



Math 104
HW #1 (Review)
Fall 2009

NAME _____

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This set of problems represents material that should be known prior to taking Math 104. Work all problems in the space provided. Circle the correct answer and **transfer your answer to this cover page.**

	Answer
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	Answer
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1. Find the domain of the function.

$$g(u) = \sqrt{u} - \sqrt{9-u}$$

Select the correct answer.

- A. $[0, \infty)$ B. $(-\infty, 0]$ C. $(0, 9)$ D. $[0, 9]$ E. $(-9, \infty]$

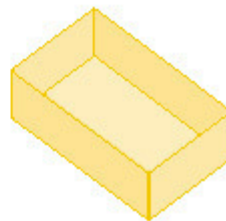
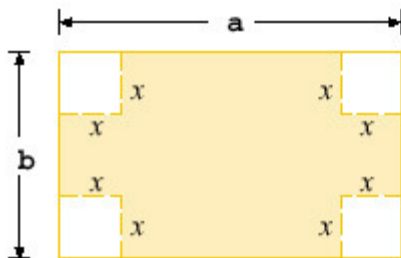
2. If the point $(9, 7)$ is on the graph of an even function, what other point must also be on the graph?

Select the correct answer.

- A. $(0, 0)$ B. $(9, -7)$ C. $(-9, 7)$ D. $(-9, -7)$ E. none of these

3. A box with an open top is to be constructed from a rectangular piece of cardboard with dimensions $b = 5$ in. by $a = 28$ in. by cutting out equal squares of side x at each corner and then folding up the sides as in the figure.

Express the volume V of the box as a function of x .



Select the correct answer.

- A. $V(x) = 4x^3 - 66x^2 + 140x$
B. $V(x) = x^3 - 33x^2 + 140x$
C. $V(x) = x^3 - 65x^2 + 140x$
D. $V(x) = x^3 - 66x^2 + 140x$
E. $V(x) = x^3 + 66x^2 + 140x$

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4. Use the table to evaluate the expression $(f \circ g)(3)$.

x	1	2	3	4	5	6
$f(x)$	3	2	1	0	1	2
$g(x)$	6	5	2	3	4	6

Select the correct answer.

- A. 2 B. 3 C. 1 D. 5 E. 6

5. Determine where f is discontinuous.

$$f(x) = \begin{cases} \sqrt{-x} & \text{if } x < 0 \\ 3-x & \text{if } 0 \leq x < 3 \\ (3-x)^2 & \text{if } x \geq 3 \end{cases}$$

Select the correct answer.

- A. 0 and 3 B. 0 only C. 3 only D. 0 and -3 E. -3 only

6. If $f(t) = \sqrt{4t+1}$, find $f''(2)$.

Select the correct answer.

- A. $-\frac{4}{27}$ B. 3 C. $-\frac{2}{3}$ D. $\frac{2}{3}$ E. $\frac{4}{27}$

7. Calculate y' .

$$y = \sqrt{x} \cos \sqrt{x}$$

Select the correct answer.

- A. $y' = \cos \sqrt{x} - \frac{\sin \sqrt{x}}{2\sqrt{x}}$ B. $y' = \frac{\sin \sqrt{x} - \sqrt{x} \cos \sqrt{x}}{2\sqrt{x}}$
C. $y' = -\frac{1}{2} \left(\frac{\cos \sqrt{x} - 1}{\sqrt{x}} \right)$ D. $y' = -\frac{1}{2} \left(\frac{\sin \sqrt{x} - 1}{\sqrt{x}} \right)$
E. $y' = \frac{\cos \sqrt{x} - \sqrt{x} \sin \sqrt{x}}{2\sqrt{x}}$

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8. The turkey is removed from the oven when its temperature reaches $175^{\circ}F$ and is placed on a table in a room where the temperature is $70^{\circ}F$. After 10 minutes the temperature of the turkey is $160^{\circ}F$ and after 20 minutes it is $150^{\circ}F$. Use a linear approximation to predict the temperature of the turkey after half an hour.

Select the correct answer.

- A. 36 B. 130 C. 134 D. 140 E. 160

9. If a ball is thrown vertically upward with a velocity of 72 ft/s, then its height after t seconds is $s = 72t - 6t^2$. What is the maximum height reached by the ball?

Select the correct answer.

- A. 6 ft B. 216 ft C. 36 ft D. 225 ft E. 81 ft

10. Find the limit if $g(x) = x^5$.

$$\lim_{x \rightarrow 2} \frac{g(x) - g(2)}{x - 2}$$

- A. 32 B. 40 C. 64 D. 80 E. 100

11. If $h(2) = 7$ and $h'(2) = -2$, find $\left. \frac{d}{dx} \left(\frac{h(x)}{x} \right) \right|_{x=2}$

- A. $-11/4$ B. 2 C. 4 D. 8 E. 16

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12. Calculate y' .

$$\cos(xy) = x^2 - y$$

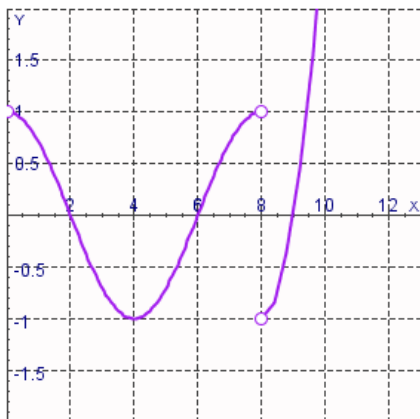
- A. $y' = \frac{2x - y(\sin(xy))}{1 + x(\sin(xy))}$
- B. $y' = \frac{2x + y(\sin(xy))}{1 + x(\cos(xy))}$
- C. $y' = \frac{2x - y(\cos(xy))}{1 + x(\cos(xy))}$
- D. $y' = \frac{2x + y(\cos(xy))}{1 + x(\sin(xy))}$
- E. $y' = \frac{2x + y(\sin(xy))}{1 - x(\sin(xy))}$

13. Given that the graph of f passes through the point $(4, 69)$ and that the slope of its tangent line at $(x, f(x))$ is $10x - 4$, find $f(1)$.

Select the correct answer.

- A. 1 B. 12 C. 11 D. 6 E. 0

14. The graph of the derivative $f'(x)$ of a continuous function f is shown. On what intervals is f decreasing?



Select the correct answer.

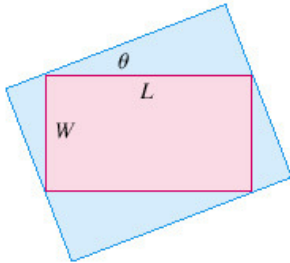
- A. $(2, 6) \cup (8, 9)$ B. $(-1, 1)$ C. $(4, 8) \cup (8, 10)$ D. $(0, 4)$ E. $(0, 2) \cup (6, 8) \cup (9, 10)$

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15. Find the maximum area of a rectangle that can be circumscribed about a given rectangle with length $L = 7$ and width $W = 4$.

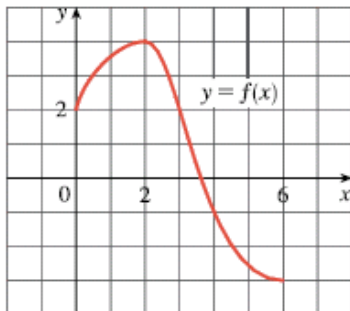


- A. 30
- B. 60.5
- C. 64
- D. 82.5
- E. 121

16. Find the absolute maximum of the function $f(x) = \sin(2x) + \cos(2x)$ on the interval $\left[0, \frac{\pi}{2}\right]$.

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

17. Use the given graph of f to find the Riemann sum with six subintervals. Take the sample points to be left endpoints.



Select the correct answer.

- A. 8
- B. 6
- C. 4
- D. 3.5
- E. 4.5

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18. If h' is a child's rate of growth in pounds per year, which of the following expressions represents the increase in the child's weight (in pounds) between the years 2 and 5?

Select the correct answer.

- A. $\int_2^5 h'(t) dt$ B. $h'(5) - h'(2)$ C. $\int_5^2 h(t) dt$ D. $\frac{h(5) - h(2)}{5 - 2}$ E. none of these

19. Let $g(x) = \int_7^{x^2} 9\sqrt{1+t} dt$

Find $g'(2)$.

- A. $9\sqrt{5}$ B. $18\sqrt{3}$ C. $18\sqrt{5}$ D. $36\sqrt{5}$ E. $36\sqrt{3}$

20. Evaluate the integral.

$$\int_0^3 (6 + 6y - y^2) dy$$

Select the correct answer.

- A. -12 B. -18 C. 45 D. 54 E. 36