Name: **Show all work. Calculators are allowed.** Time it took to take test:

1. Let $f(x) = \frac{x-1}{x+1}$ for all $x \neq -1$. Then $f'(1)$ equals?

A. -1

B. $-\frac{1}{2}$

C. 0

D. $\frac{1}{2}$

2. The indefinite integral below equals?

$$\int 4x^3 e^{x^4} dx$$

A. $e^{4x^3} + C$

B. $e^{x^4} + C$

C. $4x^3 e^{x^4} + C$

D. None of these

3. The value of $\lim_{x \to \pi} \frac{\sin x - \sin \pi}{x - \pi}$ is?

A. 0

B. $\frac{1}{2}$

C. -1

D. 1

4. The area of the region between the graph of $y=3x^2-2x$ and the x-axis from x=0.75 to x=2.25 is best approximated by?

A. 15.469

B. 10.688

C. 5.344

D. 6.469

5. Which of the following equals

$$\frac{d}{dx}(\tan x + \sec x)$$

A. sec *x* + tan *x*

B. (sec *x*)(1 + tan *x*)

C. (sec *x*)(1+sec *x*)

D. (sec *x*)(sec x + tan *x*)

6. Find the coordinates of any points of inflection of the graph of $f(x) = x^3 - x^2 + \frac{1}{3}$.

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7. Determine the domain of the function below.

$$f(x) = \frac{\sqrt{x-5}}{x}$$

8. Find y' given:

$$y = (x^3 + 1)^{15} \cos(x^2 - 3)$$

9. Evaluate:

$$\lim_{n \to \infty} \frac{1 + 3n^2}{n^2 + 1000}$$

10. Find y' given:

$$y = e^{\tan x} + 1$$

11. Suppose g is a function such that $g'(1) = 0$, $g'(x) > 0$ when x lies in the interval (-1, 1) and $g'(x) < 0$ when x lies in the interval (1, 3). Sketch the graph of g for values of x near x=1. Indicate any special characteristics of g at x =1.

12. Let $y = \cos(\cos^2 x)$. Find $\frac{dy}{dx}$.

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13. The area of the region bounded by the graphs of $f(x) = 2 - x^2$ and $g(x) = x$ is?

A. $\frac{9}{2}$

B. $\frac{27}{16}$

C. $\frac{1}{2}$

D. $\frac{11}{2}$

14. Approximate the area of the region bounded by the graph of $y = xe^{-x}$ and the x-axis over the interval is [-0.7, 2.4].

15. Which of the following properties of the definite integral is/are true?

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

II. $\int_a^c f(x)\,dx + \int_c^b f(x)\,dx = \int_a^b f(x)\,dx$

III. $\int_a^b kf(x)\,dx = k\int_a^b f(x)\,dx$

where k is a constant

A. III only C. II and III

B. I only D. I, II, and III

16. Let $f(x) = x^9 + 10$. Find $f^{-1}(x)$.

17. Approximate the slope of the line tangent to the ellipse $\frac{x^2}{9} + \frac{y^2}{16} = 1$ at the point $\left(1, -\frac{8\sqrt{2}}{3}\right)$.

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18. Integrate:

$$\int x^2 e^{x^3}\, dx$$

A. $\frac{1}{3}e^{x^3} + C$

B. $3e^{x^3} + C$

C. $\frac{1}{3}(x^3 + e^{x^3} + C)$

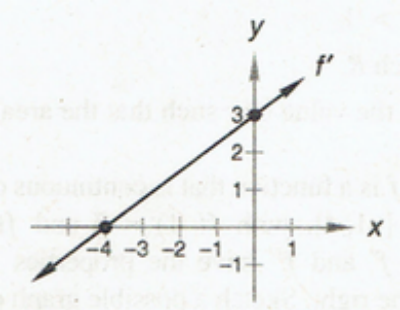
D. $e^{x^3}(3x^4 + 2x) + C$

19. Let $g(x) = x^3 + 6x + 10$.

a) State the interval(s) over which g is increasing.

b) State the interval(s) over which g is concave down.

20. The graph of the derivative of f is shown below. Sketch the graph of f.



FreedomProject Academy
Calculus II Placement Test
Print, Complete Showing ALL Work
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The End