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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. $3x^2 - 3 - 2y$

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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

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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 $\left(\dfrac{\pi}{2}, 1\right)$.

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

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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

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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

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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) = $ _____

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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. $f'(x) = e^x(\sin(x) + \cos(x))$

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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

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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 $g'(1) = \pi/2$

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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

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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.

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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

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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.

Give your answer as an exact formula or round your answer to the nearest 0.1 mg. Use the preview button before submitting your answers.
Mass remaining = _____ mg

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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. $f'(x) = 5x^4 \arctan(x) + \dfrac{x^5}{1+x^2}$

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

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

Give your answer as an exact formula (using "sqrt" for square root) or give your answer to at least 5 decimal places of accuracy. Make sure to preview your answer before submitting.

$f''(3) =$ _____

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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

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

Find $\lim\limits_{x \to 0} \dfrac{\sin(3x)}{5x}$

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

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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. $f'(x) = 4[gx][xg' + g]$

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

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

- A. $10x + 18x^2$
- B. $5 + 12x$

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

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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 $x = 6$.

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