AP CALCULUS BC SUMMER ASSIGNMENT - DO NOT SHOW YOUR WORK ON THIS!

- Complete these problems during the last two weeks of August. SHOW ALL WORK. Know how to do ALL of these problems, so do them well.
- Items marked with a * denote that a graphing calculator may be used.
- You will be tested on Calculus A material (derivatives; Ch. 1-4) within the first few weeks of school. You must do well to continue in the course.

1. If
$$f(x) = \frac{x^2 - 9}{x + 3}$$
 is continuous at $x = -3$, then
 $f(-3) =$
a. 3 b. -3 c. 0
d. 6 e. -6

2. If $f(x) = e^{\sin x}$, how many zeros does f'(x)have on the closed interval $[0, 2\pi]$? a. 1 b. 2 c. 3 d. 4 e. 5

3.
$$\lim_{x \to \infty} \frac{10^8 x^5 + 10^6 x^4 + 10^4 x^2}{10^9 x^6 + 10^7 x^5 + 10^5 x^3} =$$

a. 0 b. 1 c. -1
d. $\frac{1}{10}$ e. $-\frac{1}{10}$

The graph of which function has y = −1 as an asymptote?

a. $y = e^{-x}$ b. $y = \frac{-x}{1-x}$ c. $y = \ln(x+1)$ d. $y = \frac{x}{x+1}$ e. $y = \frac{x}{1-x}$ 5. If $f(x) = \sqrt{4\sin x + 2}$, then f'(0) =a. -2b. 0 c. $\sqrt{2}$ d. $\frac{\sqrt{2}}{2}$ e. 1

- 6. The equation of the tangent line to the curve $x^2 + y^2 = 169$ at the point (5,-12) is a. 5y - 12x = -120b. 5x - 12y = 119c. 5x - 12y = 169d. 12x + 5y = 0
- e. 12x + 5y = 169

7. If f(x) = x - 1 and $q(x) = x^2 + 1$ then f(q(x)) = q(f(x)) when x =с. —1 b. ½ a. $-\frac{1}{2}$ d. 1 e. 0 8. If the graph of $f(x) = 2x^2 + \frac{k}{x}$ has a point of inflection at x = -1, then the value of k is a. 1 b. –1 c. 2 d. –2 e. 0 9. The graph of $y = \sqrt[3]{x^2 + 1}$ is symmetric with respect to which of the following? I The *x* – axis II The y - axisIII The origin a. I only b. II only c. III only d. II and III only e. I, II, and III 10. $\frac{d}{dx}(e^{3\ln x}) =$ a. $e^{3\ln x}$ b. $\frac{e^{3\ln x}}{x}$ c. x^3 d. $3x^{2}$ 11. For what values of x is the graph of $y = \frac{2}{4-x}$ concave downward? a. No values of x b. *x* < 4 c. *x* > -4 d. *x* < −4 e. x > 4 12. A particle moves along the x – axis in such a way that its position at time t is given by $x(t) = \frac{1-t}{1+t}$. What is the acceleration of the particle at time *t* = 0? a. $-\frac{3}{5}$ b. –4 c. 4 d. 2 e. –2

13. If $y = x^{(x^3)}$ for x > 0, then $\frac{dy}{dx} =$ a. $x^3 \cdot x^{(x^3-1)}$ b. $4x^3$ c. $x^2 + 3x^2 \ln x$ d. $x^{(x^3+2)}(1+3\ln x)$ e. $3x^{(x^3+2)} \ln x$ 14. If, for all values of x, f'(x) < 0 and f''(x) > 0which one of the following curves could be a part of the graph of f? b. a. c. d. e. 15. The maximum value of $f(x) = 2x^3 - 9x^2 + 12x - 1$ on [-1, 2] is a. 0 b. 1 c. 2 d. 3 e. 4 16. *The $\lim_{x \to -3} \frac{x}{\sqrt{x^2}}$ a. –3 b. –1 c. 1 d. 3 e. nonexistent

17. *Let f and g be differentiable functions such
that
$$f(1)=4$$
, $g(1)=3$, $f'(3)=-5$
 $f'(1)=-4$, $g'(1)=-3$, $g'(3)=2$.
If $h(x)=f(g(x))$, then $h'(1)=$
a. -9 b. 15 c. 0
d. -5 e. -12

18. *The shortest distance from the curve xy = 4 to the origin is					
a. 2	b. 4		c. √2		
d. 2√2	e. ½√2		··· • • -		
	-				
19. *If $f(x) = 3x^2$	-8 <i>x</i> ⁻² , t	hen $\lim_{h\to 0} \frac{j}{2}$	$\frac{f(2+h)-f(2)}{h} =$		
a. 10	b. 14		c. 20		
d. –14	e. –20				
 20. *How many real solutions does the equation sin(6x)=2e^x have? a. None b. One c. Six d. Eight e. Infinitely many 					
of the Mean V a. None	$ -2 \le x \le$	3 satisf	v many numbers y the conclusion c. Two		
22. *If $f'(x) = e^{x}$	+sin <i>x</i> th	en ƒ (x) n	nay be		
a. $\frac{e^{x+1}}{x+1} + \cos x$		b. $e^{x} + e^{x}$	cos x		
c. $e^{x} - \cos x - 1$ e. $e^{2x} - \cos x$		d. <i>xe</i> ^{-x}	$+\cos x$		
23. If $f(x) = (2+3x)^4$, then the 4 th derivative of f is					
a. 0	b. 4! (3)	1	c. 4!(3 ⁴)		
d. 4!(3 ⁵)	e. 4!(2+	3 <i>x</i>)			
24. At what value(s) of x does $f(x) = x^4 - 8x^2$ have a relative minimum?a. 0 and -2 onlyb. 0 and 2 onlyc. 0 onlyd2 and 2 onlye2, 0, and 2					

25. The $\lim_{h \to 0} \frac{ x+h }{h}$ a. 0 d1	$\frac{ - x }{2} \text{ at } x = 3 \text{ is}$ b. 1 e. nonexistent	c. 3
	unction given by $\frac{1}{2}$ of <i>c</i> that satisfy the theorem on the theorem on the b. 1 only e. $-\sqrt{3}$ and $\sqrt{3}$	he conclusion of
27. If $x + y = xy$, t a. $\frac{1}{x-1}$ d. $x + y - 1$	b. $\frac{y-1}{x-1}$	c. $\frac{1-y}{x-1}$
28. If $g(x) = \ln(\ln 2)$ a. $\frac{x}{\ln 2x}$ d. $\frac{2}{\ln 2x}$	2x), then $g'(x) =$ b. $\frac{1}{x(\ln 2x)}$ e. $\frac{1}{\ln(\ln 2x)}$	c. $\frac{1}{\ln 2x}$
29. If $f(x) = \frac{x}{x+1}$ a. All real numbers d. $y \le 1$		ne range of fis c.y≠1
30. In which inter $f(x) = x^3 + 6x^2$ a. (- ∞ ,-3) only c. (-1, ∞) only e. (- ∞ ,-3) \cup (1, ∞	² +9x+1 increasi b. (−3, − d. (−∞,−	ng?

f is

31. Which of the following graphs represents an even function? a. b. d. c. e. 32. For |x| < 1, the derivative of $y = \ln \sqrt{1 - x^2}$ is a. $\frac{x}{1-x^2}$ b. $\frac{x}{x^2-1}$ c. $\frac{-x}{x^2-1}$ d. $\frac{1}{2(1-x^2)}$ e. $\frac{1}{\sqrt{1-x^2}}$ 33. If $f(x) = 2e^{2x}$, then $f'(\ln 3) =$ a. 9 b. 18 c. 24 d. 32 e. 36 34. Consider the function $f(x) = \begin{cases} \frac{\sin x}{x}, & x \neq 0 \\ x & \vdots \end{cases}$. In |k, x=0order for f(x) to be continuous at x = 0 the value of k must be b. 1 a. 0 с. **—**1 d. π e. A number greater than 1 35. What are all values of *x* for which the graph of $y = x^3 - 6x^2$ is concave downward? a. 0 < *x* < 4 b. *x* > 2 c. *x* < 2 e. *x* > 4 d. *x* < 0

36. If $\frac{dy}{dx} = e^{3x}$, then y could be a. 3 e^{3x} b. *e*^{x³} C. $\frac{1}{2}e^{x^3}$ d. $3e^{x^3}$ e. $\frac{1}{3}e^{3x}$ 37. If the fundamental period of the function $f(x) = 3\cos\left(\frac{kx}{2}\right)$ is $\frac{2\pi}{3}$, then k may be a. 2 c. 4 b. 3 d. 6 e. 8 38. If $y = xe^x$, then $\frac{d^n y}{dx^n} =$ b. *e*^{*nx*} a. *e*[×] d. *xⁿe^x* c. $(x+n)e^{x}$ e. $(x+n^2)e^x$ 39. A particle moves on the x – axis in such a way that its position at time t is given by $x(t) = 3t^5 - 25t^3 + 60t$. For what values of t is the particle moving to the left? a. -2 < t < 1 only b. -2 < *t* < -1 and 1 < *t* < 2 c. −1 < *t* < −1 and *t* > 2 d. 1 < t < 2 only e. *t* < -2, -1 < *t* < 1, and *t* > 2 40. The equation of the normal line to the curve $y = \sqrt[3]{x^2 - 1}$ at the point where x = 3 is b. y - 4x = 10a. v + 12x = 38d. v + 2x = 8c. y + 2x = 4e. y - 2x = -441. * *f* is a function such that $\lim_{x\to a} \frac{f(x) - f(a)}{x - a} = 0$.

- Which of the following must be true? a. $\lim_{x \to a} f(x)$ does not exist
- b. *f*(*a*) does not exist
- c. f'(a) = 0
- d. f(a) = 0
- e. f(x) is continuous at x = 0

42. *If
$$f(x) = \sqrt{(x^2 + 2)^3}$$
, then $f'(x) =$
a. $\frac{3\sqrt{x^2 + 2}}{2}$ b. $3x\sqrt{x^2 + 2}$
c. $\sqrt{6x(x^2 + 2)^2}$ d. $\frac{3x}{\sqrt{x^2 + 2}}$
e. $\frac{4x}{3\sqrt[3]{x^2 + 2}}$

- 43. *Of the choices given, which value is NOT in the domain of the function $f(x) = (\cos x)^x$?
 - a. 1 b. $\frac{\pi}{2}$ c. $\frac{4\pi}{3}$ d. 4 e. 2π
- 44. *If f is a function which is everywhere increasing and concave upwards, which statement is true about f⁻¹, the inverse of f?
 a. f⁻¹ is not a function.
- b. f^{-1} is increasing and concave upwards
- c. f^{-1} is increasing and concave downwards
- d. f^{-1} is decreasing and concave upwards
- e. f^{-1} is decreasing and concave downwards
- 45. *A function whose derivative is a constant multiple of itself must be a. Periodic b. Linear
- c. Exponential d. Quadratic
- e. Logarithmic

d. –sinx

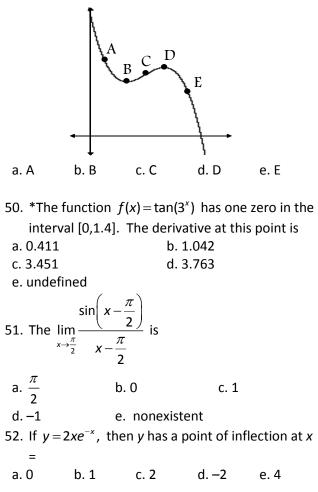
46. *For how many real numbers *x* is it true that

 $sin x = \frac{x}{10}$? a. Three b. Five c. Six d. Seven e. Infinitely many 47. *What is the 50th derivative of cosx? a. -cosx b. cosx c. sinx

e. 0

48. *Suppose that f is a continuous function defined for all real numbers x and f(-5) = 3 and f(-1) = -2. If f(x) = 0 for one and only one value of x then which of the following could be x?

49. The graph shows the distance s(t) from a reference point of a particle moving on a number line, as a function of time. Which of the points marked is the closest to the point where the acceleration first becomes negative?



53. If the radius of a sphere is increasing at the rate of 2 inches per second, is the volume increasing when the radius is 10 inches? a. 8000 b. 800 c. 3200π d. 40π c. 80π 54. What are all values of x for which $\ln(x^2 - 1) > 0?$ a. $ x > \sqrt{2}$ b. $ x > 1$ c. $ x \ge \sqrt{2}$ 55. The $\lim_{x \to 0} \frac{(3 - x)^2}{(3 - x)^2}$ is a. 0 b. -2 c. 1 d. -1 e. nonexistent 56. If $f(x) = \sqrt{x}$ is a. $\frac{\sqrt{2}}{4}$ b. $\sqrt{2}$ c. $\frac{\sqrt{2}}{2}$ 61. The coordinates of the point on the curve $y = x^2 + 1$ which is closest to $(3,1)$ is a. $(1,2)$ b. $(2,5)$ c. $(3,10)$ d. $(\frac{1}{2},\frac{x^2}{1})$ c. $(\frac{x^2}{x^2} + 1)$ 57. If $f(x) = \arctan\left(\frac{1}{x}\right)^2$, then $f'(x) = \frac{1}{x^2 + 1}$ a. $\frac{1}{x^2 + 1}$ e. $-\frac{4}{x^2 + 1}$ 58. If $f(x) = \cos(x)$, what is the range of $f?$ a. $(1,2)$ b. $(2,5)$ c. $(3,10)$ d. $(\frac{1}{2},\frac{x^2}{1})$ e. $(\frac{1}{2},\frac{x^2}{2})$ e. $(\frac{1}{2},\frac{x^2}{2})$ 57. If $f(x) = \arctan\left(\frac{1}{x}\right)^2$, then $f'(x) = \frac{1}{x^2 + 1}$ a. $\frac{1}{x^2 + 1}$ e. $-\frac{4}{x^2 + 1}$ 57. If $f(x) = \arctan\left(\frac{1}{x}\right)^2$, then $f'(x) = \frac{1}{x^2 + 1}$ 58. If $f(x) = \cos(x)$, what is the range of $f?$ a. $(1,2)$ b. $(2,5)$ c. $(3,10)$ d. $(\frac{1}{x^2 + 1})$ e. $(\frac{1}{x^2 + 1})$ e. $(\frac{1}{x^2 + 1})$ 58. If $f(x) = \cos(x)$, what is the range of $f?$ a. $(1,2)$ c. $(1/(1,-3)^3)$. For what values of t is the value of t is the value of t is the value of $f(x)^3$ is $x = 20.62x$, then at the point $x = 3$, the example $x = 0$. 58. If $f(x) = \cos(x)$, what is the range of $f?$ a. $(1,2)$ c. $(1/(1,-3)^3)$. For what values of t is the value of $f(x)^3$ is $x = 20$. Six $(1,2)^3$ is $x = 20.62x$, $(1,2)^3$ is $x = 20.62x$, $(1,2)^3$ is $(1,2)^3$			
per second, is the volume increasing when the radius is 10 inches? a. 800 x b. 800 c. 3200 π d. 40π e. 80π 54. What are all values of x for which $\ln(x^2-1) > 07$ a. $ x > \sqrt{2}$ b. $ x > 1$ c. $ x \ge \sqrt{2}$ d. $ x > \sqrt{2}$ b. $ x > 1$ c. $ x \ge \sqrt{2}$ d. $ x > \sqrt{2}$ b. $ x > 1$ c. $ x \ge \sqrt{2}$ d. $ x > \sqrt{2}$ b. $ x > 1$ c. $ x \ge \sqrt{2}$ d. $ x > \sqrt{2}$ b. $ x > 1$ c. $ x \ge \sqrt{2}$ d. $ x > \sqrt{2}$ c. $ x \ge 1$ e. $ x < \sqrt{2}$ a. 0 b. -2 c. 1 d. -1 e. nonexistent 55. If $f(x) = \ln x$ and $g(x) = e^x$, then $f(g(4)) = a$ a. $\frac{1}{x^2 + x}$ b. $\frac{x^2}{x^2 - 1}$ c. $\frac{x^2}{x^2 + 1}$ d. $(2 + \frac{1}{x^2})^2 = \frac{1}{x^2 + 1}$ 57. If $f(x) = \arctan(\frac{1}{x})$, then $f'(x) = \frac{1}{x^2 + 1}$ d. $\frac{1}{x^2 + 1}$ e. $\frac{-1}{x^2 + 1}$ 57. If $f(x) = \arctan(\frac{1}{x})$, then $f'(x) = \frac{1}{x^2 + 1}$ 58. If $f(x) = \cosh(x)$, what is the range of f? a. $\frac{1}{x^2 + 1}$ b. $\frac{\sqrt{x^2}}{x^2 - 1}$ c. $\frac{x^2}{x^2 + 1}$ 53. $ x = 1 \le x \le 1$ 54. The deviation of the tangent time to the curve $\frac{y = x^2 + 1 \text{ which is closest to (3,1) is}}{16 (3 - \frac{1}{x^2 + 1})^2 = \frac{1}{x^2 + 1} (2x)^2}$ 54. The deviative of $\frac{1}{4(x)^2}(2x)^5$ is $\frac{3}{2}$			65. *If $\lim_{x \to 0} \frac{g(3) - g(x)}{2} = -0.628$, then at the point x =
$\begin{array}{lll} radius is 10 inches?\\ a. 800 \\ a. 800 \\ c. 3200 \\ b. 800 \\ c. 3200 \\ c. 1t is always concave upward.\\ d. 40\pi \\ e. 80\pi \\ c. tt is always concave upward.\\ d. tt is decreasing or lark greater than 0.\\ e. it has a relative maximum at x = 0.c. it is always concave upward.\\ d. tt is decreasing for alk greater than 0.\\ e. it has a point of inflection at x = 0.c. it is always concave upward.d. tt is decreasing for alk greater than 0.\\ e. it has a point of inflection at x = 0.c. it is always concave upward.d. tt is decreasing for alk greater than 0.\\ e. it has a point of inflection at x = 0.c. it is durays concave upward.d. tt is decreasing for alk greater than 0.e. it has a point of inflection at x = 0.c. it is durays concave upward.d. tt is durays co$	•		5 A
d. 40π e. 80π 54. What are all values of x for which $\ln(x^2 - 1) > 0?$ a. $ x > \sqrt{2}$ b. $ x > 1$ c. $ x \ge \sqrt{2}$ d. $ x \ge 1$ e. $ x < \sqrt{2}$ a. $(x + x < x^2)$ 55. The $\lim_{x \to 1} \frac{(3 - x)^2}{(x - 3)}$ is a. 0 b. -2 c. 1 d. -1 e. nonexistent 56. If $f(x) = \ln x$ and $g(x) = e^x$, then $f(g(4)) =$ a. $\ln 4$ b. e^4 c. 4 d. e^4 e. -4 57. If $f(x) = \arctan(\frac{1}{x})$, then $f'(x) =$ a. $\frac{-1}{x^2 + x}$ b. $\frac{x}{\sqrt{x^2} - 1}$ c. $\frac{x^2}{x^2 + 1}$ a. $\frac{1}{x^2 + 1}$ e. $\frac{-1}{x^2 + 1}$ c. $\frac{x^2}{x^2 + 1}$ 57. If $f(x) = \arctan(\frac{1}{x})$, then $f'(x) =$ 58. If $f(x) = \cos(x - x)$, this the range of $f?$ a. $(x + -1 \le x \le 1)$ 58. If $f(x) = \cos(x - x)$, then $f(x) =$ 58. If $f(x) = \cos(x - x)$, then $f(x) =$ 57. If $f(x) = -4x < 50$ b. $(x + -1 \le x \le 1)$ 58. If $f(x) = \cos(x - x)$, then $f(x) =$ 58. If $f(x) = \cos(x - x)$, then $f(x) =$ 57. If $f(x) = -3 - x + 12$, then $f'(x) =$ 58. If $f(x) = \cos(x - x)$, then $f'(x) =$ 58. If $f(x) = \cos(x - x)$, then $f'(x) =$ 58. If $f(x) = \cos(x - x)$, then $f(x) =$ 58. If $f(x) = \cos(x - x)$, then $f(x) =$ 57. If $f(x) = \cos(x - x)$, then $f'(x) =$ 58. If $f(x) = \cos(x - x)$, then $f'(x) =$ 57. If $f(x) = -3 - x + 12$, then $f'(x) =$ 58. If $f(x) = \cos(x - x)$, then $f(x) =$ 59. If $f(x) = \cos(x - x)$, then $f(x) =$ 51. $(x + 1)(x - 3)^{(x)}$, for what values of t is the value of t is three a - x + 30, the the value of t is three a - x + 300 $(x - x) = 12x + 40$ $(x - x) = 12x - 8$ $(x - 1) = 2x + 40$ $(x - x) = 12x - 8$ $(x - 2) = 12x + 40$ $(x - 2) = 12x - 8$ $(x - 2) = 12x + 12$ $(x - 3)$ $(x - 3) = 0, -1$ $(x - 1)$			
If this a point of inflection at $x = 0$.54. What are all values of x for which $\ln(x^2 - 1) > 0$?a. $ x > \sqrt{2}$ b. $ x > 1$ c. $ x > \sqrt{2}$ c. $ x > \sqrt{2}$ a. $ x > \sqrt{2}$ b. $ x < 1$ c. $ x > \sqrt{2}$ 55. The $\lim_{x \to 1} \frac{(3 - x)^2}{(x - 3)}$ isc. 1 e. $-\frac{\sqrt{2}}{2}$ c. $\ln(sec^2 x)$ d. $2\ln(secx)$ a. 0 b. -2 c. 1e. $-\frac{\sqrt{2}}{2}$ d. 1e. $-\frac{\sqrt{2}}{2}$ d. -1 e. nonexistentc. 1e. $-\frac{\sqrt{2}}{2}$ c. $\ln(sec^2 x)$ d. $2\ln(secx)$ 55. If $f(x) = \ln x$ and $g(x) = e^x$, then $f(g(4)) =$ a. $\ln 4$ b. e^x c. 4c. $(\frac{1}{3}, \frac{1}{32})$ e. $(\frac{1}{3}, \frac{1}{32})$ c. $(3, 10)$ 61. The coordinates of the point on the curve $y = x^2 + 1$ which is closest to $(3, 1)$ is a. $(1, 2)$ b. $(2, 5)$ c. $(3, 10)$ a. e^{-4} e. -4 f. $(2, \lim_{x \to 1} (1 + \frac{1}{x})^{3^2} =$ a. $3e$ b. 1c. -1 3. e^-4 f. $(2, \lim_{x \to 1} (1 + \frac{1}{x})^{3^2} =$ a. $3e^+$ b. $124x^{3^2}$ c. $30(4x)^2(2x)^5$ 57. If $f(x) = \arctan(\frac{1}{x})$, then $f'(x) =$ f. $3e^x$ e. e^x f. $3e^x$ f. $8e^x$ 63. A particle moves along the $x - axis$ so that at any time t its position is given by $x(t) = (t+1)(t-3)^3$ f. $3e^x + 1e^x + 1e^x$ f. $3e^x + 1e^x $		c. It is always concave upward.	-
54. What are all values of x for which $\ln(x^2 - 1) > 0$? a. $ x > \sqrt{2}$ b. $ x > 1$ c. $ x > \sqrt{2}$ b. $ x > \frac{1}{2}$ e. $ x < \sqrt{2}$ c. $ x > \sqrt{2}$ c	d. 40 π e. 80 π	• •	-
a. $ x > \sqrt{2}$ b. $ x > 1$ c. $ x > \sqrt{2}$ d. $ x \ge 1$ e. $ x < \sqrt{2}$ 55. The $\lim_{x \to 1} \frac{(3-x)^2}{(x-3)}$ is a. 0 b. -2 c. 1 d. 1 e. $\frac{\sqrt{2}}{2}$ 61. The coordinates of the point on the curve $y = x^2 + 1$ which is closest to (3,1) is a. (1,2) b. (2,5) c. (3,10) d. $(\frac{2}{3}, \frac{x^2}{3})$ e. $(\frac{1}{2}, \frac{x^2}{3})$ 63. A particle moves along the $x - axis$ so that at a. $\frac{-1}{x^2 + x}$ b. $\frac{x}{\sqrt{x^2 - 1}}$ c. $\frac{x^2}{x^2 + 1}$ 63. A particle moves along the $x - axis$ so that at any time <i>t</i> its position is given by $x(t) = (t+1)(t-3)^2$. For what values of <i>t</i> is the $x + 2x + 3$ b. $\frac{x}{\sqrt{x^2 - 1}}$ c. $\frac{x^2}{x^2 + 1}$ 64. The equations of the tangent line to the curve $y = x^2 - 6x^2$ at its point of inflection is a, y = -12x + 40 64. The equations of the tangent line to the curve $y = \frac{k^2 + 3}{2}$ and antiderivative of 2tanx is a. ln(sec 2x) b. 2sec^2 x c. ln(sec^2 x) d. 2ln(cosx) e. ln(2secx) 65. *For $0 \le x \le \frac{\pi}{2}$, an antiderivative of 2tanx is a. ln(sec 2x) b. 2sec^2 x c. ln(sec^2 x) d. 2ln(cosx) e. ln(2secx) 66. *For $0 \le x \le \frac{\pi}{2}$, an antiderivative of 2tanx is a. ln(sec 2x) b. 2sec^2 x c. ln(sec^2 x) d. 2ln(cosx) e. ln(2secx) 67. * If the derivative of a function <i>f</i> is given by $f'(x) = \sin(x^2)$, then how many critical points does the function <i>f</i> (<i>x</i>) have on the interval [0.2, 2.6] ⁷ a. 0 b. 1 c. 2 d. 3 e. 4 68. *The derivative of 4 [x] ³ (2x) ⁵ is a. 72x ⁸ b. 124x ¹⁷ c. $30x(4x)^2(2x)^5$ d. $72x(4x)^2(2x)^5$ e. $144(4x)^4(2x)^2$ 69. *The second derivative of a function is given by $f'(x) = 0.5 + cos x - e^{-x}$. How many points of inflection does the function <i>f</i> (<i>x</i>) have on the interval $0 \le x \le 20^2$ a. None b. Three c. Six d. Seven e. Ten 70. *The equation of the line tangent to the curve $y = \frac{k + 8}{k + x}$ at $x = -2$ is $y = x + 4$. What is the x = y = 12x - 80 d. $y = -12x + 4070. *The equation of the line tangent to the curvey = \frac{k + 8}{k + x} at x = -2 is y = x + 4. What is thex = -3$ b. -1 c.	$ \mathbf{\Gamma} \mathbf{A} = \mathbf{A} \mathbf{A} \mathbf{A} \mathbf{A} \mathbf{A} \mathbf{A} \mathbf{A} \mathbf{A}$		
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a. $\frac{-1}{x^2 + x}$ b. $\frac{x}{\sqrt{x^2 - 1}}$ c. $\frac{x^2}{x^2 + 1}$ 63. A particle moves along the $x - axis so that at any time t its position is given by69. *The second derivative of a function is given byd. \frac{1}{x^2 + 1}e. \frac{-1}{x^2 + 1}e. \frac{-1}{x^2 + 1}x(t) = (t + 1)(t - 3)^3. For what values of t is the velocity of the particle increasing?a. t > 3 onlyb. 0 < t < 3 onlyf"(x) = 0.5 + cos x - e^{-x}. How many points of inflection does the function f(x) have on the interval 0 \le x \le 20?58. If f(x) = cos(arcsinx), what is the range of f?a. t > 3 onlyb. 0 < t < 3 onlyc. 0 < t < 3 onlya. \{x \mid -1 \le x \le 0\}b. \{x \mid -1 \le x \le 1\}c. \{x \mid 0 \le x \le \frac{\pi}{2}\}64. * The equations of the tangent line to the curvey = x^3 - 6x^2 at its point of inflection isa. \{x \mid 0 \le x \le 1\}x = -2 is y = x + 4. What is thee. \{x \mid 0 \le x \le 1\}y = 12x - 8y = -12x + 40y = -12x + 12e. y = 12x - 40y = -12x + 40x = -2 is y = x + 4. What is the$	57. If $f(x) = \arctan\left(\frac{-x}{x}\right)$, then $f(x) =$	d. 3 e e. e	
d. $\frac{1}{x^2+1}$ e. $\frac{-1}{x^2+1}$ 58. If $f(x) = \cos(\arcsin x)$, what is the range of f ? a. $\{x \mid -1 \le x \le 0\}$ b. $\{x \mid -1 \le x \le 1\}$ c. $\{x \mid 0 \le x \le 1\}$ a. $\{x \mid 0 \le x \le 1\}$ b. $\{x \mid 0 \le x \le 1\}$ c. $\{x \mid 0 \le x \le 1\}$	-1 x^{2}	63. A particle moves along the x – axis so that at	e. 144(4 <i>x</i>) (2 <i>x</i>)
d. $\frac{1}{x^2+1}$ e. $\frac{-1}{x^2+1}$ $x(t)=(t+1)(t-3)^3$. For what values of t is the velocity of the particle increasing?f''(x)=0.5+cos x-e^{-x}. How many points of inflection does the function $f(x)$ have on the interval $0 \le x \le 20$?58. If $f(x) = cos(arcsinx)$, what is the range of f? a. $\{x \mid -1 \le x \le 0\}$ b. $\{x \mid -1 \le x \le 1\}$ $x(t)=(t+1)(t-3)^3$. For what values of t is the velocity of the particle increasing? a. $t > 3$ only b. $0 < t < 3$ only c. $1 < t < 3$ only d. $t < 1$ or $t > 3$ f''(x)=0.5+cos x-e^{-x}. How many points of inflection does the function $f(x)$ have on the interval $0 \le x \le 20$? a. None b. Three c. Six d. Seven e. Ten64. * The equations of the tangent line to the curve $y=x^3-6x^2$ at its point of inflection is a. $y=-12x+8$ b. $y=-12x+40$ c. $y=12x-40$ 70. *The equation of the line tangent to the curve $y=\frac{kx+8}{k+x}$ at $x=-2$ is $y=x+4$. What is the value of k ? a. -3 b. -1	a. $\frac{1}{x^2 + x}$ b. $\frac{1}{\sqrt{x^2 - 1}}$ c. $\frac{1}{x^2 + 1}$		
$\frac{\sqrt{elocity}}{\sqrt{1-1}} = \frac{\sqrt{1-1}}{\sqrt{1-1}} = $	d 1 –1	$x(t) = (t+1)(t-3)^3$. For what values of t is the	
58. If $f(x) = \cos(\arcsin x)$, what is the range of f ?a. $t > 3$ onlyb. $0 < t < 3$ onlyd. $t < 1$ or $t > 3$ a. $\{x \mid -1 \le x \le 0\}$ a. $t > 3$ onlyd. $t < 1$ or $t > 3$ a. $t < 3$ onlyd. $t < 1$ or $t > 3$ b. $\{x \mid -1 \le x \le 1\}$ c. $\{x \mid 0 \le x \le \frac{\pi}{2}\}$ 64. * The equations of the tangent line to the curvea. $y = x^3 - 6x^2$ at its point of inflection isa. $y = -12x + 8$ b. $y = -12x + 40$ c. $\{x \mid 0 \le x \le 1\}$ a. $y = -12x - 8$ d. $y = -12x + 12$ c. $y = 12x - 40$ for $x < 1$	u. $\frac{1}{x^2 + 1}$ e. $\frac{1}{x^2 + 1}$		
a. $\{x \mid -1 \le x \le 0\}$ b. $\{x \mid -1 \le x \le 1\}$ b. $\{x \mid -1 \le x \le 1\}$ c. $\{x \mid 0 \le x \le \frac{\pi}{2}\}$ e. $\{x \mid 0 \le x \le 1\}$ e. $0 < t < 3 \text{ or } t > 3$ d. $1 < t < 1 \text{ or } t > 5$ d. $1 < t < 0 \text{ or } t > 5$ c. $\{x \mid 0 \le x \le \frac{\pi}{2}\}$ e. $\{x \mid 0 \le x \le 1\}$ 64. * The equations of the tangent line to the curve $y = x^3 - 6x^2$ at its point of inflection is a. $y = -12x + 8$ b. $y = -12x + 40$ c. $y = 12x - 8$ e. $y = 12x - 40$ 70. *The equation of the line tangent to the curve $y = \frac{kx + 8}{k + x}$ at $x = -2$ is $y = x + 4$. What is the value of k ? a. -3		a. $t > 3$ only b. $0 < t < 3$ only	• • •
b. $\{x \mid -1 \le x \le 1\}$ c. $\{x \mid 0 \le x \le \frac{\pi}{2}\}$ d. $\{x \mid -\frac{\pi}{2} \le x \le \frac{\pi}{2}\}$ e. $\{x \mid 0 \le x \le 1\}$ 64. * The equations of the tangent line to the curve $y = x^3 - 6x^2$ at its point of inflection is a. $y = -12x + 8$ b. $y = -12x + 40$ c. $y = 12x - 8$ e. $y = 12x - 40$ 64. * The equations of the tangent line to the curve $y = \frac{kx + 8}{k + x}$ at $x = -2$ is $y = x + 4$. What is the value of k ? a. -3 b. -1 c. 1			a. None b. Three c. Six
c. $\{x \mid 0 \le x \le \frac{\pi}{2}\}$ 64. * The equations of the tangent line to the curve70. *The equation of the line tangent to the curved. $\{x \mid -\frac{\pi}{2} \le x \le \frac{\pi}{2}\}$ $y = x^3 - 6x^2$ at its point of inflection is $y = x^3 - 6x^2$ at its point of inflection ise. $\{x \mid 0 \le x \le 1\}$ $x = -12x + 8$ $y = -12x + 40$ $y = \frac{kx + 8}{k + x}$ at $x = -2$ is $y = x + 4$. What is thevalue of k? $x = -3$ $y = 12x - 40$ $x = -3$	· ·	e. 0 < <i>t</i> < 3 or <i>t</i> > 3	d. Seven e. Ten
d. $\{x \mid -\frac{\pi}{2} \le x \le \frac{\pi}{2}\}$ e. $\{x \mid 0 \le x \le 1\}$ $y = x^3 - 6x^2 \text{ at its point of inflection is}$ a. $y = -12x + 8$ b. $y = -12x + 40$ c. $y = 12x - 8$ e. $y = 12x - 40$ b. $y = -12x + 12$ a. -3 b. -1 c. 1	-	64. * The equations of the tangent line to the surve	
e. $\{x \mid 0 \le x \le 1\}$ e. $\{x \mid 0 \le x \le 1\}$ b. $y = -12x + 8$ c. $y = 12x - 8$ e. $y = 12x - 40$ b. $y = -12x + 40$ d. $y = -12x + 12$ e. $y = \frac{12x + 4}{k + x}$ value of k? a. -3 b. -1 c. 1	· _		
c. $y = 12x - 8$ d. $y = -12x + 12$ value of k?e. $y = 12x - 40$ a. -3 b. -1 c. 1			$y = \frac{x + y}{k + y}$ at $x = -2$ is $y = x + 4$. What is the
e. $y = 12x - 40$ a. -3 b. -1 c. 1			
			d. 3 e. 4

71. *How many zeros does the function y = sin(lnx) have for $0 < x \le 1$? a. One b. Two c. Three d. Four e. More than four 72. *For all x > 0, if $f(\ln x) = x^2$, then $f(x) = x^2$ a. $\sqrt{e^x}$ с. е^{√х} b. 2ln*x* d. $\sqrt{\ln x}$ e. e^{2x} 73. What is the domain of the function $f(x) = \sqrt{\frac{x+2}{x-1}}$? b. {*x*: *x* ≤ −2} a. { $x: x \neq 1$ } c. { $x: x \le -2 \text{ or } x > 1$ } d. {*x*: *x* > 1} e. { $x: -2 \le x < 1$ } 74. The position of a particle on the x – axis at time t, t > 0, is lnt. The average velocity of the particle for $1 \le t \le e$ is b. $\frac{1}{e} - 1$ c. $\frac{1}{e-1}$ a. 1 $e_e - 1$ d. e 75. If $f(n+1) = \frac{2f(n)+1}{2}$ and f(1) = 2, then f(37) = c. 20 a. 18 b. 19 d. 21 e. 22 76. If $f(x) = \frac{x+1}{x}$, $x \neq 0$, and f(g(x)) = x, then g(x)= a. x(x-1) b. 1-x c. $\frac{x^2}{x+1}$ d. $\frac{1}{x-1}$ e. x(x+1)

77. The slope of the line normal to the graph of $y = \ln \frac{2}{x}$ at x = 2 is a. 2 b. –1 c. –2 d. −½ e. undefined 78. The minimum value of $f(x) = e^x - 2x$ is b. $e^2 - 4$ c. $\sqrt{e} - 1$ a. In2 d. 2(1 – ln2) e. 2 79. If f(x) = 3 + |x - 2|, then f'(2) is a. 3 b. 1 c. –1 d. 2 e. nonexistent 80. The volume of an expanding sphere is increasing at a rate of 12 cubic feet per second. When the volume of the sphere is 36π cubic feet, how fast, in square feet per second, is the surface area increasing? d. $\frac{8\pi}{2}$ e. 10 a. 8 b. 6 c. 8π 81. If $y = 5^{(x^3-2)}$, then $\frac{dy}{dy} =$ a. (x³-2)5^(x³-2) b. $3x^{2}(\ln 5)5^{(x^{3}-2)}$ c. $(3x^{2})5^{(x^{3}-2)}$ d. (In5)5^(x³-2) e. x³(ln5)5^(x³-2) 82. If $y = \frac{1-x}{x-1}$, then $\frac{dy}{dx} =$ a. –1 b. 0 c. $\frac{-1}{x-1}$ d. $\frac{-2}{x-1}$ e. $\frac{-2x}{(x-1)^2}$ 83. The fundamental period for the graph of $y = 1 - 2\sin^2(2x)$ is a. 4 b. $\frac{\pi}{4}$ c. $\frac{\pi}{2}$ d. *π* e. 2π

84. $\frac{d}{dx}\left(\frac{\sin x}{1+\cos x}\right) =$ a. 1 b. $\frac{1}{1+\cos x}$ c. $\frac{-1}{1+\cos x}$ d. -cotx e. $\frac{2\cos^2 x}{(1 + \cos x)^2}$ 85. The $\lim_{x\to 0} \frac{\cos(\frac{\pi}{2} + x) - \cos(\frac{\pi}{2} - x)}{x}$ is a. 1 b. -2 c. -1 d. 0 e. 2 86. If $y = \arcsin\left(\frac{3x}{4}\right)$, then $\frac{dy}{dy} =$ a. $\frac{-3}{\sqrt{16-9x^2}}$ b. $\frac{12}{16+9x^2}$ c. $\frac{4}{\sqrt{16-9x^2}}$ d. $\frac{12}{\sqrt{16-9x^2}}$ e. $\frac{3}{\sqrt{16-9x^2}}$ 87. If the graph of a function f is symmetric about the y-axis, and contains the point (-2,1), which point is also on f? a. (–2 ,–1) b. (1,-2) c. (0,0) d. (1,2) e. (2,1) 88. *If $e^{xy} = 2$, then at the point (1,ln2), $\frac{dy}{dy} =$ a. –In2 b. 2ln2 c. ln2 d. –2e e. –4ln2 89. *At the point of intersection of $f(x) = \cos x$ and $q(x) = 1 - x^2$, the tangent lines are a. the same line b. parallel lines c. perpendicular lines d. intersecting but not perpendicular lines e. none of the above

90. *The $\lim_{h \to 0} \frac{\tan 2(x+h) - \tan(2x)}{h}$ is a. 0 b. 2cot(2x) c. sec²(2x) d. 2sec²(2x) e. nonexistent

91. *A particle moves along the *x*-axis so that its position at any time t > 0 is given by $x(t) = t^4 - 10t^3 + 29t^2 - 36t + 2$. For which value of *t* is the <u>speed</u> the greatest? a. t = 1 b. t = 2 c. t = 3d. t = 4 e. t = 5

- 92. *A particle moves along the *x*-axis so that at any time *t* its position is given by $x(t) = \frac{1}{2} \sin t + \cos(2t)$. What is the acceleration of the particle at $t = \frac{\pi}{2}$? a. 0 b. $\frac{1}{2}$ c. $\frac{3}{2}$ d. $\frac{5}{2}$ e. $\frac{7}{2}$
- 93. *The <u>derivative</u> of a function if given by f'(x) = (sin x)(cos²(3x)). Which of the following is true about the function f(x) for -π≤x≤π ?
 a. f(x) is an odd function
 b. f(x) is increasing for all values in the interval
 c. f(x) has exactly one relative minimum in the interval
 d. f(x) has no points of inflection in the interval
 e. f(-π) is the absolute minimum value
 94. *How many points of inflection does the

function
$$f(x) = \left(\frac{\pi}{3}\right)^{x^{-3}}$$
 have?
a. None b. One c. Two
d. Three e. Infinitely many

95. *The function $y = x^4 + bx^2 + 8x + 1$ has a horizontal tangent and a point of inflection for the same value of x. What must be the value of b? a. –1 b. 4 c. 1 d. 6 e. –6 96. If $y = (2x^2 + 1)^4$, then $\frac{dy}{dx} =$ b. $4(2x^2+1)^3$ a. 16x³ c. $4x(2x^2+1)^3$ d. $16(2x^2+1)^3$ e. $16x(2x^2+1)^3$ 97. If the graph of a function f has a horizontal tangent at the point (1,2), what is the equation of the normal line at this point? a. y = 2 b. y = 1c. y = -1d. *x* = 1 e. *x* = 0 98. If $f(x) = x^3 - x + 3$ and if c is the only real number such that f(c) = 0, then c is between a. –2 and –1 b. -1 and 0 c. 0 and 1 d. 1 and 2 e. 2 and 3 99. The graph of $y = 2x^3 + 24x - 18$ is a. Increasing for all x b. Decreasing for all x c. Only decreasing for all x such that |x| > 2d. Only increasing for all x such that |x| < 2e. Only decreasing for all x such that |x| < -2100. For how many real numbers x does $e^x = \ln |x|$? a. 0 b. 1 c. 2 d. 3 e. Infinitely many 101. If $f(x) = x\sqrt[3]{x}$, then $f'(x) = x\sqrt[3]{x}$ a. $4x^{3}$ b. $\frac{3}{7}x^{\frac{7}{3}}$ c. $\frac{4}{3}x^{\frac{1}{3}}$ d. $\frac{1}{3}x^{\frac{1}{3}}$ e. $\frac{1}{3}x^{-\frac{2}{3}}$

102.
$$sin(xy) = x^2$$
, then $\frac{dy}{dx} =$
a. $2x sec(xy)$ b. $\frac{sec(xy)}{x^2}$
c. $2x sec(xy) - y$ d. $\frac{2x sec(xy)}{y}$
e. $\frac{2x sec(xy) - y}{x}$
103. How many points of inflection does the

103. How many points of inflection does the graphof $y = 2x^6 + 9x^5 + 10x^4 - x + 2$ have?a. Noneb. Onec. Twod. Threee. Four

104.
$$\lim_{x \to 2} \frac{2^{\frac{x}{2}} - 2}{2^{x} - 4}$$
 is
a. 0 b. $\frac{1}{4}$ c. $\frac{1}{2}$
d. ln2 e. nonexistent

105. The graph of
$$y = \frac{x}{1 - |x|}$$
 has

- a. No horizontal asymptotes and one vertical asymptote
- b. One horizontal asymptote and one vertical asymptote
- c. Two horizontal asymptotes and one vertical asymptote
- d. One horizontal asymptote and two vertical asymptotes
- e. Two horizontal asymptotes and two vertical asymptotes

106. If
$$f(x) = \begin{cases} x^2 + 2, x \le 1 \\ 2x + 1, x > 1 \end{cases}$$
, then $f'(1)$ is
a. $\frac{1}{2}$ b. 1 c. 2
d. 3 e. nonexistent

117. *A particle moves along the *x*-axis so that its 113. *Suppose that f(x) is a twice-differentiable 107. For what value of k will $\frac{8x+k}{x^2}$ have a relative function on the closed interval [*a*,*b*]. If position at any time t > 0 is given by f'(c) = 0 for a < c < b, which of the following $x(t) = t^3 + 22t + 3 - 6\cos(\pi t)$. For what value of minimum at x = 4? statements must be true? t is the velocity negative? a. -32 b. -16 c. 0 d. 16 e. 32 I. f(a) = f(b)a. $t = \frac{1}{2}$ b. *t* = 1 C. $t = \frac{3}{2}$ II. f has a relative extremum at x = c108. If f is a function such that f(0) = 1, f(1) = 2, d. *t* = 2 e. The velocity is never negative III. f has a point of inflection at x = cand $f(n) = \frac{f(n-2)}{f(n-1)}$ for all integers $n \ge 0$, what a. None 118. Which of the following functions is symmetric b. I only with respect to the origin? is the value of f(4)? c. II only a. v = |x|b. ½ a. ½ b. $v = e^x$ d. I and II d. y = sinxc. 1 d. 2 c. $y = x^3 + 1$ e. II and III e. It cannot be determined from the given e. $v = \cos x$ information given. 119. The $\lim_{h \to 0} \frac{(x+h)^3 - x^3}{h}$ at the point x = 2 is 114. * $\frac{d}{dx}\left(x^{\frac{1}{\ln x}}\right) =$ 109. What is the maximum value of the derivative b. 12 c. 8 a. 36 d. 2 e. 0 of $f(x) = 3x^2 - x^3$? a. 0 b. 1 c. Inx d. xlnx e. $x^{\ln x}$ a. 0 b. 1 c. 2 d. 3 e. 4 120. If $f(x) = (x-1)^2 \cos x$, then f'(0) =115. *Let f be a function which is continuous on a. –2 b. –1 d. 1 c. 0 e. 2 [2,10] and whose derivative is given by 110. If $f(x) = x^{-\frac{1}{3}}$, what is the derivative of the $f'(x) = \frac{\cos x}{\ln(x+1)}$. Which of the following is true inverse of f(x)? 121. What is the domain of the function f given by a. $x^{\frac{1}{3}}$ b. $-\frac{1}{2}x^{-\frac{4}{3}}$ c. $\frac{1}{2}x^{-\frac{2}{3}}$ $f(x) = \ln \sqrt{\frac{x+2}{x-4}}$? about f(x) on the interval [2,10]? d. $-3x^{-2}$ e. $-3x^{-4}$ I. f(x) is monotonic a. $\{x: x < -2\}$ b. $\{x: x \neq 4\}$ II. f(x) has a relative minimum c. {*x*: *x* > 4} d. {x: -2 < x < 4} 111. * $\lim_{h \to 0} \frac{2(x+h)^5 - 5(x+h)^3 - 2x^5 + 5x^3}{h}$ is III. f(x) has three points of inflection e. {*x*: *x* < −2 or *x* > 4} a. I only 122. $\lim_{x\to 2} \frac{x-2}{2-x}$ is a. 0 b. $10x^3 - 15x$ b. II only c. III only c. $10x^4 + 15x^2$ d. $10x^4 - 15x^2$ a. –1 b. 0 c. 1 d. II and III only e. $-10x^4 + 15x^2$ d. 2 e. nonexistent e. I. II. and III 112. *What is the 20th derivative of y = sin(2x)? 123. If the line y = 4x + 3 is tangent to the curve 116. *If f is a continuous function on the closed a. $-2^{20} \sin(2x)$ b. $2^{20} \sin(2x)$ $y = x^2 + c$, then c is interval [a,b], which of the following is NOT c. $-2^{19}\cos(2x)$ d. $2^{20} \cos(2x)$ necessarily true? a. 2 b. 4 c. 7 d. 11 e. 15 e. $2^{21}\cos(2x)$ I. f has a minimum on [a,b] 124. If $f(x) = \frac{\sin^2 x}{1 - \cos x}$, then f'(x) =II. *f* has a maximum on [*a*,*b*] III. *f* ′(*c*) = 0 for *a* < *c* < *b* b. sinx a. cosx a. I only d. I and II only d. – cosx c. –sinx b. II only e. I. II. and III e. 2cosx

c. III only

125. The equation of the horizontal asymptote for the graph of $u^{2} - e^{\frac{1}{x}}$ is	130. If $f(x) = e^{2x}$ and $g(x)$ is the inverse function of $f(x)$, then $f(g(\ln 2)) =$	137. *If $f(x) = 2x^3$, then the average rate of change of f on the interval [0,2] is
the graph of $y = \frac{2 - e^{\frac{1}{x}}}{2 + e^{\frac{1}{x}}}$ is	a. ¼ b. ½ ln2 c. ln2	a. 4 b. 8 c. 12 d. 16 e. 24
a. $y = -1$ b. $y = -\frac{1}{2}$ c. $y = \frac{1}{3}$ d. $y = \frac{1}{2}$ e. $y = 1$	d. 2 e. 4 131. What is the area of the largest rectangle with	138. *Which statement is true for the function f (x) = ln(tanx) on the interval $\pi < x < \frac{5\pi}{4}$?
126. Let $f(x) = \begin{cases} \frac{x^2 - 1}{x - 1}, & x \neq 1 \\ 1, & x = 1 \end{cases}$. Which of the following	lower base on the x – axis and upper vertices on the curve $y=12-x^2$? a. 8 b. 12 c. 16 d. 32 e. 48	 a. f (x) is increasing at an increasing rate b. f (x) is increasing at a decreasing rate c. f (x) has an absolute maximum in the open
statements is correct?		interval
a. f (x)is continuous at 1 since f (x) is defined at x = 1.	132. $\lim_{h \to 0} \frac{3^{2+h} - 9}{h}$ is	d. <i>f</i> (<i>x</i>) has a point of inflection in the open interval
b. $f(x)$ is continuous at 1 since $\lim_{x\to 1} f(x)$ exists. c. $f(x)$ is not continuous at 1 since $f(x)$ is not	a. 0 b. 1 c. 9 d. 9ln3 e. 9 <i>e</i> ³	e. <i>f</i> (<i>x</i>) has a point of symmetry in the open interval
defined at $x = 1$. d. $f(x)$ is not continuous at 1 since $\lim_{x\to 1} f(x)$	133. If $y^2 - 2xy = 21$, then $\frac{dy}{dx}$ at (2,-3) is a. $-\frac{6}{5}$ b. $-\frac{3}{5}$ c. $-\frac{2}{5}$ d. $\frac{3}{8}$ e. $\frac{3}{5}$	139. *A company must manufacture x calculators weekly that can be sold for $75-0.01x$ dollars
does not exist. e. <i>f</i> (x) is not continuous at 1 since		each, at a cost of $1850 + 28x - x^2 + 0.001x^3$ dollars for manufacturing x calculators. The
$\lim_{x\to 1} f(x) \neq f(1) .$	134. *The maximum value of $\frac{k - \ln x}{x}$ occurs when x	number of calculators the company should manufacture weekly in order to maximize its weekly profit is
127. The equation of the tangent line to the curve $y = \frac{3x+4}{4x-3}$ at the point (1,7) is	a. k b. $k + 1$ c. e^{k} d. e^{k+1} e. $1 + e^{k}$	a. 611 b. 652 c. 683 d. 749 e. 754
a. $y + 25x = 32$ b. $y - 31x = -24$ c. $y - 7x = 0$ d. $y + 5x = 12$ e. $y - 25x = -18$	135. *How many extrema (maximum and minimum) does the function $f(x) = (x+2)^3(x-5)^2$ have on	140. *A missile rises vertically from a point on the ground 75,000 feet from a radar station. If the
128. If $y = \ln(3x+5)$, then $\frac{d^2y}{dx^2} =$	the interval $-3 \le x \le 6$? a. None b. One c. Two d. Three e. Four	missile is rising at a rate of 16,500 feet per minute at the instant when it is 38,000 feet high, what is the rate of change, in radians per minute, of the missile's angle of elevation from
a. $\frac{3}{3x+5}$ b. $\frac{3}{(3x+5)^2}$ c. $\frac{9}{(3x+5)^2}$ d. $\frac{-9}{(3x+5)^2}$ e. $\frac{-3}{(3x+5)^2}$	136. *The tangent line to the graph of $y = \sin x$ at the point $\left(\frac{2\pi}{3}, \frac{\sqrt{3}}{2}\right)$ crosses the sine graph at the	the radar station at this instant? a. 0.175 b. 0.219 c. 0.227 d. 0.469 e. 0.507
129. The derivative of $e^{(e^x)}$ is	point where <i>x</i> = a0.781 b. 4.712 c. 5.388	
a. e^{x} b. $e^{(e^{x})}$ c. $e^{(e^{x^{2}})}$ d. $e^{(x+e^{x})}$ e. $e^{(xe^{x})}$	d. 5.760 e. 6.283	