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choose the correct answer: (2 marks for each right answer)

1. Find the slope of the line $2y + x = 3$ A) $\frac{-1}{2}$ B) $\frac{1}{2}$ C) -2 D) 2

2. Which of the following function is symmetric about the origin and has one intercept with x-axis?
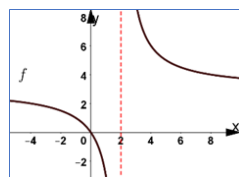
   A)$f(x) = (x-1)^3$ B)$f(x) = \frac{x^2-1}{x}$ C) $f(x) = \frac{x^3+x}{x^2+1}$ D) $f(x) = \frac{x^3-x}{x^2+1}$

3. Find the domain of the function $g \circ f$ where $f(x) = x^2 - 1$ and $g(x) = \sqrt{x}$

   A) $[-1, 1]$ B) $[0, 1]$ C) $]-\infty, -1] \cup [1, +\infty[$ D)$]-\infty, 0] \cup [1, +\infty[$

4. Use the graph given to find the $\lim_{x \to 0} f(x)$.

   A) 0 B) $+\infty$

   C) $-\infty$ D) -4

5. Find the distance between the point $(-1, 3)$ and the line $x - 2y = -2$.

   A) $\frac{2}{\sqrt{5}}$ B) $\sqrt{5}$ C) $\frac{1}{\sqrt{5}}$ D)$\frac{5}{\sqrt{3}}$

6. Find the points of intersection of the graphs of $f(x) = x^2 - 4x + 1$ and $g(x) = -x^2 + 2x + 1$
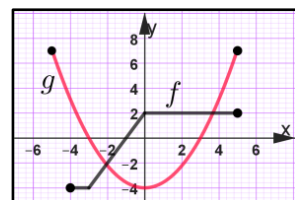
   A) $\begin{cases}(0,1)\\(-2,13)\end{cases}$ B)$\begin{cases}(-1,6)\\(-3,-14)\end{cases}$ C)$\begin{cases}(0,1)\\(3,2)\end{cases}$ D)$\begin{cases}(0,1)\\(3,-2)\end{cases}$

7. If $f(x) = \frac{-3}{x}$, then find the value of $f(\sqrt{3})$.

   A) $\frac{1}{\sqrt{3}}$ B) $-\sqrt{3}$ C) $\sqrt{3}$ D) $\frac{-1}{\sqrt{3}}$

8. Use the given graph to find the value of $(gf)(0)$

   A) -8 B) 8

   C) -4 D) 4

9. Find the value of $\lim_{x \to 0} \frac{x+sinx}{2x}$.   A) $\frac{1}{2}$ B) -2 C) 0 D) 1

10. The derivative of the function $f(x) = x^{-7}$ is :   A) $\frac{7}{x^8}$ B)$\frac{-7}{x^8}$ C)$\frac{-7}{x^6}$ D)$\frac{7}{x^6}$

11. Find the value of $\lim_{x \to 6} f(x)$, where $f(x) = -2 \ln(x-5)$.

   A) -2 B) 2 C) 0 D) does not exist

12. For what value of a , does the function $f(x) = \begin{cases}ax+2 & x \le 1\\ x+1 & x > 1\end{cases}$ have no points of

   discontinuity .   A) $a = 0$ B) $a = -2$ C) $a = 2$ D) $a = 1$

13. Which value of c makes $x = -1$ to be a vertical asymptote to the function $f(x) = \frac{2x+5}{x^2+3x+c}$?

   A) $c = 4$ B) $c = -2$ C) $c = -1$ D) $c = 2$

14. Which of the following is true ?

   A) $\lim_{x \to -1} \frac{1}{|x+1|} = +\infty$ B) $\lim_{x \to 0} \frac{\cos(3x)}{x} = 3$ C) $\lim_{x \to -1^-} \frac{1}{2(x+1)} = +\infty$ D) (A and B) together.

15. Depending on the indeterminate value theorem (IVT) , determine the function where the equation $f(x) = 0$ has a root between 1 and 3 .

   A) $f(x) = x^2 - 4x$ B)$f(x) = \frac{2}{2x-5}$ C)$f(x) = \frac{1}{2-x}$ D)$f(x) = \frac{x-2}{x+2}$

16. Over which interval does the function $f(x) = \frac{-1}{\sqrt{x}}$ have points of discontinuity?

   A) $]-\infty, 0]$ B) $]1, 2[$ C) $]0, +\infty[$ D) $[1, +\infty[$

17. Find the value of c , if the tangent line of the function $f(x) = x^2 + 2x + c$ at $y = 3$ is

   perpendicular to the line $y = \frac{1}{4}x - 2$.   A) $c = 6$ B) $c = -6$ C) $c = -1$ D) $c = 0$

18. Find the slope of the tangent line to the circle $(x+3)^2 + (y+2)^2 = 25$ at the point $(-7, 1)$

   A)$\frac{4}{3}$ B) $\frac{-4}{3}$ C) $\frac{3}{4}$ D)$\frac{-3}{4}$

19. If the position function of the motion body is $S(t) = t^3 - 6t^2 - 15t$, t is measured

   in second and S in meters. Find the acceleration of the body at $t = 5$.

   A) $5 \ m/s^2$ B)$18 \ m/s^2$ C) $-18 \ m/s^2$ D)$12 \ m/s^2$

20. If $f(x) = \ln e^x$, find $f'(x)$.   A)1 B) e^x C) -1 D) $\frac{1}{e^x}$

21. If $f(x) = \cos x + x \sin x$, find $f''(x)$.

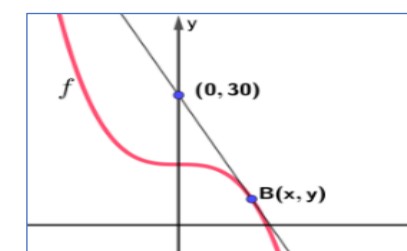   A) $x \cos x$ B) $-x \sin x$ C) $\cos x - x \sin x$ D) $\sin x + x \cos x$

22. Use L'Hôpital's rule to find the result of $\lim_{x \to 0} \frac{1-\cos x}{x^2 + \sin x}$ A) 0 B) $\frac{-1}{2}$ C) 1 D) $\frac{1}{2}$
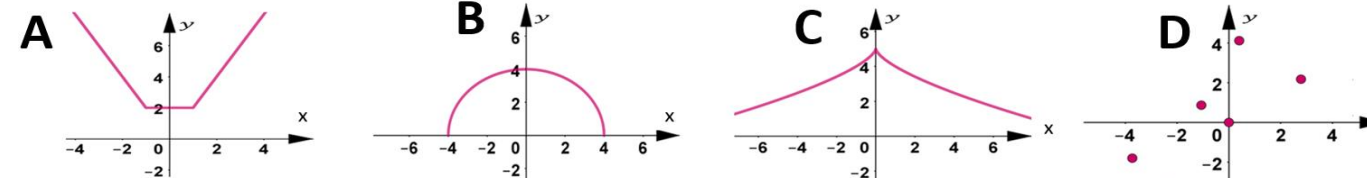
23. Use the given graph on the right to find the tangent line to the function $f(x) = 14 - x^3$ at the point B .

   A) $y = 12x + 14$ B) $y = -6x + 30$

   C) $y = -10x + 30$ D) $y = -12x + 30$

24. Which of the following graphs represent a one-to-one function?

A   **B**   **C**   **D**

25. Assume that x and y are two differentiable function of a variable t. If $x y = 15$ then

   find the value of $\frac{dx}{dt}$ if you know that $\frac{dy}{dt} = -3$ when $x = 5$.

   A)15 B) 10 C) 12 D) 5

26. find the result of $\lim_{x \to -\infty} \frac{-2x}{\sqrt{2x^2+1}}$.   A) 2 B) -2 C) $\sqrt{2}$ D) $-\sqrt{2}$

27. If $f'(\frac{5\pi}{3}) = 0$ and $f''(x) = 2\sin x$ on the interval $]0, 2\pi[$.

Which of the following is true for the function f at $x = \frac{5\pi}{3}$?

A) The function has a local maximum. B) The function has a local minimum.
C) The function is concave. D) None of them.

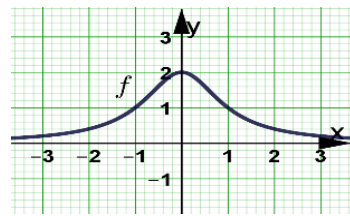**28.** Find the critical values of the function $f(x) = \frac{x^2}{x+1}$.

A) $\begin{cases} x = -2 \\ x = -1 \\ x = 0 \end{cases}$
B) $\begin{cases} x = 1 \\ x = 0 \end{cases}$
C) $\begin{cases} x = 0 \\ x = 2 \end{cases}$
D) $\begin{cases} x = -2 \\ x = 0 \end{cases}$

29. The function $f(x) = (x + 3)(x^2 - 1)$ has a point of inflection at :

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

30. Use the intercepts, symmetry, asymptotes, first and second derivative test to determine the function of the given graph.

A)$f(x) = \frac{2x}{x^2+1}$ B)$f(x) = 2 - x^2$

C) $f(x) = \frac{2}{x^2+1}$ D) $f(x) = \frac{x+2}{x^2+1}$

31. If the line $y = ax + b$ is the slant asymptote for the function $f(x) = \frac{x^2 - 3x + 2}{3 - x}$.

Find the value of a and b .

A) $\begin{cases} a = -1 \\ b = -12 \end{cases}$
B) $\begin{cases} a = 1 \\ b = -6 \end{cases}$
C) $\begin{cases} a = -1 \\ b = 0 \end{cases}$
D) $\begin{cases} a = 1 \\ b = 2 \end{cases}$

32. Find the point on the graph of the function $f(x) = \sqrt{x + 4}$ that is closest to the point $(-1, 0)$.

A) $(\frac{-1}{2}, \sqrt{\frac{7}{2}})$
B) $(\frac{-3}{2}, \sqrt{\frac{5}{2}})$
C) $(-1, \sqrt{3})$
D) $(-2, \sqrt{3})$

33. Which of the following is true ? A) $\int f(x) g(x)dx = \int f(x)dx \int g(x)dx$.

B) $\lim_{x \to +\infty} \frac{\sin x}{x} = 1$.

C) If $f''(c) > 0$, then the slope of the tangent line to the graph of f at $x = c$ is positive
D) The function $f(x) = -(x - 5)^2$ is convex on its Domain .

34. Find the value of b where the mean value of the function $f(x) = 2x + 1$ over the
interval $[1, b]$ is equal to 6 . A) 1 B) 4 C) 5 D) both (A and B)

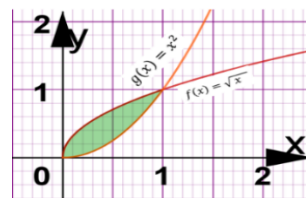**35.** Find the value of $\int_0^\pi x \sin x \, dx$. A) $\frac{\pi}{2}$ B) π C) $\frac{-\pi}{2}$ D) 0

36. Find the volume of the solid obtained by revolving the area bound by the graph of
the functions $y = x$, $y = \frac{1}{x}$ around the x-axis with $1 \le x \le 2$.

A) $\frac{11\pi}{6}$ B) $\frac{29\pi}{6}$ C) $\frac{13\pi}{6}$ D) $\frac{\pi}{2}$

37. Find the area of the shaded region bounded by the graph of the
two functions $f(x) = \sqrt{x}$, $g(x) = x^2$
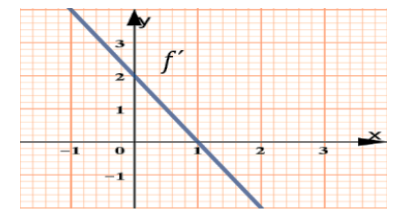
A)1 B) $\frac{1}{3}$
C)$\frac{1}{2}$ D)$\frac{3}{2}$

38. Find $\int(3 - 2x) \, dx$.

A) $3x - 4x^2 + c$ B) $3 - x^2 + c$ C) $3x - 2x^2 + c$ D) $3x - x^2 + c$

39. The figure on the right shows the curve of the function f' .
Find the function of f which is passes throw the point of origin
A) $f(x) = x(2 - x) + 2$ B) $f(x) = x(x - 2) + 2$
C) $f(x) = x(2 - x)$ D) $f(x) = x(x - 2)$

40. Find $\int \sin^3 x \cos x \, dx$.

A) $\frac{1}{4}\sin^4 x + c$ B) $\frac{-1}{4}\sin^4 x + c$ C) $\sin^4 x + c$ D) $-\sin^4 x + c$
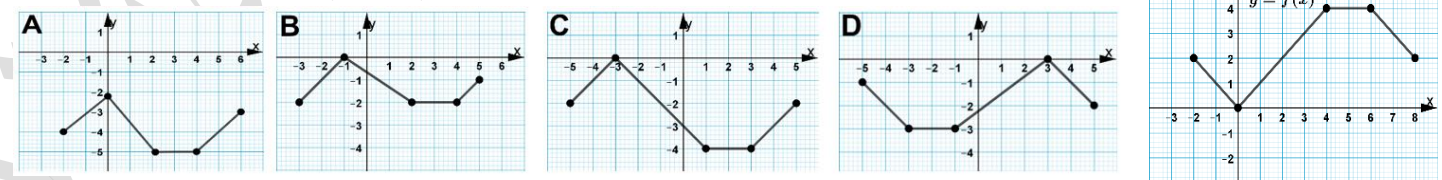
41. If $\int_a^b f(x)dx = a - 2b$, then the value of $\int_b^a [f(x) - 2] \, dx$ is :

A) $-3a + b$ B)$4b - 3a$ C)$3a + b$ D) $4b + 3a$

42. What is k so that $\int_2^k x^2 dx = 0$? A) 2 B) -2 C) 0 D) $-2, 2$

43. Use the graph of the function $y = f(x)$ shows on the right to determine the graph of the
function $y = -f(x + 3)$

A B C D

44. Find the value of $\lim_{x \to 0} \frac{\sqrt{x+4}-2}{x}$. A) $\frac{-1}{4}$ B) $\frac{1}{4}$ C) $\frac{-1}{2}$ D) $\frac{1}{2}$

45. The graph of the function $f(x) = x^3 - 6x^2 + 12x$ is concave on the interval :
A) $]-\infty, 6[$ B) $]-\infty, 2[$ C) $]2, +\infty[$ D) $]-\infty, +\infty[$

46. find the value of $(a^2 - 3a)$ if you know that the line passes through the two
points $(-4, \frac{a}{2})$ and $(2, -3)$ is parallel to the $x - axis$.

A) $\frac{1}{2}$ B) 54 C) 27 D) -16

47. If the area of the region bound by graphs of the two functions f and g , is equal to 12 , then
find the area of the region bound by the two function $h(x) = f(x) + 8$ and $k(x) = g(x) + 8$

A) 12 B) 20 C) 36 D) 48

48. Find the value of $\lim_{x \to +\infty} \cos\frac{1}{x}$. A) 0 B) $+\infty$ C) 1 D) $-\infty$

49. Find the horizontal asymptote for the function $f(x) = \frac{5-2x}{x}$

A) $y = 0$ B) $y = -2$ C) $y = 3$ D) None

50. If $f(x) = x^2 + 1$, then find the value of $\lim_{\Delta x \to 0} \frac{f(5+\Delta x)-f(5)}{\Delta x}$.

A) 25 B) 26 C) 11 D) 10