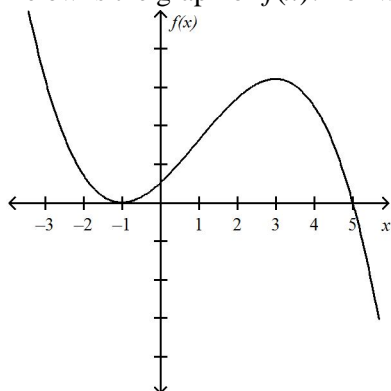# A∞Ω
MATH@TD

Chapter 4 Practice Test - Curve Sketching

Multiple Choice

Circle the choice that best completes the statement or answers the question. Also write the letter of your answer on the appropriate line.

$$K\_\_/5, \qquad T\_\_/5$$

____ 1. Below is the graph of $f(x)$. For what value(s) of x does $f(x)$ have a local maximum?

    a. $x = -1$ c. $x = 5$

    b. $x = 3$ d.   None

____ 2. Let $f(x)$ be a continuous function. If $f'(x) > 0$ for $x > c$ and $f'(x) < 0$ for $x < c$ then what type of critical point is $(c, f(c))$?

    a.   Local maximum   c.   Neither a local max or local min

    b.   Local minimum   d.   Unknown

____ 3. Let $f(x) = x^3 + 3x + 4$. What are the critical value(s)?

    a. $x = -1$ c. $x = -1$ and $x = 1$

    b. $x = 1$ d.   None

_____ 4. Below is the graph of $f(x)$. For what values of x is $f(x)$ concave down?
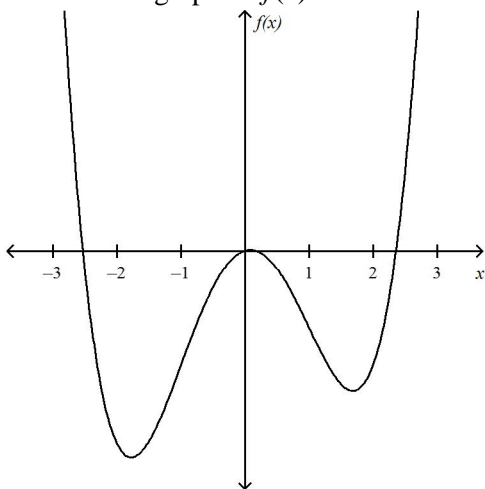
a. $x < -1$
b. $-1 < x < 1$

c. $x > 1$
d. $x < -1$ and $x > 1$

_____ 5. Which of the following is true for the interval $(2, \infty)$ for the graph of $f(x)$ shown below?
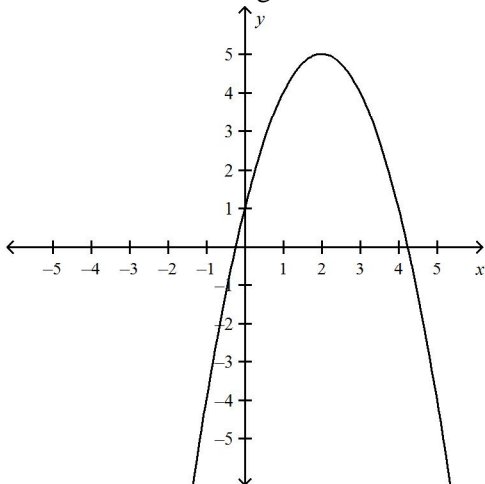
a. $f'(x) > 0, f''(x) > 0$
b. $f'(x) > 0, f''(x) < 0$

c. $f'(x) < 0, f''(x) > 0$
d. $f'(x) < 0, f''(x) < 0$

_____ 6. If $f(x)$ is decreasing for every $x > 5$, then which choice is not a possibility for $f'(x)$?

a. $f'(x) = x - 5$
b. $f'(x) = 5 - x$

c. $f'(x) = -x^2 + 10x - 25$
d. $f'(x) = -5$

_____ 7. Let $f(x) = \dfrac{3x^3 + 2x^2 + x + 1}{x^2 + x - 2}$. What types of asymptotes does $f(x)$ have?

a. horizontal and vertical asymptotes
b. oblique and vertical asymptotes

c. horizontal and oblique asymptotes
d. None

_____ 8. Let $f(x) = \dfrac{3x^2 + 1}{4x^2 - 16}$. What is the equation of the horizontal asymptote of $f(x)$?

a. $x = \dfrac{3}{4}$
b. $x = 2$

c. $y = \dfrac{3}{4}$
d. $y = 2$

_____ 9. Let $f(x) = \dfrac{-x^2 + x + 2}{x^2 - 5x + 6}$. What is the equation of the vertical asymptote of $f(x)$ and what is the sign of $f(x)$ as x approaches the asymptote from the right?

    a. $x = 2$, positive   c. $x = 3$, positive

    b. $x = 2$, negative   d. $x = 3$, negative

_____ 10. Let $f(x) = x^4 + 10x^3 + 36x^2 + 12x + 2$. For what value(s) of x does $f(x)$ have a point of inflection?

    a. $x = -3$ c. $x = -2$

    b. $x = -1$ d. $x = -3$ and $x = -2$

Problems

Write clear solutions for the following problems. ***On the test a communication mark, out of 5, will be given for how well you present your mathematics.*** Note that I hae given an indication what these kinds of questions are "worth" as an assessment.

11. For what values of x is $f(x) = x^2 - 2x + 1$ decreasing?   **T/3**

12. Let $f(x) = 2x^3 + 3x^2 - 36x - 54$. What type of critical point is located at $x = 2$? Does $f(x)$ have a point of inflection? If so, determine the P.O.I, and determine on what interval(s) $f(x)$ is concave down.   **A/5**

13. Let $f(x) = \dfrac{3x^2 - 2x + 1}{x - 1}$. What are the types of asymptotes of $f(x)$? What are the equations of all of the asymptotes of $f(x)$? If there is a vertical asymptote, determine how the function is "behaving" (i.e. is $f(x)$ approoacing $+\infty$ or $-\infty$) on either side of the vertical asymptote.   **K/6**

14. Determine the values of a and b for $f(x) = -2x^3 + ax^2 + bx + 6$ so that $f'(-2) = 0$ and $f'(7) = 0$.   **T/4**

15. Use the algorithm for curve sketching to sketch the graph of $f(x) = \dfrac{x - 2}{x^2 - 3x - 4}$. Be sure to label any intercepts, critical values, and points of inflection. Also label any asymptotes. **A/9**