Name: _____

CLEP PRACTICE TEST #1
ANSWER SHEET

CIRCLE YOUR RESPONSE. ANSWER EVERY QUESTION!

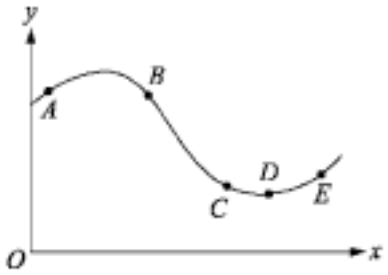
1.	A	B	C	D	E	24.	A	B	C	D	E
2.	A	B	C	D	E	25.	A	B	C	D	E
3.	A	B	C	D	E	26.	A	B	C	D	E
4.	A	B	C	D	E	27.	A	B	C	D	E
5.	A	B	C	D	E	28.	A	B	C	D	E
6.	A	B	C	D	E	29.	A	B	C	D	E
7.	A	B	C	D	E	30.	A	B	C	D	E
8.	A	B	C	D	E	31.	A	B	C	D	E
9.	A	B	C	D	E	32.	A	B	C	D	E
10.	A	B	C	D	E	33.	A	B	C	D	E
11.	A	B	C	D	E	34.	A	B	C	D	E
12.	A	B	C	D	E	35.	A	B	C	D	E
13.	A	B	C	D	E	36.	A	B	C	D	E
14.	A	B	C	D	E	37.	A	B	C	D	E
15.	A	B	C	D	E	38.	A	B	C	D	E
16.	A	B	C	D	E	39.	A	B	C	D	E
17.	A	B	C	D	E	40.	A	B	C	D	E
18.	A	B	C	D	E	41.	A	B	C	D	E
19.	A	B	C	D	E	42.	A	B	C	D	E
20.	A	B	C	D	E	43.	A	B	C	D	E
21.	A	B	C	D	E	44.	A	B	C	D	E
22.	A	B	C	D	E	45.	A	B	C	D	E
23.	A	B	C	D	E						

1. If $f(x) = -2x^{-3}$, then $f'(x) =$

(A) $6x^2$
(B) $6x^{-2}$
(C) $6x^{-4}$
(D) $-6x^{-2}$
(E) $-6x^{-4}$

2. $\lim_{x \to 3} \frac{1}{x-3}$ is

(A) –3 (B) 0 (C) 1 (D) 3 (E) nonexistent



3. At which of the five points on the graph in the figure above are $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ both negative?

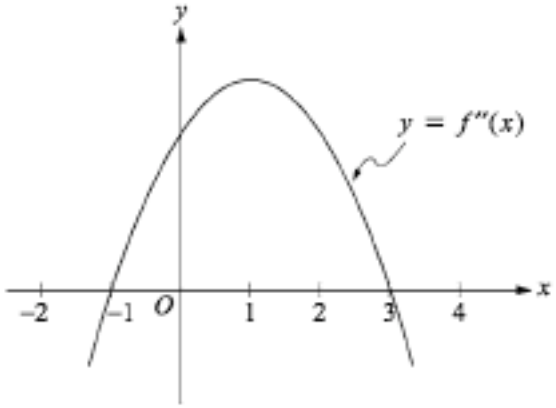
(A) A (B) B (C) C (D) D (E) E

4. Which of the following is an equation of the line tangent to the graph of $f(x) = x^3 - x$ at the point where $x = 2$?

(A) $y - 6 = 4(x - 2)$
(B) $y - 6 = 5(x - 2)$
(C) $y - 6 = 6(x - 2)$
(D) $y - 6 = 11(x - 2)$
(E) $y - 6 = 12(x - 2)$

5. $\int (e^x + e)\,dx =$

(A) $e^x + C$
(B) $e^x + e + C$
(C) $e^x + ex + C$
(D) $\frac{e^{x+1}}{x+1} + ex + C$
(E) $\frac{e^{x+1}}{x+1} + \frac{e^2}{2} + C$



6. The graph of f'', the second derivative of the function f, is shown in the figure above. On what intervals is f concave up?

(A) $(-\infty, \infty)$
(B) $(-\infty, -1)$ and $(3, \infty)$
(C) $(-\infty, 1)$
(D) $(-1, 3)$
(E) $(1, \infty)$

7. $\int (x-1)\sqrt{x}\,dx =$

(A) $\frac{2}{5}x^{\frac{5}{2}} - \frac{2}{3}x^{\frac{3}{2}} + C$
(B) $\frac{1}{2}x^2 + 2x^{\frac{2}{3}} - x + C$
(C) $\frac{1}{2}x^2 - x + C$
(D) $\frac{2}{3}x^{\frac{3}{2}} + 2x^{\frac{1}{2}} + C$
(E) $\frac{3}{2}x^{\frac{1}{2}} - x^{-\frac{1}{2}} + C$

8. The acceleration, at time t, of a particle moving along the x-axis is given by $a(t) = 20t^3 + 6$. At time $t = 0$, the velocity of the particle is 0 and the position of the particle is 7. What is the position of the particle at time t ?

(A) $120t + 7$
(B) $60t^2 + 7t$
(C) $5t^4 + 6t + 7$
(D) $t^5 + 3t^2 + 7$
(E) $t^5 + 3t^2 + 7t$

9. What is $\lim_{x \to \infty} \frac{x^2 - 4}{2 + x - 4x^2}$?

(A) -2
(B) $-\frac{1}{4}$
(C) $\frac{1}{2}$
(D) 1
(E) The limit does not exist.

10. $\int_{-3}^{3} |x+2| \, dx =$

(A) 0 (B) 9 (C) 12 (D) 13 (E) 14

11. Let f and g be the functions defined by $f(x) = \sin x$ and $g(x) = \cos x$. For which of the following values of a is the tangent line to f at $x = a$ parallel to the tangent line to g at $x = a$?

(A) 0 (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{2}$ (D) $\frac{3\pi}{4}$ (E) π

12. The function f is given by $f(x) = 3x^2 + 1$. What is the average value of f over the closed interval $[1, 3]$?

(A) $\frac{28}{3}$ (B) 8 (C) 12 (D) 14 (E) 28

13. If $f(x) = \frac{\sin x}{2x}$, then $f'(x) =$

(A) $\frac{\cos x}{2}$
(B) $\frac{x\cos x - \sin x}{2x^2}$
(C) $\frac{x\cos x - \sin x}{4x^2}$
(D) $\frac{\sin x - x\cos x}{2x^2}$
(E) $\frac{\sin x - x\cos x}{4x^2}$

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
10	35	15	6	4
20	8	5	12	10
30	24	25	20	10

14. Selected values of the functions f and g and their derivatives, f' and g', are given in the table above. If $h(x) = f(g(x))$, what is $h'(30)$?

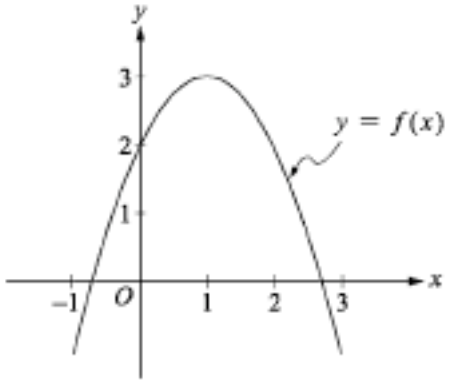
(A) 5 (B) 15 (C) 35 (D) 50 (E) 250

15. $\int_{2}^{5} \frac{1}{x} dx =$

(A) $-\frac{3}{10}$
(B) $\frac{21}{100}$
(C) $-\ln 10$
(D) $\ln \frac{5}{2}$
(E) $\ln 3$

16. What is $\lim_{h \to 0} \frac{\cos\left(\frac{\pi}{2} + h\right) - \cos\frac{\pi}{2}}{h}$?

(A) $-\infty$ (B) -1 (C) 0 (D) 1 (E) ∞



17. The function f has a relative maximum value of 3 at $x=1$, as shown in the figure above. If $h(x)=x^2 f(x)$, then $h'(1)=$

(A) -6 (B) -3 (C) 0 (D) 3 (E) 6

18. The area of the region in the first quadrant between the graph of $y=x\sqrt{4-x^2}$ and the x-axis is

(A) $\frac{2}{3}\sqrt{2}$

(B) $\frac{8}{3}$

(C) $2\sqrt{2}$

(D) $2\sqrt{3}$

(E) $\frac{16}{3}$

19. If $x^2+y^3=x^3y^2$, then $\frac{dy}{dx}=$

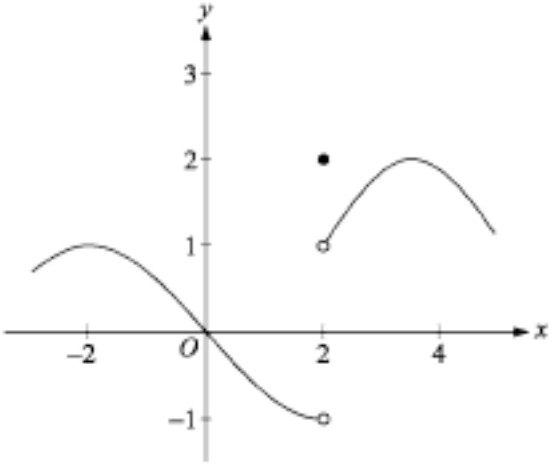
(A) $\frac{2x+3y^2-3x^2y^2}{2x^3y}$

(B) $\frac{2x^3y+3x^2y^2-2x}{3y^2}$

(C) $\frac{3x^2y^2-2x}{3y^2-2x^3y}$

(D) $\frac{3y^2-2x^3y}{3x^2y^2-2x}$

(E) $\frac{6x^2y-2x}{3y^2}$



20. The graph of the function f is shown in the figure above. What is $\lim_{x\to 2} f(x)$?

(A) -1
(B) 0
(C) 1
(D) 2
(E) The limit does not exist.

21. $\lim_{x\to\infty}\frac{x^2}{x\ln x}=$

(A) 0 (B) 1 (C) 2 (D) e (E) ∞

22. The function f is differentiable on $[a,b]$ and $a<c<b$. Which of the following is NOT necessarily true?

(A) $\int_a^b f(x)dx=\int_a^c f(x)dx+\int_c^b f(x)dx$

(B) There exists a point d in the open interval (a,b) such that $f'(d)=\frac{f(b)-f(a)}{b-a}$.

(C) $\int_a^b f(x)dx\geq 0$

(D) $\lim_{x\to c} f(x)=f(c)$

(E) If k is a real number, then $\int_a^b kf(x)dx=k\int_a^b f(x)dx$.

23. $\int \frac{\ln x}{x}\,dx =$

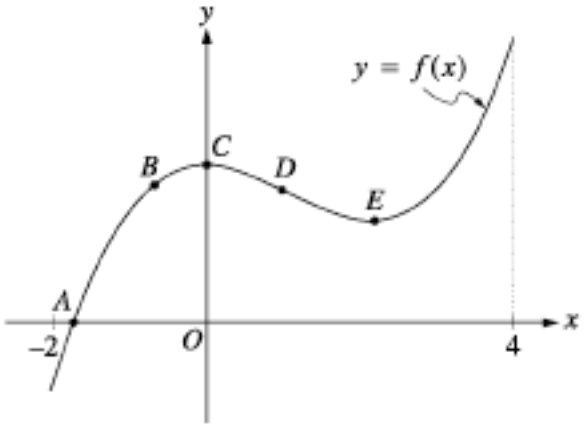
(A) $\frac{1}{x^2}+C$

(B) $\frac{2}{x^3}+C$

(C) $\frac{(\ln x)^2}{2}+C$

(D) $\frac{(\ln x)^2}{2x}+C$

(E) $\frac{(\ln x)^2}{x^2}+C$



24. The function f is shown in the figure above. At which of the following points could the derivative of f be equal to the average rate of change of f over the closed interval $[-2,4]$?

(A) A (B) B (C) C (D) D (E) E

25. For which of the following functions does $\frac{d^3y}{dx^3}=\frac{dy}{dx}$?

I. $y=e^x$

II. $y=e^{-x}$

III. $y=\sin x$

(A) I only
(B) II only
(C) III only
(D) I and II
(E) II and III

26. The vertical height, in feet, of a ball thrown upward from a cliff is given by $s(t)=-16t^2+64t+200$, where t is measured in seconds. What is the height of the ball, in feet, when its velocity is zero?

(A) 2 (B) 8 (C) 64 (D) 200 (E) 264

27. If the function f is continuous for all real numbers and $\lim_{h\to 0}\frac{f(a+h)-f(a)}{h}=7$, then which of the following statements must be true?

(A) $f(a)=7$
(B) f is differentiable at $x=a$.
(C) f is differentiable for all real numbers.
(D) f is increasing for $x>0$.
(E) f is increasing for all real numbers.

28. $\frac{d}{dx}(\sin(\cos x))=$

(A) $\cos(\cos x)$
(B) $\sin(-\sin x)$
(C) $(\sin(-\sin x))\cos x$
(D) $-(\cos(\cos x))\sin x$
(E) $-(\sin(\cos x))\sin x$

29. Which of the following statements about the curve $y = x^4 - 2x^3$ is true?

(A) The curve has no relative extremum.
(B) The curve has one point of inflection and two relative extrema.
(C) The curve has two points of inflection and one relative extremum.
(D) The curve has two points of inflection and two relative extrema.
(E) The curve has two points of inflection and three relative extrema.

30. $\int \cos^2 x \sin x \, dx =$

(A) $-\frac{\cos^3 x}{3} + C$

(B) $-\frac{\cos^3 x \sin^2 x}{6} + C$

(C) $\frac{\sin^2 x}{2} + C$

(D) $\frac{\cos^3 x}{3} + C$

(E) $\frac{\cos^3 x \sin^2 x}{6} + C$

31. Let $r(t)$ be a differentiable function that is positive and increasing. The rate of increase of r^3 is equal to 12 times the rate of increase of r when $r(t) =$

(A) $\sqrt[3]{4}$ (B) 2 (C) $\sqrt[3]{12}$ (D) $2\sqrt{3}$ (E) 6

32. $\frac{d}{dx}\int_1^x t^2 dt =$

(A) $2x$

(B) $x^2 - 1$

(C) x^2

(D) $\frac{x^3}{3} - \frac{1}{3}$

(E) $\frac{x^3}{3} + C$

33. Let f be the function defined by

$$f(x) = \begin{cases} \frac{x^2 - 25}{x - 5} & \text{for } x \neq 5 \\ 0 & \text{for } x = 5. \end{cases}$$

Which of the following statements about f are true?

I. $\lim_{x \to 5} f(x)$ exists.
II. $f(5)$ exists.
III. $f(x)$ is continuous at $x = 5$.

(A) None
(B) I only
(C) II only
(D) I and II only
(E) I, II, and III

x	1	2	3	4	5
$f(x)$	15	10	9	6	5

34. The function f is continuous on the closed interval $[1,5]$ and has values that are given in the table above. If two subintervals of equal length are used, what is the midpoint Riemann sum approximation of $\int_1^5 f(x)dx$?

(A) –3 (B) 9 (C) 14 (D) 32 (E) 35

35. What is the average rate of change of the function f defined by $f(x) = 100 \cdot 2^x$ on the interval $[0,4]$?

(A) 100
(B) 375
(C) 400
(D) 1,500
(E) 1,600

36. If the functions f and g are defined for all real numbers and f is an antiderivative of g, which of the following statements is NOT necessarily true?

(A) If $g(x) > 0$ for all x, then f is increasing.
(B) If $g(a) = 0$, then $f(x)$ has a horizontal tangent at $x = a$.
(C) If $f(x) = 0$ for all x, then $g(x) = 0$ for all x.
(D) If $g(x) = 0$ for all x, then $f(x) = 0$ for all x.
(E) f is continuous for all x.

37. A college is planning to construct a new parking lot. The parking lot must be rectangular and enclose 6,000 square meters of land. A fence will surround the parking lot, and another fence parallel to one of the sides will divide the parking lot into two sections. What are the dimensions, in meters, of the rectangular lot that will use the least amount of fencing?

(A) 1,000 by 1,500
(B) $20\sqrt{5}$ by $60\sqrt{5}$
(C) $20\sqrt{10}$ by $30\sqrt{10}$
(D) $20\sqrt{15}$ by $20\sqrt{15}$
(E) $20\sqrt{15}$ by $40\sqrt{15}$

38. If $f(x) = \ln\left(\sin\left(x^2\right)\right)$, then $f'(x) =$

(A) $\dfrac{1}{\cos\left(x^2\right)}$

(B) $\dfrac{1}{\sin\left(x^2\right)}$

(C) $\dfrac{\cos\left(x^2\right)}{\sin\left(x^2\right)}$

(D) $\dfrac{2x\cos\left(x^2\right)}{\sin\left(x^2\right)}$

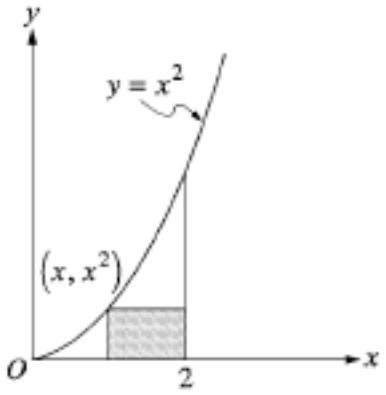
(E) $\dfrac{2x}{\cos\left(x^2\right)}$

39. Let f be a differentiable function defined on the closed interval $[a,b]$ and let c be a point in the open interval (a,b) such that

I. $f'(c) = 0$,
II. $f'(x) > 0$ when $a \le x < c$, and
III. $f'(x) < 0$ when $c < x \le b$.

Which of the following statements must be true?

(A) $f(c) = 0$
(B) $f''(c) = 0$
(C) $f(c)$ is an absolute maximum value of f on $[a,b]$.
(D) $f(c)$ is an absolute minimum value of f on $[a,b]$.
(E) $f(x)$ has a point of inflection at $x = c$.



40. A rectangle with one side on the x-axis and one side on the line $x = 2$ has its upper left vertex on the graph of $y = x^2$, as indicated in the figure above. For what value of x does the area of the rectangle attain its maximum value?

(A) 2 (B) $\frac{4}{3}$ (C) 1 (D) $\frac{3}{4}$ (E) $\frac{2}{3}$

41. Let $f(x) = x^3 + x$. If h is the inverse function of f, then $h'(2) =$

(A) $\frac{1}{13}$ (B) $\frac{1}{4}$ (C) 1 (D) 4 (E) 13

42. If f is continuous for all x, which of the following integrals necessarily have the same value?

I. $\int_a^b f(x)dx$

II. $\int_0^{b-a} f(x+a)dx$

III. $\int_{a+c}^{b+c} f(x+c)dx$

(A) I and II only
(B) I and III only
(C) II and III only
(D) I, II, and III
(E) No two necessarily have the same value.

43. Let F be the number of trees in a forest at time t, in years. If F is decreasing at a rate given by the equation $\frac{dF}{dt} = -2F$ and if $F(0) = 5000$, then $F(t) =$

(A) $5000t^{-2}$
(B) $5000e^{-2t}$
(C) $5000 - 2t$
(D) $5000 + t^{-2}$
(E) $5000 + e^{-2t}$

44. A spherical balloon is being inflated at a constant rate of 25 cm^3/sec. At what rate, in cm/sec, is the radius of the balloon changing when the radius is 2 cm? (The volume of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.)

(A) $\frac{25}{16\pi}$
(B) $\frac{25}{8\pi}$
(C) $\frac{75}{16\pi}$
(D) $\frac{32\pi}{25}$
(E) $\frac{32\pi}{3}$

45. The Riemann sum $\sum_{i=1}^{50}\left(\frac{i}{50}\right)^2\frac{1}{50}$ on the closed interval [0,1] is an approximation for which of the following definite integrals?

(A) $\int_0^1 x^2 dx$
(B) $\int_0^{50} x^2 dx$
(C) $\int_0^1 \left(\frac{x}{50}\right)^2 dx$
(D) $\int_0^{50} \left(\frac{x}{50}\right)^2 dx$
(E) $\int_0^1 \frac{x^2}{50^3} dx$