

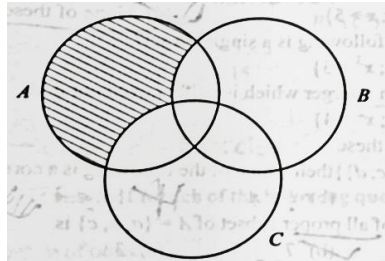
TOPICS: Sets Theory, Relation, Function, Differential Calculus & Integral Calculus

- A set is
 - A collection of objects
 - A well defined collection of objects
 - A collection of objects with common property
 - None of these
- If $f(x) = x^k$ and $f'(1) = 10$, then the value of k is :
 - 10
 - 10
 - 1/10
 - None
- $\int x(x^2+4)^5 dx$ is equal to
 - $(x^2 + 4)^6 + c$
 - $\frac{1}{2}(x^2 + 4)^6 + c$
 - $\frac{1}{6}(x^2 + 4)^6 + c$
 - $\frac{1}{12}(x^2 + 4)^6 + c$
- If $f(x) = 100x$ then $f^{-1}(x) =$
 - $\frac{x}{100}$
 - $\frac{1}{100x}$
 - $\frac{1}{100}$
 - None of these
- If $y = 4x^3 - 7x^4$ then dy/dx is
 - $2x(14x^2 - 6x)$
 - $2x(-14x^2 + 6x)$
 - $2x(14x^2 + 6x)$
 - None.
- $\int \left(\sqrt{x} + \frac{1}{\sqrt{x}} \right) dx$
 - $2x^{1/2} \left(\frac{1}{3}x - 1 \right)$
 - $2x^{1/2} \left(\frac{1}{3}x + 1 \right)$
 - $2 \left(\frac{1}{3}x + x^{1/2} \right)$
 - None of these
- The third quadrant is given by which of the following set ?
 - $\{(x, y)/x < 0, y < 0\}$
 - $\{(x, y)/x > 0, y < 0\}$
 - $\{(x, y)/x < 0, y > 0\}$
 - None
- If $x^2 + y^2 = a^2$, find $\frac{dy}{dx}$.
 - $\frac{y}{x}$
 - $\frac{-y}{x}$
 - $\frac{-x}{y}$
 - $\frac{x}{y}$
- Integrate w.r.t x , $(4x^3 + 3x^2 - 2x + 5)$
 - $x^4 + x^3 - x^2 + 5x + c$
 - $x^4 - x^3 + x^2 - 5x + c$
 - $x^4 + x^3 - x^2 + 5x + c$
 - None

10. The range of $\{(1, 3), (2, 5), (6, 7)\} =$
- (a) $\{1, 2, 6\}$ (b) $\{3, 5, 7\}$
(c) $\{1, 5, 7\}$ (d) None of these
11. Let $x = at^3, y = \frac{a}{t^2}$. Then $\frac{dy}{dx} =$
- (a) $\frac{-1}{t^6}$ (b) $\frac{-3a}{t^6}$ (c) $\frac{1}{3at^6}$ (d) None of the above
12. If $f: \mathbb{R} \rightarrow \mathbb{R}$ is a function, defined by $f(x) = 10x - 7$, if $g(x) = f^{-1}(x)$, then the value of $g(x)$ is equal to
- (a) $\frac{1}{10x-7}$ (b) $\frac{1}{10x+7}$ (c) $\frac{x+7}{10}$ (d) $\frac{x-7}{10}$
13. If $A \Delta B = (A - B) \cup (B - A)$ and $A = \{1, 2, 3, 4\}, B = \{3, 5, 7\}$ then $A \Delta B$ is
- (a) $\{1, 2, 4, 5, 7\}$ (b) $\{3\}$
(c) $\{1, 2, 3, 4, 5, 7\}$ (d) None of these
14. The derivative of $x^2 \log x$ is :
- (a) $1 + 2 \log x$ (b) $2 \log x$
(c) $x(1 + 2 \log x)$ (d) None of these
15. Integrate w.r.t $x, x(x-1)^{-1}(2x+1)^{-1}$
- (a) $(1/3)[\log(x-1) - (1/2)\log(2x+1)] + c$
(b) $(1/3)[\log(x-1) + \log(2x+1)] + c$
(c) $(1/3)[\log(x-1) + (1/2)\log(2x+1)] + c$
(d) None
16. If $y = e^{3x}$, find y'' .
- (a) $6e^{3x}$ (b) $3e^{3x}$ (c) $12e^{3x}$ (d) $9e^{3x}$
17. $\int \log(a^x) dx =$
- (a) $\log a \left(\frac{x^2}{2}\right) + c$ (b) $\log a \left(\frac{x}{2}\right) + c$
(c) $x \log a^x - x + c$ (d) $x \log a^x + c$
18. The relation 'has the same mother as' over the set of children
- (a) Transitive (T) (b) Symmetric (S)
(c) Reflexive (R) (d) Equivalence
19. If $x^m y^n = (x + y)^{m+n}$, then find $\frac{dy}{dx}$:
- (a) $\frac{x}{y}$ (b) $\frac{y}{x}$ (c) xy (d) None
20. Integrate w.r.t $x, xe^x (x+1)^{-2}$
- (a) $e^x (x+1)^{-2}$ (b) $e^x (x+1)^{-1} + c$ (c) $xe^x (x+1)^{-1} + c$ (d) None

21. If $f(x) = 2x + h$ then find $f(x + h) - 2f(x)$
- (a) $h - 2x$ (b) $2x - h$ (c) $2x + h$ (d) None of these
22. $\int e^x (x^2 + 2x) dx =$
- (a) $x^x \cdot e^2 + c$ (b) $e^x \cdot x + c$
(c) $-e^x x^2 + c$ (d) $-e^x \cdot x + c$

23. In the figure given below, the shaded region is given by the st



- (a) $A - B$ (b) $A - C$ (c) $A - (B \cap C)$ (d) $(A - B) \cap (A - C)$
24. If $y = \log x^x$ then $\frac{dy}{dx}$ is equal to :
- (a) $\log ex$ (b) $\log \frac{e}{x}$ (c) $\log \frac{x}{e}$ (d) 1

25. Integrate w.r.t x , $(x^2+1)^{-3}x^3$
- (a) $(1/4)(2x^2+1)/(x^2+1) + k$ (b) $(1/4)(2x^2+1)/(x^2+1)^2 + k$
(c) $-(1/4)(2x^2+1)/(x^2+1) + k$ (d) $-(1/4)(2x^2+1)/(x^2+1)^2 + k$

26. If $f(x) = x$, then $f \circ f \circ f(x) = ?$
- (a) x (b) x^2 (c) x^3 (d) $x + f(x)$

27. If $y = (x^{1/3} - x^{-1/3})^3$, then dy/dx is
- (a) $1 - x^{-2} + x^{-2/3} - x^{-4/3}$ (b) $1 + x^{-2} + x^{-2/3} - x^{-4/3}$
(c) $1 - x^{-2} + x^{-2/3} - x^{-4/3}$ (d) None of these

28. $\int (e^x + e^e)^{dx} =$
- (a) $e^x + e^e (x) + c$ (b) $e^x + e^e + c$
(c) 0 (d) None

29. If $y = e^{a \log x} + e^{x \log a}$, then $\frac{dy}{dx} =$
- (a) $x^a + a^x$ (b) $a x^{a-1} + a^x \log a$
(c) $a x^{a-1} + x a^{x-1}$ (d) $x^x + a^a$

30. The anti - derivative of $\frac{(5+\log x)^2}{x}$ is
- (a) $\frac{(5+\log x)^3}{3} + c$ (b) $\frac{(5+\log x)^2}{3} + c$
(c) $\frac{-(5+\log x)^2}{2}$ (d) None

31. Which of the following is a true statement ?
- (a) $A - B = B - A$ (b) $A \Delta B = (A - B) \cap (B - A)$
(c) $A - B = A \cap B'$ (d) $(A \cup B)' = A' \cup B'$
32. If $f(x) = e^{ax^2+bx+c}$ the $f'(x)$ is
- (a) e^{ax^2+bx+c} (b) $e^{ax^2+bx+c}(2ax + b)$
(c) $2ax + b$ (d) None of these
33. $\int e^x \left[\frac{1}{x} - \frac{1}{x^2} \right] dx =$
- (a) $\frac{e^x}{x^2} + c$ (b) $\frac{e^x}{-x^2} + c$ (c) $\frac{e^x}{x} + c$ (d) $\frac{e^{-x}}{-x^2} + c$
34. Out of a total population in an area of 60000, 20000 read magazine A, 32000 read magazine B, while 6000 read both. How many do not read any of these magazines ?
- (a) 14000 (b) 42000 (c) 46000 (d) 22000
35. Find the fourth derivative of $\log[(3x+4)^{1/2}]$
- (a) $243(3x+4)^{-4}$ (b) $-243(3x+4)^{-4}$ (c) $-243(4x+3)^{-4}$ (d) None
36. $\int_0^1 (2x + 1)^2 dx =$
- (a) 20/3 (b) 10/8 (c) 26/6 (d) 27/7
37. $x = at^2$ $y = 2at$, $\frac{dy}{dx} = ?$
- (a) 1/t (b) $-1/t$ (c) t (d) None of the above
38. Integration of $3 - 2x - x^4$ will become
- (a) $-x^2 - x^5/5$ (b) $3x - x^2 - x^5/5 + c$
(c) $3x - x^2 + x^2/5 + k$ (d) None of these
39. If $f(x) = \log_{10}x$ then $f^{-1}(x) =$
- (a) 10^x (b) $\log_{10}y$ (c) $\log_{10}x$ (d) x^{10}
40. The derivative of the function $\sqrt{x + \sqrt{x}}$ is
- (a) $\frac{1}{2\sqrt{x+\sqrt{x}}}$ (b) $1 + \frac{2}{2\sqrt{x}}$
(c) $\frac{1}{2(x+\sqrt{x})} \left(1 + \frac{1}{2\sqrt{x}} \right)$ (d) None of these
41. The value of $\int_1^2 \frac{x}{x^2+1} dx$ is equal to :
- (a) $\log_e \left(\frac{5}{2} \right)$ (b) $\frac{1}{2} \log_e \left(\frac{5}{2} \right)$
(c) $\log_e (5) - \log_e 2 + c$ (d) None of these
42. If $A = \{10, 8, 9, 7\}$, $B = \{6, 7, 10, 3\}$, then $B - A = ?$
- (a) $\{10, 8\}$ (b) $\{9, 7\}$ (c) $\{6, 3\}$ (d) None

43. The null set is represented by
 (a) $\{\phi\}$ (b) $\{0\}$ (c) ϕ (d) All of these
44. If $y = (5x^4 - 6x^2 - 7x + 8)/(5x - 6)$ then dy/dx is
 (a) $(75x^4 - 120x^3 - 30x^2 + 72x - 2)(5x - 6)^{-2}$
 (b) $(75x^4 - 120x^3 + 30x^2 - 72x + 2)(5x - 6)^{-2}$
 (c) $(75x^4 - 120x^3 - 30x^2 + 72x + 2)(5x - 6)^{-2}$
 (d) None
45. Integrate w.r.t x , $(x+a)^n$
 (a) $(x+a)^{n-1}/(n-1) + k$ (b) $(x+a)^n/n + k$ (c) $(x+a)^{n+1}/(n+1) + k$ (d) None
46. If the universal set $E = \{x \mid x \text{ is positive integer} < 25\}$, $A = \{2, 6, 8, 14, 22\}$, $B = \{4, 8, 10, 14\}$ then
 (a) $(A \cap B)' = A' \cup B'$ (b) $(A \cap B)' = A' \cap B'$
 (c) $(A' \cap B)' = \phi$ (d) None of these
47. If $u = 3t^4 + 5t^3 + 2t^2 + t + 4$, then the value of $\frac{du}{dt}$ at $t = -1$ is :
 (a) 0 (b) 1 (c) 2 (d) 5
48. Integrate w.r.t x , $5x^2$
 (a) $10x$ (b) $(3/5)x^3 + k$ (c) $5x + k$ (d) $(5/3)x^3 + k$
49. $\int \frac{1}{\sqrt{x^5}} dx =$
 (a) $\frac{2}{3}x^{-3/2} + c$ (b) $\frac{3}{2}x^{-3/2} + c$ (c) $\frac{2}{3}x^{-2/3} + c$ (d) $\frac{-2}{3}x^{-3/2} + c$
50. If $y = (x - 1)(x + 1)$, find $\frac{d^2y}{dx^2}$.
 (a) 2 (b) -1 (c) 0 (d) x^2