

## Concavity and Inflection Points

**MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.

**Use the Concavity Theorem to determine where the given function is concave up and where it is concave down. Also find all inflection points.**

1)  $f(x) = x^2 - 16x + 69$  1) \_\_\_\_\_

- A) Concave down for all  $x$ ; no inflection points
- B) Concave up on  $(-\infty, 8)$ , concave down on  $(8, \infty)$ ; inflection point  $(8, 5)$
- C) Concave up on  $(8, \infty)$ , concave down on  $(-\infty, 8)$ ; inflection point  $(8, 5)$
- D) Concave up for all  $x$ ; no inflection points

2)  $q(x) = 3x^3 + 2x + 8$  2) \_\_\_\_\_

- A) Concave up for all  $x$ ; no inflection points
- B) Concave down for all  $x$ ; no inflection points
- C) Concave up on  $(0, \infty)$ , concave down on  $(-\infty, 0)$ ; inflection point  $(0, 8)$
- D) Concave up on  $(-\infty, 0)$ , concave down on  $(0, \infty)$ ; inflection point  $(0, 8)$

3)  $T(t) = 2t - t^3$  3) \_\_\_\_\_

- A) Concave up on  $(-\infty, 0)$ , concave down on  $(0, \infty)$ ; inflection point  $(0, 0)$
- B) Concave down for all  $t$ , no points of inflection
- C) Concave up on  $(0, \infty)$ , concave down on  $(-\infty, 0)$ ; inflection point  $(0, 0)$
- D) Concave up on  $(-\infty, 0) \cup (1, \infty)$ , concave down on  $(0, 1)$ ; inflection points  $(0, 0), (1, 2)$

4)  $f(x) = x^3 + 12x^2 - x - 24$  4) \_\_\_\_\_

- A) Concave down on  $(-\infty, -4) \cup (4, \infty)$ , concave up on  $(-4, 4)$ ; inflection points  $(-4, 108), (4, 108)$
- B) Concave up on  $(-\infty, -4)$ , concave down on  $(-4, \infty)$ ; inflection point  $(-4, 108)$
- C) Concave up on  $(-4, \infty)$ , concave down on  $(-\infty, -4)$ ; inflection point  $(-4, 108)$
- D) Concave down for all  $x$ ; no inflection points

5)  $h(z) = \frac{4}{3}z^3 - 12z^2 + 10z + 46$  5) \_\_\_\_\_

- A) Concave down for all  $z$ ; no inflection points
- B) Concave up on  $(-\infty, 0) \cup (3, \infty)$ , concave down on  $(0, 3)$ ; inflection points  $(0, 46), (3, 4)$
- C) Concave up on  $(3, \infty)$ , concave down on  $(-\infty, 3)$ ; inflection point  $(3, 4)$
- D) Concave up on  $(-\infty, 3)$ , concave down on  $(3, \infty)$ ; inflection point  $(3, 4)$

6)  $G(x) = \frac{1}{4}x^4 - x^3 + 14$  6) \_\_\_\_\_

- A) Concave up on  $(0, 2)$ , concave down on  $(-\infty, 0) \cup (2, \infty)$ ; inflection points  $(0, 14)$  and  $(2, 10)$
- B) Concave up on  $(-\infty, 0) \cup (2, \infty)$ , concave down on  $(0, 2)$ ; inflection points  $(0, 14)$  and  $(2, 10)$
- C) Concave up for  $(-\infty, 0)$ , concave down for  $(0, \infty)$ ; inflection point  $(0, 14)$
- D) Concave up for  $(2, \infty)$ , concave down on  $(-\infty, 2)$ ; inflection point  $(2, 10)$

Answer Key

Testname: CONCAVITY AND INFLECTION POINTS

- 1) D
- 2) C
- 3) A
- 4) C
- 5) C
- 6) B