

WINTER HOLIDAY ADAGE

1. $\int \sin 7x \, dx$
 Y) $\cos 7x + C$ Z) $7\sin 7x + C$
 A) $-\frac{1}{7} \cos 7x + C$ B) $-7\cos 7x + C$
 C) $7\cos\frac{1}{7}x + C$
-
2. $\lim_{x \rightarrow 1} \frac{x^5 - 1}{x^2 - x} =$ B) 5 C) $\frac{5}{2}$ D) 0 E) 1
 F) No limit exists
-
3. If $w(x) = x^7 + 4x^5 - 7$ and $z(t) = t^2$ then $w(z(c)) =$
 Y) $(c^7 + 4c^5 - 7)^2$ Z) $c^7 + 4c^5 - 7$
 A) c^2 B) $c^{14} + 4c^{10} - 7c^2$
 C) $c^{14} + 4c^{10} - 7$
-
4. If $f(x) = \sin x + \cos x + e^x$, then $f'(x) =$
 C) $-\cos x + \sin x + 1$
 D) $\cos x - \sin x + e^x$
 E) $-\cos x - \sin x + e^x$
 F) $x\sin x + x\cos x + e^x$
 G) $\cos x - \sin x + 1$
-
5. $\int_0^1 (2x^3 + x)e^{x^4 + x^2} \, dx =$
 D) $\frac{e^4 - e^2}{2}$ E) $\frac{e^2 - 1}{2}$ F) $e^2 - e$
 G) $e^4 - e^2$ H) $e^2 - 1$
-
6. The area bounded by $y = x^3$, $x = 2$, $x = 4$, and the x -axis is
 C) 56 D) $\frac{56}{3}$ E) $\frac{195}{4}$ F) 60 G) 42
-
7. Given that $f(x) = x^3$, find c such that
 $f(3) - f(1) = (3 - 1)f'(c)$
 C) 6 D) 13 E) $\sqrt{13}$ F) $\frac{27}{2}$ G) $\sqrt{\frac{13}{3}}$
-
8. If $f(x) = \frac{2}{x+1}$, then $f^{-1}(x) =$
 F) $\frac{x+1}{2}$ G) $2(x+1)^{-1}$ H) $\frac{2-x}{x}$
 I) $\frac{2}{x} + 1$ J) $\frac{x}{2} + 1$
-
9. A point of discontinuity for $f(x) = \frac{x^2 - 4}{x^2 + 2x - 3}$ is
 I) -3 J) 2 K) 0 L) -1 M) -2

12. $\frac{d(\arccos 3x)}{dx} =$
 G) $\frac{3}{\sqrt{1-x^2}}$ H) $\frac{-1}{3\sin 3x}$ I) $\frac{3}{\sqrt{1-3x^2}}$
 J) $\frac{-3}{\sqrt{1-9x^2}}$ K) $\frac{3}{\sqrt{9x^2-1}}$
-
13. $\int_1^2 \frac{3x^2 - 2}{x^3} \, dx =$ J) $\ln 2 - 1$ K) $\ln 8 - \frac{3}{4}$
 L) $3\ln 2$ M) $-\frac{1}{4}$ N) $\ln 2 + 1$
-
14. The equation of the line normal to the curve
 $y = x^4 + 3x^3 + 2$ at the point where $x = 0$ is
 H) $y = 2$ I) $y = x$ J) $y = 0$
 K) $y = x + 2$ L) $x = 0$
-
15. If $\frac{dy}{dx} = y$, then K) $x = y^2 + C$ L) $y = x^2 + C$
 M) $x - \ln|y| = C$ N) $y = x + \ln|x|$
 O) $\ln|x| + \ln|y| = C$
-
16. If $y = \sin u$, $u = 3w$, and $w = e^{2x}$, then $\frac{dy}{dx} =$
 N) $6e^{2x}\cos(3e^{2x})$ O) $3\cos(e^{2x})$ P) $e^{2x}\cos(3e^{2x})$
 Q) $-6\sin(6e^{2x})$ R) $6x\cos(e^{2x})$
-
17. $\lim_{h \rightarrow 0} \frac{(x+h)^{1/2} - x^{1/2}}{h} =$
 L) \sqrt{x} M) $\frac{1}{\sqrt{x}}$ N) $\frac{\sqrt{x}}{2}$ O) $\frac{1}{2\sqrt{x}}$ P) $\frac{x^2}{2}$
-
19. If $e^x + e^{2x} = e^y$, then $\frac{dy}{dx} =$
 M) $e^x + 2e^{2x}$ N) $\frac{e^x + 2e^{2x}}{e^x}$ O) $3e^{3x}$
 P) $\frac{1 + 2e^x}{1 + e^x}$ Q) $\frac{1 + e^{2x}}{e^x}$
-
20. If the surface area of a sphere is increasing at a
 rate of $12 \frac{\text{ft}^2}{\text{sec}}$, how fast, in terms of $\frac{\text{ft}}{\text{sec}}$, is the
 radius increasing when it is 2 ft.
 M) 1 N) $\frac{1}{p}$ O) p P) $\frac{2}{p}$ Q) $\frac{3}{4p}$
-
21. If $f(x) = 2e^x + e^{2x}$, then $f'''(0) =$
 R) 10 S) 8 T) 6 U) 4 V) 3

WINTER HOLIDAY ADAGE

24. If $e^{xy} = \ln x$, then $\frac{dy}{dx} =$

- R) $\frac{1}{e^{xy}}$ S) $\frac{1-xye^{xy}}{x^2e^{xy}}$ T) $\frac{1-xy}{xe^{xy}}$
 U) $\frac{xy-1}{x^2e^{xy}}$ V) $\frac{1-xy}{x^2e^{xy}}$

25. The area of the region between the graph of $y = 8x - 8x^3$ and the x-axis from $x = 0$ to $x = 1$ is
 Q) 0 R) 4 S) 6 T) 2 U) 8

26. **How many** of the following functions are **NOT** continuous over the set of real numbers?

(i) $y = \frac{x}{x^4 + 1}$

(ii) $y = |x + 1|$

(iii) $y = \frac{14}{x^{16} - 9}$

(iv) $y = x^{3/5}$

- T) 0 U) 1 V) 2 W) 3 X) 4

29. The area above the line $y = 1$ and bounded by $y = e^{-x/2}$, $x = -1$, and $x = 0$ is

V) $2e^{1/2} - 3$ W) $2e^{1/2} - 2$ X) $1 - \frac{1}{e}$

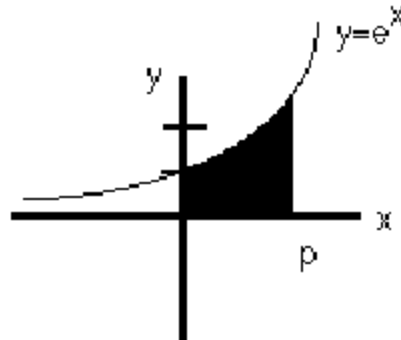
Y) $\frac{\sqrt{e} - 1}{\sqrt{e}}$ Z) $\sqrt{e} + 1$

31. If $f(u) = \tan^{-1} u$ and $g(u) = e^u$, then $f'(g(u)) =$

W) $\frac{e^u}{1 + e^{2u}}$ X) $\frac{1}{1 + e^{2u}}$ Y) $\sec^2(e^u)$

Z) $\frac{e^u}{1 + \frac{1}{2}e^u}$ A) $e^u \sec^2 u$

38. The following graph represents $y = e^x$. If the area of the shaded region is 2 square units, what is the value of p ?



- T) 1 U) $\frac{3}{2}$ V) 2 W) $\ln 2$ X) $\ln 3$

42. $\int \cos(4x + 7) dx =$

W) $4\sin(4x) + C$

X) $4\sin(4x+7) + C$

Y) $\frac{1}{4}\sin(4x+7) + C$

Z) $-4\sin(4x+7) + C$

A) $-\frac{1}{4}\sin(4x+7) + C$

44. What is the equation of the tangent line to the

curve $x^2y + y = 5$ at the point where $x = 2$?

W) $4x + y = 9$

X) $y = -3x + 7$

Y) $x = 2y$

Z) $5y + 4x = 13$

A) $6y - x = 4$