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3. **(5 points)** local/GlobalPandemic/Exam03/MA113_Exam03_problem03.pg

Let $F(x) = \int_3^x (t^2-4)e^{t^2}\,dt$. Find the largest interval where F is decreasing.

- A. $[2,\infty)$.
- B. $[2,3]$.
- C. $[-2,2]$
- D. $(-\infty,2]$.
- E. $[-2,3]$.

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1. **(5 points)** local/GlobalPandemic/Exam03/MA113_Exam03_problem01.pg

Let $f(x) = x^2+2x$ for $-5 \le x \le 0$. Find the x-coordinates where f has its absolute minimum value and absolute maximum value.

- A. The absolute maximum is at $x=0$ and the absolute minimum is at $x=-1$.
- B. The absolute maximum is at $x=0$ and the absolute minimum is at $x=-5$.
- C. The absolute maximum is at $x=-5$ and the absolute minimum is at $x=-1$.
- D. The absolute maximum is at $x=-1$ and the absolute minimum is at $x=0$.
- E. The absolute maximum is at $x=-5$ and the absolute minimum is at $x=0$.

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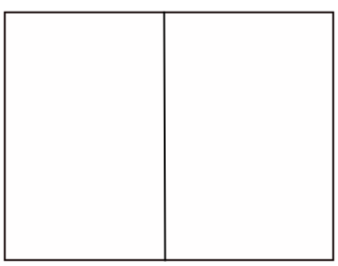
20. **(5 points)** local/Library/Union/setDervOptimization/s3_8_6/s3_8_6.pg



A rancher wants to fence in an area of 240000 square feet in a rectangular field and then divide it in half with a fence down the middle, parallel to one side.

What is the shortest length of fence that the rancher can use?

Length of fence = ________ feet.

Round your answer to the nearest foot.

---

14. **(5 points)** local/GlobalPandemic/Exam03/MA113_Exam03_problem14.pg

If $\int_0^2 f(x)dx = 3$, $\int_0^2 g(x)dx = 4$, then $\int_0^2 (5f(x)-2g(x)+1)dx = ?$

- A. 3

- B. 9
- C. 10
- D. 8
- E. 4

---

11. **(5 points)** `local/GlobalPandemic/Exam03/MA113_Exam03_problem11.pg`

Evaluate the limit $\lim_{x\to 0} \dfrac{\tan(4x)}{\sin(3x)}$.

- A. 0
- B. ∞
- C. $4/3$
- D. 1
- E. $-\infty$

---

6. **(5 points)** `local/GlobalPandemic/Exam03/MA113_Exam03_problem06.pg`

What are x-coordinates of the inflection points of $f(x) = x^4 - 8x^2$?

- A. $x = 0$
- B. $x = \dfrac{2}{\sqrt{3}}$ and $x = -\dfrac{2}{\sqrt{3}}$
- C. $x = -\dfrac{2}{\sqrt{3}}$
- D. $x = \dfrac{2}{\sqrt{3}}$
- E. There are no inflection points.

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15. **(5 points)** `local/GlobalPandemic/Exam03/MA113_Exam03_problem15.pg`

Find $\int_0^4 f(x)dx$ if $f(x) = \begin{cases} 1, & x < 2, \\ -x+3, & x \geq 2 \end{cases}$

- A. 5
- B. 4
- C. 2
- D. 0
- E. 3

---

13. **(5 points)** `local/GlobalPandemic/Exam03/MA113_Exam03_problem13.pg`

Evaluate the indefinite integral $\int (x^3 + 2x - \sin x)dx$.

- A. $\frac{1}{4}x^4 + x^2 - \sin x + C$
- B. $\frac{1}{4}x^4 + x^2 + \cos x + C$
- C. $3x^2 + 2 + \cos x + C$

- D. $3x^2 + 2 - \cos x + C$
- E. $\frac{1}{4}x^4 + x^2 - \cos x + C$

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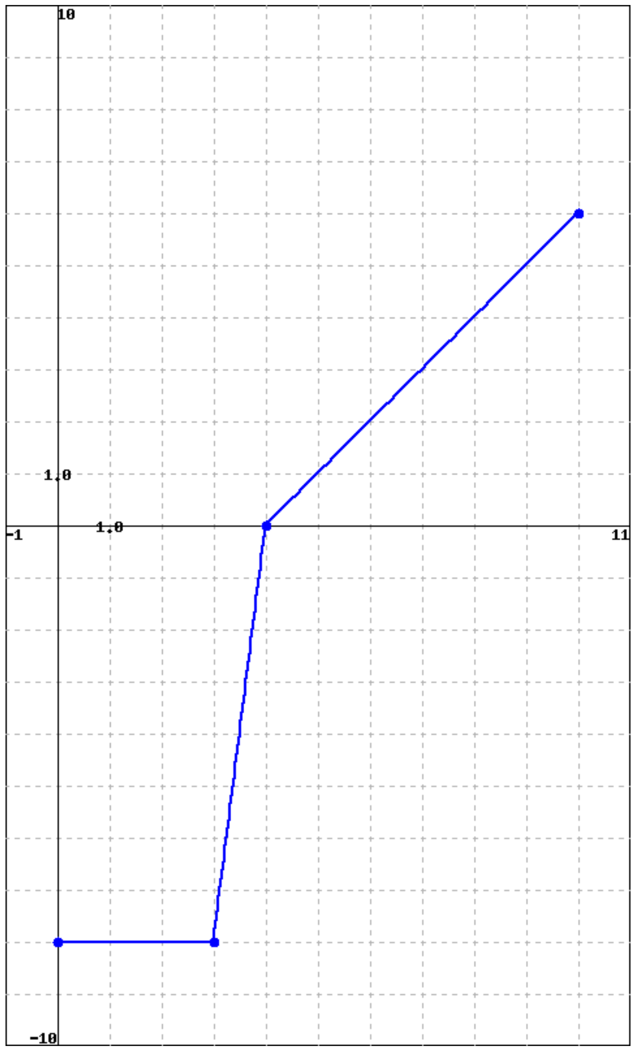
19. **(5 points)** `local/Library/GlobalPandemic/APEX_5.2_6.pg`



A graph of $f(x)$ is shown above. Using the geometry of the graph, evaluate the definite integrals.

The grid lines in the above graph are one unit apart. You may click on the graph to open a resizable graph in a separate window.

a) $\int_0^3 f(x)\,dx =$ __________

b) $\int_3^4 f(x)\,dx =$ __________

c) $\int_0^4 f(x)\,dx =$ __________

d) $\int_4^{10} f(x)\,dx =$ __________

e) $\int_0^{10} -6f(x)\,dx =$ __________

18. **(5 points)** `Rogawski_Calculus_Early_Transcendentals_Second_Edition_Offering/5_The_Integral/5.4_The_Fundamental_Theorem_of_Calculus_Part_II/5.4.8.pg`

Find a formula for the function represented by the integral.
$\int_2^x \left(4t^2 - 3t\right)\, dt =$ ____________

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5. **(5 points)** `local/GlobalPandemic/Exam03/MA113_Exam03_problem05.pg`

The acceleration of an object is given by $a(t) = 2\sin(t) + 1$ meters/second^2 and the velocity of the object at time $t = 0$ is 6 meters/second. Find the velocity of the object.

- A. $v(t) = -2\cos(t) + t + 8$ meters/second
- B. $v(t) = 2\cos(t) + 4$ meters/second
- C. $v(t) = -2\sin(t) + t + 6$ meters/second
- D. $v(t) = 2\cos(t) + t + 4$ meters/second
- E. $v(t) = 2\sin(t) + t + 6$ meters/second

---

12. **(5 points)** `local/GlobalPandemic/Exam03/MA113_Exam03_problem12.pg`

Find the largest area of a rectangle if its perimeter is 12 m.

- A. 5 square meters
- B. 8 square meters
- C. 9 square meters
- D. 16 square meters
- E. None of the above.

---

7. **(5 points)** `local/GlobalPandemic/Exam03/MA113_Exam03_problem07.pg`

What is the x-coordinate of the point on the line $y = x + 1$ that is the closest to the origin $(0,0)$?

- A. 0
- B. 1
- C. $-1/2$
- D. $1/2$
- E. There is no such point.

---

8. **(5 points)** `local/GlobalPandemic/Exam03/MA113_Exam03_problem08.pg`

Consider the function $f(x) = x^3$ on the interval $[0,4]$. Which expression below is the correct one for computing the left Riemann sum for $n = 8$?

Note that in the book this Riemann sum is denoted by L_8 and in the video lectures it is denoted by $LSUM(8)$.

- A. $\sum_{k=1}^{8}(\frac{k}{2})^3$
- B. $\frac{1}{2}\sum_{k=1}^{8}(\frac{k}{2})^3$
- C. $\frac{1}{2}\sum_{k=0}^{7}(\frac{k}{2})^3$
- D. $\sum_{k=0}^{7}(\frac{k}{2})^3$
- E. $\frac{1}{2}\sum_{k=1}^{8}(\frac{k}{8})^3$

---

10. **(5 points)** `local/GlobalPandemic/Exam03/MA113_Exam03_problem10.pg`

Let $f(x) = \int_0^{3x+2} e^{-t^2}dt$. What is $f'(x)$?

- A. $3e^{-(3x+2)^2}$
- B. $-2xe^{-x^2}$
- C. $e^{-(3x+2)^2}$
- D. e^{-9x^2-4}
- E. e^{-x^2}

---

4. **(5 points)** `local/GlobalPandemic/Exam03/MA113_Exam03_problem04.pg`

Let $f(x) = \frac{x^2-2x+A}{x-1}$. For which value of A will $\lim_{x\to 1} f(x)$ exist and be finite?

- A. 0.
- B. 1
- C. -1.
- D. 3.
- E. 2.

---

17. **(5 points)** `Rogawski_Calculus_Early_Transcendentals_Second_Edition_Offering/4_Applications_of_the_Derivative/4.9_Antiderivatives/4.9.5.pg`

The general antiderivative of $f(x) = 11\cos(x) + 19\sin(x)$ is __________

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2. **(5 points)** `local/GlobalPandemic/Exam03/MA113_Exam03_problem02.pg`

Use that $\sum_{k=1}^{N} k^2 = \frac{N(N+1)(2N+1)}{6}$ to find

$$\lim_{N\to\infty} \frac{2}{N}\sum_{k=1}^{N}(\frac{12k^2}{N^2} - 6).$$

- A. 0.
- B. 2.
- C. -4
- D. -6.
- E. -2.

---

9. (5 points) `local/GlobalPandemic/Exam03/MA113_Exam03_problem09.pg`

Let f be a function so that $\int_0^1 f(x)dx = 5$, $\int_0^4 f(x)dx = 9$, and $\int_1^3 f(x)dx = 1$. What is $\int_3^4 f(x)dx$?

- A. 9
- B. 8
- C. 4
- D. 3
- E. 0

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16. (5 points) `Rogawski_Calculus_Early_Transcendentals_Second_Edition_Offering/4_Applications_of_the_Derivative/4.5_L'Hopital's_Rule/4.5.8.pg`

Evaluate the limit using L'Hopital's Rule.

$\lim_{x\to 0} \frac{23x^3}{\sin(5x) - 5x} =$ ______________