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1. (5 points) local/GlobalPandemic/Exam04/MA113\_Exam04\_problem02.pg

A ball is thrown up in the air so that its height at time  $t$  is  $h(t) = -5t^2 + 40t$  meters. Find the velocity when the ball is at its greatest height.

- A.  $-35$  meters per second
- B.  $-40$  meters per second
- C.  $40$  meters per second
- D.  $0$  meters per second
- E.  $35$  meters per second

Correct Answers:

- D

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2. (5 points) local/GlobalPandemic/Exam04/MA113\_Exam04\_problem04.pg

Find the tangent line to the curve  $2x^2 + 3y^2 = 30$  at the point where  $x = 3$  and the slope is positive.

- A.  $y = \frac{1}{2}x - \frac{7}{2}$
- B.  $y = x + 5$
- C.  $y = x - 5$
- D.  $y = 2x - 8$
- E.  $y = \frac{1}{2}x + \frac{7}{2}$

Correct Answers:

- C

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3. (5 points) local/GlobalPandemic/Exam04/MA113\_Exam04\_problem05.pg

A population satisfies  $P' = kP$ ,  $P(0) = 2000$  and  $P(10) = 6000$ . Give the value of  $k$  rounded to two decimal places.

- A.  $k = 0.11$
- B.  $k = 0.09$
- C.  $k = 0.15$
- D.  $k = 0.17$
- E.  $k = 0.13$

Correct Answers:

- A

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**4. (5 points)** local/GlobalPandemic/Exam04/MA113\_Exam04\_problem06.pg

An object is moving along a line so that its velocity at time  $t$  is  $v(t) = 3t^2 - 4t$  meters/second. Find the change in position between  $t = 1$  and  $t = 3$  seconds. Assume that displacement to the right is positive.

- A. 10 meters to the right
- B. 12 meters to the right
- C. 10 meters to the left
- D. 8 meters to the left
- E. 14 meters to the right

*Correct Answers:*

- A

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**5. (5 points)** local/GlobalPandemic/Exam04/MA113\_Exam04\_problem07.pg

Suppose that  $f(x) = \sqrt{9+x}$ . Find a second degree Taylor polynomial function  $p(x)$  so that  $p(0) = f(0)$ ,  $p'(0) = f'(0)$  and  $p''(0) = f''(0)$ .

- A.  $p(x) = 3 + \frac{1}{3}x - \frac{1}{108}x^2$
- B.  $p(x) = 3 + \frac{1}{6}x - \frac{1}{108}x^2$
- C.  $p(x) = 3 + \frac{1}{18}x - \frac{1}{108}x^2$
- D.  $p(x) = 3 + \frac{1}{3}x - \frac{1}{54}x^2$
- E.  $p(x) = 3 + \frac{1}{6}x - \frac{1}{216}x^2$

*Correct Answers:*

- E

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**6. (5 points)** local/GlobalPandemic/Exam04/MA113\_Exam04\_problem08.pg

If  $f$  and  $g$  are continuous functions with  $f(3) = 3$  and  $\lim_{x \rightarrow 3} [5g(f(x)) - f(x)g(x)] = 4$ , find  $g(3)$ .

- A. 2
- B. 3
- C. 1
- D. 5
- E. 4

*Correct Answers:*

- A

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7. (5 points) local/GlobalPandemic/Exam04/MA113\_Exam04\_problem10.pg

Find the value of  $B$  such that the function

$$f(x) = \begin{cases} -x^2 + 3 & x \leq 1 \\ -x + B & x > 1 \end{cases}$$

is continuous.

- A. 1
- B.  $-3$
- C. 0
- D. 3
- E.  $-1$

*Correct Answers:*

- D

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8. (5 points) local/GlobalPandemic/Exam04/MA113\_Exam04\_problem11.pg

Find the horizontal asymptote of  $f(x) = \frac{2e^{-2x} + 5}{e^{x+1}}$ .

- A.  $y = 0$
- B.  $y = 5$
- C.  $y = \frac{2}{e}$
- D.  $y = \frac{e}{2}$
- E. Does not exist.

*Correct Answers:*

- A

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9. (5 points) local/GlobalPandemic/Exam04/MA113\_Exam04\_problem12.pg

The displacement (in meters) of a particle moving in a straight line is given by  $s(t) = t^3 - 8t + 10$  where  $t$  is measured in seconds. Find the instantaneous velocity when  $t = 2$ .

- A. 4 meters per second
- B. 10 meters per second
- C. 8 meters per second
- D. 5 meters per second
- E. 2 meters per second

*Correct Answers:*

- A

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**10. (5 points)** local/GlobalPandemic/Exam04/MA113\_Exam04\_problem13.pg

Let  $f(x) = \frac{1}{3}x^3 - 4x$  for  $-6 \leq x \leq 3$ . Find the  $x$  coordinates where  $f$  has its absolute minimum value and absolute maximum value.

- A. The absolute maximum is at  $x = -2$  and the absolute minimum is at  $x = 2$ .
- B. The absolute maximum is at  $x = -2$  and the absolute minimum is at  $x = -6$ .
- C. The absolute maximum is at  $x = 3$  and the absolute minimum is at  $x = -6$ .
- D. The absolute maximum is at  $x = 2$  and the absolute minimum is at  $x = -6$ .
- E. The absolute maximum is at  $x = 3$  and the absolute minimum is at  $x = 2$ .

*Correct Answers:*

- B

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**11. (5 points)** local/GlobalPandemic/Exam04/MA113\_Exam04\_problem14.pg

Evaluate the limit  $\lim_{x \rightarrow 0} \frac{e^{2x} - 1}{x^3 + x}$ .

- A.  $\frac{1}{3}$
- B. 1
- C. 2
- D.  $\infty$
- E.  $\frac{2}{3}$

*Correct Answers:*

- C

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**12. (5 points)** local/GlobalPandemic/Exam04/MA113\_Exam04\_problem16.pg

Evaluate the indefinite integral  $\int \frac{2}{x} + e^{-x} dx$ .

- A.  $2 \ln|x| + e^{-x} + C$
- B.  $2 - e^{-x} + C$
- C.  $2x - e^{-x} + C$
- D.  $x^2 + e^{-x} + C$
- E.  $2 \ln|x| - e^{-x} + C$

*Correct Answers:*

- E

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**13. (5 points)** local/GlobalPandemic/Exam04/MA113\_Exam04\_problem17.pg

Let  $f(x) = \int_0^{x^2} \ln(1+t) dt$ . What is  $f'(x)$ ?

- A.  $\ln(1+x^2)$

- B.  $x^2 \ln(1+x)$
- C.  $2x \ln(1+x)$
- D.  $\frac{1}{1+x}$
- E.  $2x \ln(1+x^2)$

Correct Answers:

- E

**14. (5 points)** local/GlobalPandemic/Exam04/MA113\_Exam04\_problem18.pg

Let  $f(x) = xe^x$ . What is the linearization of  $f$  at  $x = 0$ ?

- A.  $L(x) = x$
- B.  $L(x) = x + 1$
- C.  $L(x) = 0$
- D.  $L(x) = (x + 1)e^x$
- E.  $L(x) = 1$

Correct Answers:

- A

**15. (5 points)** local/GlobalPandemic/Exam04/MA113\_Exam04\_problem19.pg

Compute  $\int_{-1}^2 \sqrt{x+2} dx$ .

- A. 2
- B. 7
- C.  $14/3$
- D.  $-1/4$
- E.  $21/2$

Correct Answers:

- C

**16. (5 points)** local/GlobalPandemic/Exam04/MA113\_Exam04\_problem20.pg

Let  $f$  be a differentiable function with  $f(\pi/2) = 1$  and  $f'(\pi/2) = 3$  and suppose that  $h(x) = \cos(x)f(x)$ . Find  $h'(\pi/2)$ .

$h'(\pi/2) = \underline{\hspace{2cm}}$

Correct Answers:

- -1

**17. (5 points)** local/GlobalPandemic/Exam04/MA113\_Exam04\_problem21.pg

Find  $\int_0^6 f(x) dx$  if

$$f(x) = \begin{cases} 2x, & x < 4 \\ 6, & 4 \leq x \end{cases}$$

$\int_0^6 f(x) dx = \underline{\hspace{2cm}}$

Correct Answers:

- 28

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**18. (5 points)** local/GlobalPandemic/Exam04/MA113\_Exam04\_problem22.pg

Find the value of  $\lim_{x \rightarrow 5} \frac{x^2 + 20x - 125}{x^2 - 5x}$ .

$$\lim_{x \rightarrow 5} \frac{x^2 + 20x - 125}{x^2 - 5x} = \underline{\hspace{2cm}}$$

*Correct Answers:*

- 6

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**19. (5 points)** local/GlobalPandemic/Exam04/Ma113\_Exam04\_problem23.pg

The length of a rectangle is increasing at the rate of 4 cm/sec while its width increases at the rate of 10 cm/sec. Find how fast the area of the rectangle is changing when the length is 4 centimeters and the width is 3 centimeters.

$\underline{\hspace{2cm}}$  cm<sup>2</sup>/sec

*Correct Answers:*

- 52

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**20. (5 points)** local/GlobalPandemic/Exam04/MA113\_Exam04\_problem24.pg

Let  $f$  be a differentiable function with  $f(1) = 6$  and  $f'(1) = 4$ . If  $h(x) = f(e^{2x})$ , find  $h'(0)$ .

$$h'(0) = \underline{\hspace{2cm}}$$

*Correct Answers:*

- 8