Absolute Maximum and Absolute Minimum

Set 2

Worksheet Curve Sketching Calculus

Do Not Use Calculator

1) Determine where $y = 7x^3 - 4x^2 - 4x + 15$ has local maximum or minimum values.

A) local max where $x = -\frac{2}{3}$
local min where $x = \frac{2}{7}$

B) local max where $x = -\frac{2}{7}$
local min where $x = \frac{2}{3}$

C) local max where $x = \frac{2}{3}$
local min where $x = -\frac{2}{7}$

D) local max where $x = \frac{2}{7}$
local min where $x = -\frac{2}{3}$

2) Find the absolute maximum value of the function $f(x) = -\frac{x^4}{4} + 2x^3 + 8x^2$.

Support your answer graphically.

A) 8 B) 512 C) –2 D) 12

3) Suppose $f'(-1) = 0$, $f'(x) > 0$ to the right of $x = -1$, and $f'(x) > 0$ to the left of $x = -1$. Does f have a relative minimum, a relative maximum, or neither at $x = -1$? Explain your answer.

Do Not Use Calculator

4) For $y = x^4 - 12x^2 + 8$, use analytic methods to find the exact intervals on which the function is
(a) concave up
(b) concave down.
Then
(c) find any inflection points.

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Answers

1) Answer: B

2) Answer: B

3) Answer: neither

4) Answer: (a) $(-\infty, -\sqrt{2}), (\sqrt{2}, \infty)$
(b) $(-\sqrt{2}, \sqrt{2})$
(c) $(-\sqrt{2}, -12)$ and $(\sqrt{2}, -12)$

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5) Let $y = e^{-2x}$ on the domain [2, 3]. Find the exact intervals on which the function is
(a) increasing
(b) decreasing
Then
(c) find any local extreme values.

6) Find the subinterval(s) of $[0, 2\pi]$ on which the graph of cos x is concave up.

A) $(0, \frac{\pi}{2}) \cup (\frac{3\pi}{2}, 2\pi)$

B) $(\pi, 2\pi)$

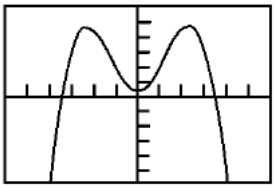
C) $(0, \pi)$

D) $(\frac{\pi}{2}, \frac{3\pi}{2})$

7) Let $f(x) = x^4 + ax^2$. What is the value of a if f has a local minimum at x = 5?

A) a = −150 B) a = −50 C) a = 50 D) a = 0

8) Use the graph of f'(x) to estimate the interval(s) on which the function f is increasing. Explain your answer.



(a) $(-\infty, -3.5] \cup [3.5, \infty)$
(b) $[-3.5, 3.5]$
(c) $(-\infty, -2.4] \cup [0, 2.4]$
(d) $[-1.41, 1.41]$

9) Let $f(x) = x^4 + ax^2$. What is the value of a if f has a point of inflection at x = −6?

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Answers

5) Answer: (a) none
(b) [2, 3]
(c) maximum at $(2, e^{-4})$; minimum at $(3, e^{-6})$

6) Answer: D

7) Answer: B

8) Answer: (b) The function is increasing when the derivative is greater than zero.

9) Answer: $a = -216$