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1. **(5 points)** `local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem01.pg`

Find the second derivative of the function $f(x) = 5e^x \cos x$.

- A. $10e^x \sin x$
- B. $10e^x \cos x$
- C. $-10e^x \sin x$
- D. $-10e^x \cos x$
- E. None of the above

Correct Answers:

- C

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2. **(5 points)** `local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem02.pg`

Find an equation of the line tangent to the graph of $y = \dfrac{e^{-9x}}{x^9+1}$ at the point where $x = 0$.

- A. $y = -9x + 1$
- B. $y = 9x$
- C. $y = 9x + 1$
- D. $y = -9x$
- E. None of the above

Correct Answers:

- A

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3. **(5 points)** `local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem03.pg`

If the function f satisfies $f'(7) = 2$ and $f(7) = 10$, and if $g(x) = (x^2+1)f(x)$, then find $g'(7)$.

- A. 240
- B. 0
- C. Does not exist.
- D. 360
- E. 720

Correct Answers:

- A

4. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem04.pg

The function $f(x) = 1 + x + \sin(x)$ is invertible. Call its inverse $g(x) = f^{-1}(x)$. Compute $g(1)$ and $g'(1)$.

- A. $g(1) = \sqrt{2}$ and $g'(1) = \sqrt{3}/2$
- B. $g(1) = \pi$ and $g'(1) = 0$
- C. $g(1) = 0$ and $g'(1) = 1/2$
- D. $g(1) = -1/2$ and $g'(1) = \pi$
- E. $g(1) = \pi$ and $g'(1) = \pi/2$

Correct Answers:

- C

5. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem05.pg

The graph of $f(x) = 12x - x^3$ has horizontal tangent lines at which points?

- A. $x = \pm 2$
- B. $x = 12$ only
- C. $x = \pm\sqrt[3]{12}$
- D. $x = \pm 36$
- E. $x = 4$ only

Correct Answers:

- A

6. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem06.pg

Find $\dfrac{dy}{dx}$ if $y^2 = x^3 - 3x + 2$.

- A. $\dfrac{x^3 - 3x + 2}{y^2}$
- B. $\dfrac{3x^2 - 3}{2y}$
- C. $\dfrac{2y}{x^3 - 3x + 2}$
- D. $\dfrac{x^2 - y^2}{3xy}$
- E. $3x^2 - 3 - 2y$

Correct Answers:

- B

7. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem07.pg

Find f' in terms of g' where $f(x) = [g(x)]^4$.

- A. $f'(x) = 4g'(x)$

- B. $f'(x) = 4g(x)$
- C. $f'(x) = 4[g(x)]^3 g'(x)$
- D. $f'(x) = 4[g'(x)]^3$
- E. $f'(x) = 4[gx][xg' + g]$

Correct Answers:

- C

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8. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem08.pg

Differentiate the function $g(t) = t^5 \ln(9t)$.

- A. $\frac{5}{9}t^3$
- B. $t^4(1 + 5\ln(9t))$
- C. $1 + \dfrac{\ln(9t)}{9t}$
- D. $t^4\left(\dfrac{1}{9} + 5\ln(9t)\right)$
- E. None of the above

Correct Answers:

- B

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9. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem09.pg

If $f(0) = 4$, $f'(0) = 2$, $g(0) = 1$, and $g'(0) = -9$, find $(f + g)'(0)$.

- A. 0
- B. 4
- C. 2
- D. -11
- E. -7

Correct Answers:

- E

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10. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem10.pg

Suppose that $F(x) = f(g(x))$ and $g(14) = 2$, $g'(14) = 5$, $f'(14) = 15$, and $f'(2) = 11$. Find $F'(14)$.

- A. 55
- B. 17
- C. 140
- D. 24
- E. 20

Correct Answers:

- A

11. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem11.pg

Use implicit differentiation to find an equation of the tangent line to the curve $y = \sin(xy^2)$ at the point $\left(\frac{\pi}{2}, 1\right)$.

- A. $y = 1$
- B. $y = x$
- C. $x = \frac{\pi}{2}$
- D. $2x + 1$
- E. None of the above

Correct Answers:

- A

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12. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem12.pg

Find $\lim_{x \to 0} \frac{\sin(3x)}{5x}$

- A. $5/3$
- B. $\frac{\sin 3}{5}$
- C. $+\infty$
- D. $3/5$
- E. None of the above

Correct Answers:

- D

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13. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem13.pg

Compute the derivative of $\frac{5x^2 + 6x^3}{x}$.

- A. $10x + 18x^2$
- B. $5 + 12x$
- C. $\frac{x^2}{12x^3 + 5x^2 + 1}$
- D. $30x^5$
- E. $\frac{(5x^2 + 6x^3)^2}{10x + 18x^2}$

Correct Answers:

- B

14. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem14.pg

Find the derivative of $f(x) = e^x \sin(x)$.

- A. $f'(x) = e^x + \sin(x)$
- B. $f'(x) = \dfrac{e^x}{\tan(x)}$
- C. $f'(x) = e^x \cos(x)$
- D. $f'(x) = e^x \sin(x)$
- E. $f'(x) = e^x(\sin(x) + \cos(x))$

Correct Answers:

- E

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15. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem15.pg

Find the derivative of $f(x) = x^5 \arctan(x)$.

- A. $f'(x) = \dfrac{5x^4}{1+x^2}$
- B. $f'(x) = \dfrac{x^5}{\arctan(x)}$
- C. $f'(x) = 5\arctan(x^4)$
- D. $f'(x) = \dfrac{x^5 - \arctan(x)}{x^2}$
- E. $f'(x) = 5x^4 \arctan(x) + \dfrac{x^5}{1+x^2}$

Correct Answers:

- E

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16. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem16.pg

If $f(t) = \sqrt{2t+1}$, find $f''(3)$.

$f''(3)$ = _____

Correct Answers:

- 0.0539949

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17. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem17.pg

A point moves along the curve $4y - 4y^2 + 7x = 4$. When the point is at $\left(\dfrac{4}{7}, 1\right)$, its x-coordinate is increasing at the rate of 2 units per second. How fast is its y-coordinate changing at that instant of time?

The y-coordinate is changing at _____ units per second.

Correct Answers:

- 3.5

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18. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem18.pg

What is the derivative of $f(x) = 2x^7 + 15x^5 - 7x^2 + 2x + 57$?

$f'(x) =$ _____

Correct Answers:

- 14*x^6+75*x^4-14*x+2

19. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem19.pg

Strontium-90 has a half-life of 28 days. A sample has a mass of 60 mg initially. Find the mass remaining after 50 days.

Mass remaining = _____ mg

Correct Answers:

- 17.4022

20. **(5 points)** local/GlobalPandemic/Exam02_S21/MA113_Exam02_Problem20.pg

Find the instantaneous rate of change of the function $f(x) = \sqrt{6x}$ when $x = 6$.

_____

Correct Answers:

- 0.5