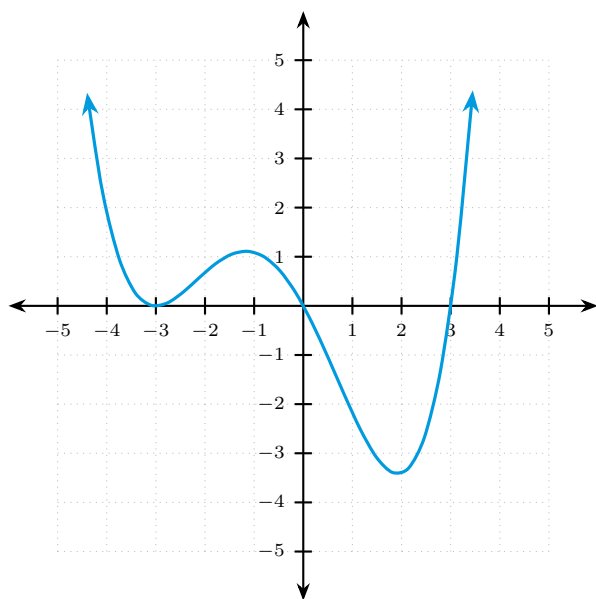   Approximate the area of the shaded region using 4 left endpoint rectangles.

5. File: area_rectangle_approximation-graph_provided-3.tex
   Approximate the area of the shaded region using 4 left endpoint rectangles.

6. File: concavity-increase-graphical-1.tex

   Use the graph below to answer the questions that follow. Some important x and y values occur at non-integer values, please just estimate them to the nearest half of a unit.

a. Determine the intervals for which the function is:
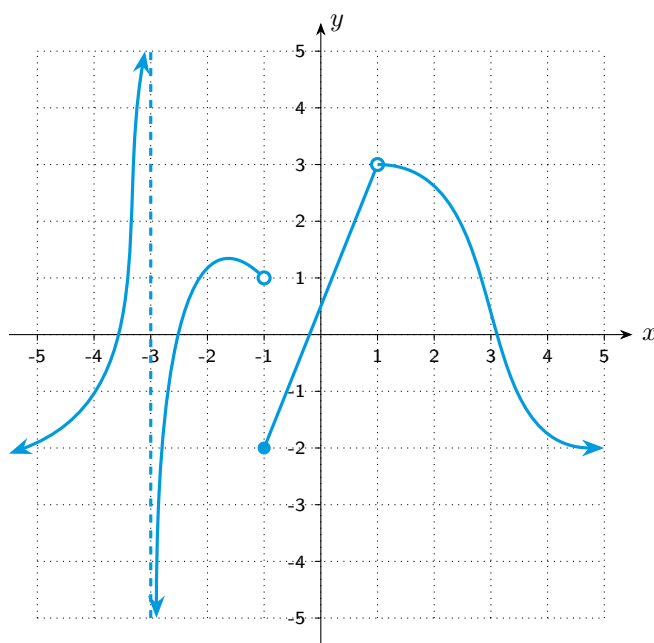
Increasing: _____

Decreasing: _____

Concave Up: _____

Concave Down: _____

b. Identify any inflection points.

7. File: continuity-graphical-1.tex

The graph below depicts a function $f(x)$. Use it to identify any discontinuities and label them as either removable or non-removable.

8. File: derivative-chain-radical-1.tex

Differentiate: $y = \sqrt[3]{x^5 - 3x}$

9. File: derivative-implicit-1.tex

Differentiate: $-6x^4 - 5x^3 y^2 + 5y^5 = -15$

10. File: derivative-logarithm-quotient-1.tex

Differentiate: $f(x) = \log\left(\dfrac{x^3 - 5x}{-3x^4 + x^3}\right)$

11. File: derivative-powerrule-1.tex

    Differentiate: $y = \dfrac{1}{5}x^5 + 2\sqrt[5]{x} - \dfrac{-11}{x^{1/3}} + 12$

12. File: derivative-product-chain-1.tex

    Differentiate: $y = 5x^4 \sin\left(x^2 - 4x\right)$

13. File: derivative-quotient-basic-1.tex

    Differentiate: $f(x) = \dfrac{2x^2 - 10}{2e^x}$

14. File: derivative-sketch-1.tex

    Sketch a possible graph of the derivative of the function shown.
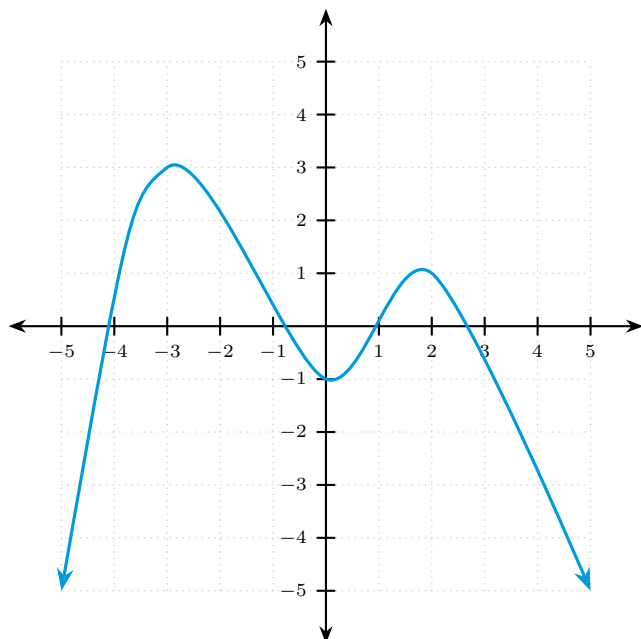

15. File: extrema-global-polynomial-1.tex

    Find the global extrema for the function $f(x) = \left(x^2 - 4x\right)^2$ on the closed interval $[1, 5]$.

    a. Global Minimum: _____

    b. Global Maximum: _____

16. File: extrema-graphical-global-local-1.tex

Use the graph below to answer the questions that follow. Some important x and y values occur at non-integers, please just estimate them to the nearest half of a unit.

a. Identify any global extrema:

b. Identify any local extrema:

17. File: first_derivative_test-extrema-intervals-1.tex

Given the function $f(x) = \dfrac{x^2}{4(x+3)}$, identify the location of any local extrema (only x-values), and the intervals for which the function is increasing, or decreasing.

For simplicity, the first and second derivatives are:

$f'(x) = \dfrac{x(x+6)}{4(x+3)^2}$, and $f''(x) = \dfrac{9}{2(x+3)^3}$
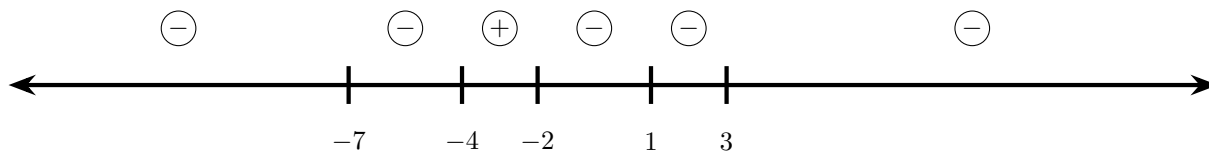
Increasing: _____   Decreasing: _____

Local Minima: _____   Local Maxima: _____

18. File: first_derivative_test-no_function-label_extrema-1.tex

The following intervals indicate where the first derivative of a function is either positive or negative. Each value on the number line is a critical value of the function. Label each critical number that appears on the number line as a local minimum, local maximum, or neither.

$$\ominus \qquad \ominus \qquad \oplus \qquad \ominus \qquad \ominus \qquad\qquad \ominus$$

$$-7 \qquad -4 \quad -2 \qquad 1 \quad 3$$

19. File: integral-definite-geometry-1.tex

    Calculate the exact area under the curve of $f(x) = \sqrt{16 - x^2}$ on $[-4, 4]$.

20. File: integral-definite-polynomial-1.tex
$$\int_5^7 x^2 + 4x \ dx$$

21. File: integral-definite-properties-1.tex

    Evaluate the definite integral $\int_4^{15} 5f(x) + g(x) + 3 \ dx$ given that:

$$\int_9^{15} f(x) \ dx = 1, \ \int_4^9 f(x) \ dx = 4, \text{ and } \int_{15}^4 g(x) \ dx = 3.$$

22. File: integral-definite-properties-2.tex

    Use the properties of definite integrals to combine the following statements into a single integral. You may find it helpful to draw out a sketch of what the region could look like.

$$\int_{-12}^2 f(x) \ dx + \int_2^8 f(x) \ dx - \int_{-12}^{-3} f(x) \ dx$$

23. File: integral-definite-substitution-power_rule-1.tex

    Evaluate the definite integral: $\int_{1/2}^{17/4} \sqrt{4x - 1} \ dx$

24. File: integral-indefinite-arctrig-1.tex
$$\int -\frac{10}{64x^2 + 25} \ dx$$

25. File: integral-indefinite-power-mixed-1.tex

    Evaluate $\int -2x^{\frac{2}{3}} - \frac{1}{x} + \frac{2}{x^4} \ dx$

26. File: integral-indefinite-simple-mixed-1.tex

    Evaluate $\int -4x^{\frac{3}{4}} - 2\sqrt[3]{x} + \frac{3}{x^5} \ dx$

27. File: integral-indefinite-substitution-basic_trig-1.tex

    Evaluate: $\int 2x \cot \left(2x^2\right) \csc \left(2x^2\right) \ dx$

28. File: integral-indefinite-substitution-log_rule_with_polynomials-1.tex
$$\int \frac{8x - 14}{2x^2 - 7x + 3} \ dx$$

29. File: integral-indefinite-substitution-log_trig-1.tex
$$\int 2x \cot \left(2x^2\right) \ dx$$

30. File: integral-indefinite-substitution-power_rule-1.tex

Evaluate: $\displaystyle\int 6x^3 \left(3x^4 + 11\right)^5 \, dx$

31. File: limit-analytic-defined-1.tex

Evaluate: $\displaystyle\lim_{x \to -1} \frac{x - 7}{x - 5} =$

32. File: limit-analytic-piecewise-1.tex

Answer the following based on the given function:

$$f(x) = \begin{cases} 2x + 2 & \text{if } x \leq -1 \\ 7 - 2x & \text{if } x > -1 \end{cases}$$

a. $\displaystyle\lim_{x \to -1^-} f(x) =$

b. $\displaystyle\lim_{x \to -1^+} f(x) =$

c. $\displaystyle\lim_{x \to -1} f(x) =$

d. $f(-1) =$

33. File: limit-analytic-polynomial-1.tex

Evaluate: $\displaystyle\lim_{x \to -8} \frac{x + 8}{x^2 + 18x + 80} =$
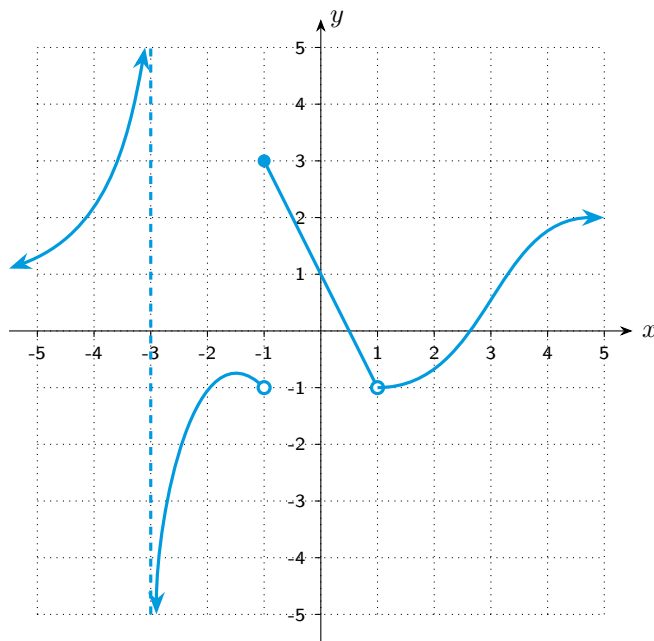
34. File: limit-analytic-radical-1.tex

Evaluate: $\displaystyle\lim_{x \to 9} \frac{\sqrt{x - 5} - 2}{x - 9} =$

35. File: limit-analytic-toinfinity-1.tex

Evaluate: $\displaystyle\lim_{x \to \infty} \frac{x - 2}{3x^2 - x + 12} =$

36. File: limit-graphical-1.tex

The graph below depicts a function $f(x)$. Use it to answer the questions that follow.

a. $\displaystyle\lim_{x \to -3} f(x) =$

b. $\displaystyle\lim_{x \to 1} f(x) =$

c. $\displaystyle\lim_{x \to -1} f(x) =$

d. $\displaystyle\lim_{x \to -1^-} f(x) =$

e. $f(-1) =$

f. $f(1) =$

37. File: limit-lhopitals-type1-1.tex

Evaluate the limit : $\lim\limits_{x \to 0} \dfrac{1 - \cos{(8x)}}{15x^2} =$

38. File: limit-numeric-1.tex

Use the table below to answer the questions that follow:

x	0.9	0.99	0.999	1	1.001	1.01	1.1
$f(x)$	-9.1	-9.01	-9.001	12	12.001	12.01	12.1

a. $\lim\limits_{x \to 1^-} f(x) =$

b. $\lim\limits_{x \to 1^+} f(x) =$

c. $\lim\limits_{x \to 1} f(x) =$

d. $f(1) =$

39. File: limit-numeric-2.tex

Use the table below to answer the questions that follow:

x	-12.1	-12.01	-12.001	-12	-11.999	-11.99	-11.9
$f(x)$	-0.1	-0.01	-0.001	DNE	0.001	0.01	0.1

a. $\lim\limits_{x \to -12^-} f(x) =$

b. $\lim\limits_{x \to -12^+} f(x) =$

c. $\lim\limits_{x \to -12} f(x) =$

d. $f(-12) =$

40. File: secant-radical-1.tex

Let $f(x) = \sqrt{x - 1}$. The point $P : (5, 2)$ is on the graph of $f(x)$. Find the equation of the secant line passing between point P and the point on the graph corresponding to $x = 10$.

41. File: secant-rational-1.tex

Let $f(x) = \frac{1}{x-4}$. Find the equation of the secant line passing between the points on the graph corresponding to $x = 7$, and $x = 10$.

$f(a) = 1/3$, $f(b) = 1/6$, slope $= -1/18$, line $= \frac{13}{18} - \frac{x}{18}$

42. File: second_derivative_test-1.tex

The second derivative of a function and the critical values of that function are given below. Use the second derivative test to state whether each critical value is a local minimum, local maximum, or if the test fails.
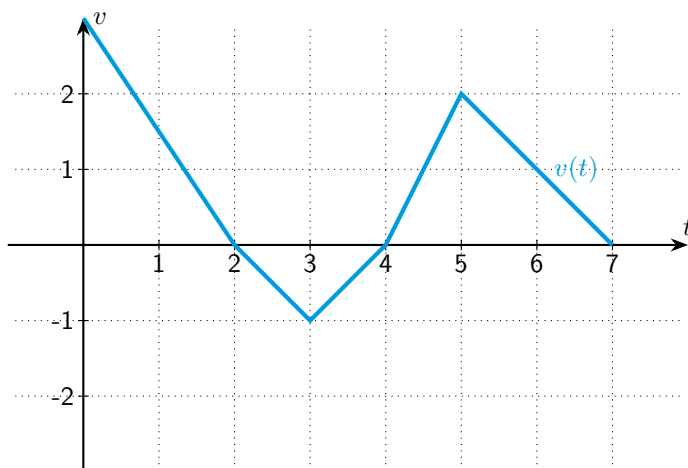
Critical values:

a. $x = -6$ _____

$$f''(x) = -\dfrac{4(x - 2)}{(x^2 + 5)^2}$$

b. $x = -2$ _____

c. $x = 8$ _____

7

43. File: summation-linear-1.tex

Calculate the sum $\displaystyle\sum_{i=1}^{5} 2i - 4$

44. File: velocity-graph-misc-1.tex

The graph below shows the velocity function $v(t)$ in meters per second for an object moving along a horizontal axis. Use the graph to answer the questions that follow.

a. Over what interval(s) of time is the object moving in the positive direction?
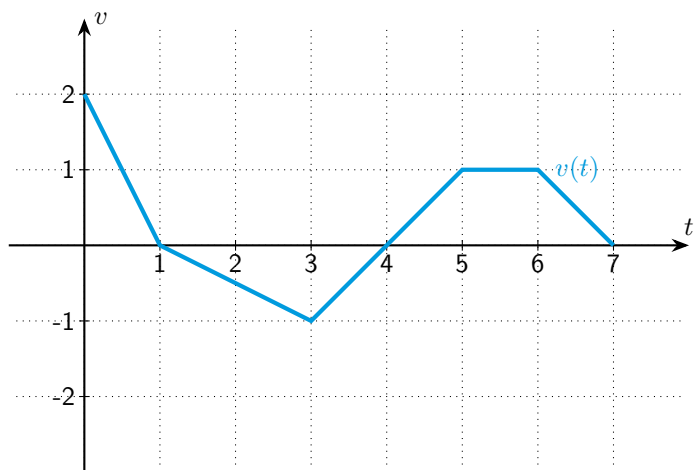
b. What is the position of the object at $t = 4$?

c. On what interval(s) of time is the acceleration of the object negative?

d. Find the net distance traveled by the object from $t = 0$ to $t = 7$.

45. File: velocity-graph-misc-2.tex

The graph below shows the velocity function $v(t)$ for an object moving along a horizontal axis. Use the graph to answer the questions that follow.

a. Over what intervals of time is the object moving in the positive direction?

b. What is the position of the object at $t = 4$?

c. On what interval(s) of time is the acceleration of the object negative?

d. Find the net distance traveled by the object form $t = 0$ to $t = 7$.