

1. If the range of the function $f(x)$ is $[2,5]$. Which one of the following equations has solution *
(2 Points)

$10 - 2f(x) = -4$

$2f(x) = 6f(x) - 12$

$2 - 3f(x) = 1$

$3f(x) - 18 = 0$

$f(x) + 8 = 0$

1. Find the following limit *
(2 Points)

$$\lim_{x \rightarrow 1} \left(\frac{1}{x-1} + \frac{1}{x^2-3x+2} \right)$$

-5

-2

-1

-3

-4

2. Find the domain of the function *
(2 Points)

$$f(x) = \frac{3x+1}{3x+2}$$

$\mathbb{R} - \{1\}$

$\mathbb{R} - \{\frac{1}{3}\}$

$\mathbb{R} - \{2\}$

$\mathbb{R} - \{3\}$

$\mathbb{R} - \{\frac{2}{3}\}$

3. Find the value of *
(2 Points)

$$\cos(\sin^{-1} \frac{2}{3})$$

$\frac{2\sqrt{2}}{3}$

$\frac{\sqrt{7}}{4}$

2

$\frac{\sqrt{10}}{3}$

$\frac{\sqrt{5}}{3}$

4. Find the following limit *
(2 Points)

$$\lim_{x \rightarrow 0^+} \tan^{-1}\left(\frac{1}{x}\right)$$

$-\frac{\pi}{2}$

π

$\frac{\pi}{2}$

$+\infty$

0

5. Find an equation of the tangent line at $x=e$ for the function *
(2 Points)

$$f(x) = \ln(x) + \frac{1}{e}x$$

$y = \frac{3}{e}x - 1$

$y = \frac{2}{e}x - 1$

$y = \frac{2}{e}x$

$y = \frac{3}{e}x + 1$

$y = \frac{4}{e}x - 1$

6. Find *
(2 Points)

$$\frac{d^2y}{dx^2} \text{ given that } \frac{dy}{dx} = \sqrt{1-y^2}$$

$-3y^5$

$-y^4$

$-3y^2$

$-2y^3$

$-y$

8. Solve the following equation *
(2 Points)

$$\ln(x) - \ln(x - 1) = 1$$

$x = \frac{4e}{e-1}$

$x = \frac{3e}{e-1}$

$x = \frac{2e}{e-1}$

$x = \frac{5e}{e-1}$

$x = \frac{e}{e-1}$

9. Find *
(2 Points)

$f'(1)$ given that $f(x) = \tan^{-1} \sqrt{x}$

$\frac{1}{10}$

$\frac{1}{20}$

$\frac{1}{4}$

$\frac{1}{60}$

$\frac{1}{30}$

10. For what value of the constant c is the following function continuous at $x=2$ *
(2 Points)

$$f(x) = \begin{cases} cx^2 + 2x & : x < 2 \\ 4x^3 + cx & : x \geq 2 \end{cases}$$

$c = 14$

$c = 12$

$c = 8$

$c = 10$

$c = 6$

11. Evaluate *
(2 Points)

$\lim_{x \rightarrow 1} g(x)$. If $2x + 1 \leq g(x) + 1 \leq x^4 - x^2$

3

5

4

6

2

12. Find *
(2 Points)

$\cosh(x)$ given that $\sinh(x) = \frac{4}{3}$

$\frac{13}{5}$

$\frac{5}{13}$

$\frac{3}{5}$

$\frac{5}{4}$

$\frac{13}{12}$

13. Where is the following function continuous *
(2 Points)

$$f(x) = \frac{\ln x + \tan^{-1} x}{x^2 - 1}$$

$(0, 1) \cup (1, \infty)$

$(1, \infty)$

$(0, \infty)$

$(0, 2) \cup (2, \infty)$

$(2, \infty)$

14. Find the vertical asymptote(s) for the following function *
(2 Points)

$$f(x) = \frac{x-2}{x^2-4}$$

$x = 1$

$x = -2$

$x = -1$

$x = 2$ and $x = -2$

$x = 2$

15. If the range of the function $f(x)$ is $[2,5]$. Which one of the following equations has solution *

(2 Points)

$2 - 3f(x) = 1$

$f(x) + 8 = 0$

$2f(x) = 6f(x) - 12$

$10 - 2f(x) = -4$

$3f(x) - 18 = 0$

15. Solve the following equation *
(2 Points)

$$\ln(x) - \ln(x - 3) = 1$$

$x = \frac{e}{e-1}$

$x = \frac{2e}{e-1}$

$x = \frac{3e}{e-1}$

$x = \frac{4e}{e-1}$

$x = \frac{5e}{e-1}$

14. Find *

(2 Points)

$\cosh(x)$ given that $\sinh(x) = \frac{5}{12}$

$\frac{13}{12}$

$\frac{13}{5}$

$\frac{5}{4}$

$\frac{5}{3}$

$\frac{5}{12}$

15. Solve the following equation *

(2 Points)

13. Find the value of *
(2 Points)

$$\cos(\sin^{-1} \frac{3}{4})$$

$\frac{\sqrt{5}}{3}$

$\frac{2\sqrt{2}}{3}$

$\frac{\sqrt{7}}{4}$

$\frac{\sqrt{10}}{3}$

$\frac{2}{3}$

12. Find *
(2 Points)

$\frac{d^2y}{dx^2}$ given that $\frac{dy}{dx} = \sqrt{1-y^4}$

$-2y^3$

$-3y^2$

$-3y^3$

$-y^4$

$-y$

11. Where is the following function continuous *
(2 Points)

$$f(x) = \frac{\ln x + \tan^{-1} x}{x-2}$$

- (2, ∞)
- (1, ∞)
- (0, 1) \cup (1, ∞)
- (0, ∞)
- (0, 2) \cup (2, ∞)

10. Find the domain of the function *
(2 Points)

$$f(x) = \frac{2x+1}{3x+2}$$

$\mathbb{R} - \{1\}$

$\mathbb{R} - \{\frac{2}{3}\}$

$\mathbb{R} - \{\frac{1}{3}\}$

$\mathbb{R} - \{3\}$

$\mathbb{R} - \{2\}$

11. Where is the following function continuous *
(2 Points)

9. Find the following limit ∞
(2 Points)

$$\lim_{x \rightarrow 1} \left(\frac{3}{x-1} + \frac{3}{x^2-3x+2} \right)$$

-2

-3

-4

-5

-6

10. Find the domain of the function

8. For what value of the constant c is the following function continuous at $x=2$?
(2 Points)

$$f(x) = \begin{cases} cx^2 + 2x & : x < 2 \\ 4x^3 + cx & : x \geq 2 \end{cases}$$

$c = 6$

$c = 10$

$c = 14$

$c = 12$

$c = 8$

9. Find the following limit
(2 Points)

7. Find the vertical asymptote(s) for the following function *
(2 Points)

$$f(x) = \frac{x-2}{(x^2-4)^2}$$

$x = 1$

$x = -1$

$x = 2$

$x = -2$

$x = 2$ and $x = -2$

6. Evaluate *
(2 Points)

$$\lim_{x \rightarrow 1} g(x). \text{ If } 2x + 3 \leq g(x) + 3 \leq x^4 - x^2 + 5$$

4

3

5

2

6

5. Find an equation of the tangent line at $x=e$ for the function
(2 Points)

$$f(x) = \ln(x) + \frac{1}{e^3}x^3$$

$y = \frac{4}{e}x - 2$

$y = \frac{3}{e}x - 1$

$y = \frac{3}{e}x + 1$

$y = \frac{2}{e}x$

$y = \frac{2}{e}x - 1$

4. Find the following limit *
(2 Points)

$$\lim_{x \rightarrow 0^+} e^{\frac{1}{x}}$$

0

$+\infty$

$\frac{\pi}{2}$

$-\frac{\pi}{2}$

π

3. Find the range of the function *
(2 Points)

$$f(x) = \tan^{-1}x + \frac{3\pi}{2}$$

(0, 2 π)

(π , 2 π)

(0, π)

($-\pi$, 0)

($-\pi$, π)

4. Find the following limit *

2. Find *
(2 Points)

$f'(9)$ given that $f(x) = \tan^{-1} \sqrt{x}$

$\frac{1}{20}$

$\frac{1}{60}$

$\frac{1}{10}$

$\frac{1}{4}$

$\frac{1}{30}$

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