(circle one)

Find all local extrema and inflection points.

1) $f(x) = 2x^3 + 15x^2 + 24x$

A) Local max: $(-4,16)$, min: $(-1,-11)$
Inflection point: $\left(-\frac{5}{2},\frac{5}{2}\right)$

B) Local maximum: $(0, 0)$
Local minimum: $(-8,512)$
Inflection point: $(-4,256)$

C) No extrema
Inflection point: $(0, 0)$

D) Local min: $(3,6)$
No inflection point

Find the open interval(s) where the function is changing as requested.

2) Increasing; $y = x^4 - 18x^2 + 81$

A) $(-3, 0)$ B) $(-3, 0), (3, \infty)$ C) $(-3, 3)$ D) $(-\infty, 0)$

Find f ' '(x) for the function.

3) $f(x) = 3e^{-x^2}$

A) $6x^2 e^{-x^2}$ B) $12x^2 e^{-x^2} - 6e^{-x^2}$ C) $9xe^{-x^2} + 6e^{-x^2}$ D) $12x^2 e^{-x^2} + 3e^{-x^2}$

Find the indicated derivative of the function.

4) $f^{(4)}(x)$ of $f(x) = 3x^5 - 5x^2 - 2x + 1$

A) $180x$ B) $240x^2 + 10$ C) $240x + 10$ D) $360x$

Find the open interval(s) where the function is concave upward.

5) $f(x) = 4x^3 - 45x^2 + 150x$

A) $\left(-\frac{15}{4}, \infty\right)$ B) $\left(\frac{15}{4}, \infty\right)$ C) $\left(-\infty, -\frac{15}{4}\right)$ D) $\left(-\infty, \frac{15}{4}\right)$

The function gives the distances (in feet) traveled in time t (in seconds) by a particle. Find the velocity and acceleration at the given time.

6) $d = -7t^3 - 3t^2 + 8t + 8$, $t = 3$

A) $v = -132$ ft/s, $a = -199$ ft/s^2 B) $v = -199$ ft/s, $a = -132$ ft/s^2

C) $v = -199$ ft/s, $a = -81$ ft/s^2 D) $v = -81$ ft/s, $a = -199$ ft/s^2

Find the location of the indicated absolute extremum within the specified domain.

7) Maximum of $f(x) = 3x^4 + 16x^3 + 24x^2 + 32$; $[-3, 1]$

A) $x = 0$ B) $x = 1$ C) $x = -2$ D) $x = -3$

Solve the problem.

8) The price P of a certain computer system decreases immediately after its introduction and then increases. If the price P is estimated by the formula $P = 170t^2 - 2500t + 6100$, where t is the time in months from its introduction, find the approximate time until the minimum price is reached.

A) 12.5 months B) 14.7 months C) 7.4 months D) 29.4 months

9) A manufacturer sells telephones with cost function $C(x) = 6.14x - .0002x^2$, $0 \le x \le 950$ and revenue function $R(x) = 9.2x - .002x^2$, $0 \le x \le 950$. Determine the interval(s) on which the profit function is increasing.

A) (0 , 850) B) (850 , 950) C) (0 , 7850) D) (50 , 800)

Find the integral.

10) $\int 9\sqrt[3]{x}$

A) $\frac{27}{4}x^{4/3}$ B) $27x^{4/3} + C$ C) $\frac{9}{4}x^{4/3} + C$ D) $9x^{4/3} + C$

11) $\int (t^4 + e^{2t})\, dt$

A) $\frac{t^3}{3} + 2e^{2t} + C$ B) $\frac{t^5}{5} + \frac{e^{3t}}{3} + C$ C) $\frac{t^5}{5} + e^{2t} + C$ D) $\frac{t^5}{5} + \frac{e^{2t}}{2} + C$

Find the values of any relative extrema.

12) $f(x) = x^3 - 3x^2 + 1$

A) Relative maximum of 1 at 0.

B) No relative extrema.

C) Relative maximum of 0 at 1; Relative minimum of −3 at −2.

D) Relative maximum of 1 at 0; Relative minimum of −3 at 2.

13) $f(x) = x^5 e^x - 9$

A) Relative maximum of −9 at 0; relative minimum of −30.06 at −5

B) Relative minimum of −30.06 at −5

C) No relative extrema

D) Relative maximum of 12.06 at −5; relative minimum of −9 at 0

Evaluate the definite integral.

14) $\int_{-2}^{5} 6x^5 \, dx$

A) 93,366 B) 15,689 C) 609 D) 15,561

Solve the problem.

15) Find the cost function if the marginal cost function is $C'(x) = 16x - 11$ and the fixed cost is $4.

A) $C(x) = 8x^2 - 11x + 3$ B) $C(x) = 16x^2 - 11x + 3$

C) $C(x) = 8x^2 - 11x + 4$ D) $C(x) = 16x^2 - 11x + 4$

Find the integral.

16) $\int \frac{3\sqrt{x} - 5}{x^2}\,dx$

A) $\frac{6}{\sqrt{x}} - \frac{5}{x} + C$ B) $-\frac{6}{\sqrt{x}} - \frac{5}{x} + C$ C) $-\frac{6}{\sqrt{x}} + \frac{5}{x} + C$ D) $\frac{6}{\sqrt{x}} + \frac{5}{x} + C$

17) $\int (2x^2 + x^{-4})\,dx$

A) $-\frac{2x^3}{3} + \frac{x^{-3}}{3} + C$ B) $\frac{2x^3}{3} + \frac{x^{-3}}{3} + C$ C) $-\frac{2x^3}{3} - \frac{x^{-3}}{3} + C$ D) $\frac{2x^3}{3} - \frac{x^{-3}}{3} + C$

Evaluate the definite integral.

18) $\int_1^e \frac{8}{x}\,dx$

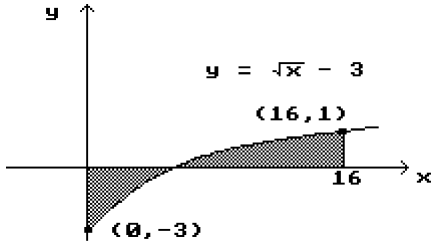
A) $-8e^2$ B) 8 C) 0 D) -8

19) $\int_1^4 \frac{x^3 - x^{-1}}{x^2}\,dx$

A) $\frac{225}{32}$ B) $\frac{225}{16}$ C) $\frac{447}{64}$ D) $\frac{257}{32}$

Find the area of the shaded region.

20)



A) $\frac{38}{3}$ B) $\frac{22}{3}$ C) $\frac{16}{3}$ D) $\frac{29}{3}$

Provide the proper response.

21) If F'(x) = f(x), then $\int_a^b f(x)\,dx$ =

i) F(a) – F(b).
ii) F(b) – F(a).
iii) F(b) + F(a).

A) Either i or ii could be correct. B) Only i is correct.

C) Only iii is correct. D) Only ii is correct.

22) If $f(x) \le 0$ on the interval [a, b], then $\int_a^b f(x)\,dx$ represents

i) the area to the right of the y–axis between y = a and y = b.
ii) the area above the x–axis between x = a and x = b.
iii) the area below the x–axis between x = a and x = b.

A) Either ii or iii could be correct. B) Only ii is correct.

C) Only iii is correct. D) Only i is correct.

BONUS: Find the area between the curves.

23) $y = x^3$, $y = 4x$

A) 16 B) 8 C) 4 D) 2