Math 104
HW #1 (Review)
Fall 2009

NAME_____
please print legibly

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. $(-9, \infty]$

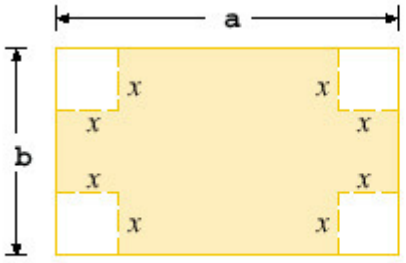
2. If the point (9, 7) is on the graph of an even function, what other point must also be on the graph?

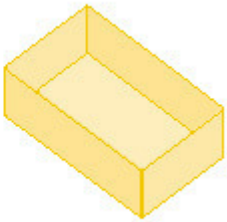
Select the correct answer.

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. $V(x) = x^3 + 66x^2 + 140x$

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.

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

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. $y'=\frac{\cos\sqrt{x}-\sqrt{x}\sin\sqrt{x}}{2\sqrt{x}}$

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 $g(x) = x^5$.

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

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

12. Calculate y'.

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

A. $y' = \dfrac{2x - y(\sin(xy))}{1 + x(\sin(xy))}$

B. $y' = \dfrac{2x + y(\sin(xy))}{1 + x(\cos(xy))}$

C. $y' = \dfrac{2x - y(\cos(xy))}{1 + x(\cos(xy))}$

D. $y' = \dfrac{2x + y(\cos(xy))}{1 + x(\sin(xy))}$

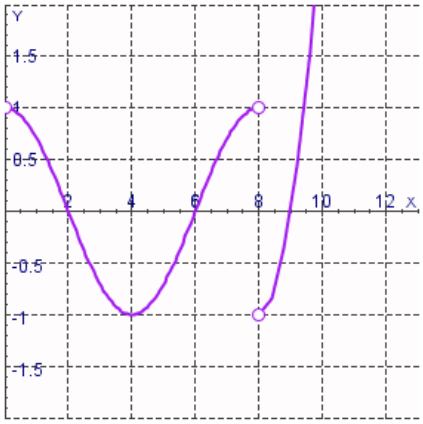
E. $y' = \dfrac{2x + y(\sin(xy))}{1 - x(\sin(xy))}$

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

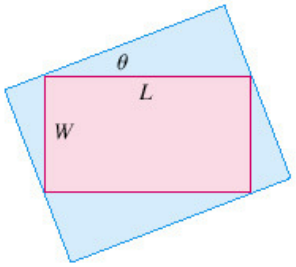
14. The graph of the derivative $f'(x)$ of a continuous function f is shown. On what intervals is f decreasing?



Select the correct answer.

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

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

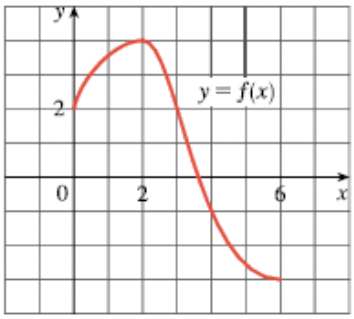


A. 30
B. 60.5
C. 64
D. 82.5
E. 121

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

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. $\dfrac{h(5)-h(2)}{5-2}$ 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.

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

Select the correct answer.

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