

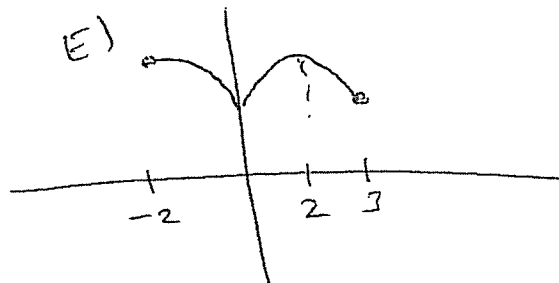
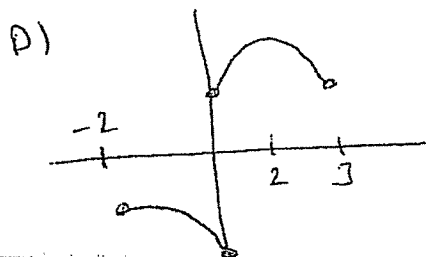
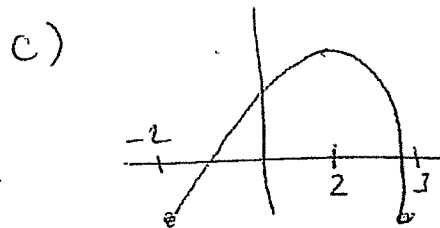
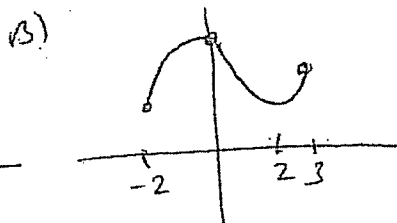
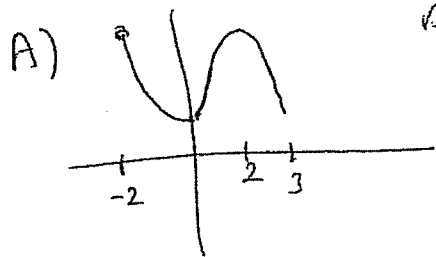
- ① For what value of k will $x + \frac{k}{x}$ have a relative maximum at $x = -2$?
- A) -4 B) -2 C) 2 D) 4 E) None of these.
- ② The graph of $y = 5x^4 - x^5$ has a point of inflection at
- A) $(0, 0)$ B) $(3, 162)$ C) $(4, 256)$ D) $(0, 0)$ E) $(4, 256)$
- ③ An equation for a tangent to the graph of $y = \arcsin\left(\frac{x}{2}\right)$ at the origin is
- A) $x - 2y = 0$ B) $x - y = 0$ C) $x = 0$ D) $y = 0$ E) $\pi x - 2y = 0$
- ④ At $x = 0$, which of the following is true of the function f defined by $f(x) = x^2 + e^{-2x}$?
- A) f is increasing.
 B) f is decreasing.
 C) f is discontinuous.
 D) f has a relative minimum.
 E) f has a relative maximum.

5. The function defined by $f(x) = x^3 - 3x^2$ has a relative maximum at $x =$
- A) -2 B) 0 C) 1 D) 2 E) 4

6. If $f(x) = \frac{\ln x}{x}$, for all $x > 0$, which of the following is true?
- A) f is increasing for all x greater than 0.
 B) f is increasing for all x greater than 1.
 C) f is decreasing for all x between 0 and 1.
 D) f is decreasing for all x between 1 and e .
 E) f is decreasing for all x greater than e .

7. An equation of the line tangent to $y = x^3 + 3x^2 + 2$ at its point of inflection is
- A) $y = -6x - 6$ B) $y = -3x + 1$ C) $y = 2x + 10$ D) $y = 3x - 1$ E) $y = 4x + 1$

8. Let f be a function that is continuous on the closed interval $[-2, 3]$ such that $f'(0)$ does not exist, $f'(2) = 0$ and $f''(x) < 0$ for all x except $x = 0$. Which of the following could be the graph of f ?



9. The graph of $y = \frac{-3}{x-2}$ is concave down when for all values of x such that

- A) $x < 0$ B) $x < 2$ C) $x < 5$ D) $x > 0$ E) $x > 2$

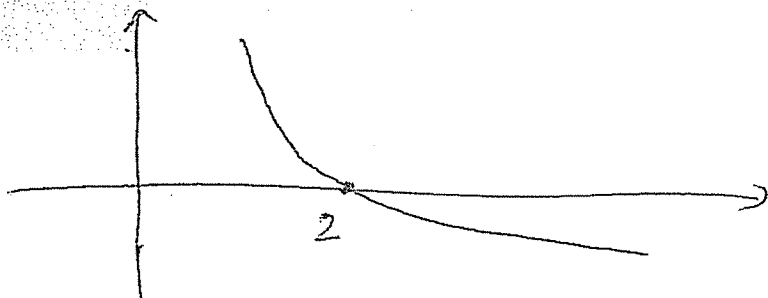
10. For what value of x does the function $f(x) = (x-2)(x-3)^2$ have a relative maximum?

- A) -3 B) $-7/3$ C) $-5/2$ D) $7/3$ E) $5/2$

11. What are all values of x for which the function f defined by $f(x) = (x^2 - 3)e^{-x}$ is increasing?

- A) No values B) $x < -1$ and $x > 3$ C) $-3 < x < 1$ D) $-1 < x < 3$
E) All values of x .

12.



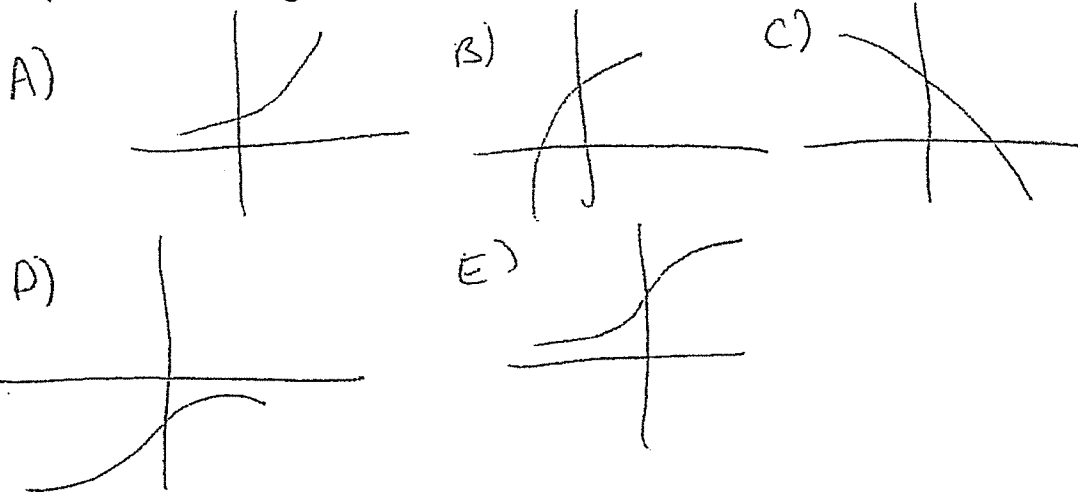
The graph of a twice-diff. function f is shown above. Which of the following is true?

- A) $f(2) < f'(2) < f''(2)$
B) $f'(2) < f(2) < f''(2)$
C) $f''(2) < f'(2) < f(2)$
D) $f'(2) < f''(2) < f(2)$
E) $f(2) < f'(2) < f''(2)$

13.

13.

If y is a function of x such that $y' > 0$ for all x and $y'' < 0$ for all x , which of the following could be part of the graph of $y = f(x)$?



14. If $f''(x) = x(x+1)(x-2)^2$, then the graph of f has inflection points when $x =$

- A) -1 only
- B) 2 only
- C) -1 and 0 only
- D) -1 and 2 only
- E) -1, 0, and 2 only.

15) If g is a differentiable function such that $g(x) < 0$ for all real numbers x and if $f'(x) = (9-x^2)g(x)$, which of the following must be true?

- | | <u>Rel. max</u> | <u>Rel. min</u> |
|----|--------------------------|------------------|
| A) | $x = 3$ | $x = -3$ |
| B) | $x = -3$ | $x = 3$ |
| C) | $x = 3$ and -3 | none |
| D) | None | $x = 3$ and -3 |
| E) | It cannot be determined. | |