Started on	Wednesday, 4 December 2024, 10:49 AM
State	Finished
Completed on	Wednesday, 4 December 2024, 11:29 AM
Time taken	40 mins 1 sec
Marks	15.00/20.00
Grade	**7.50** out of 10.00 (**75**%)

Question **1**

Complete

Mark 1.00 out of 1.00

Let f be the function satisfying $f'(x) = x\sqrt{f(x)}$ for all real numbers x, where $f(3) = 25$. Find $f''(3)$

A. 19/2 B. 9/2 C. 5 D. 53/10

Select one:

- a. D
- b. C
- c. A
- d. B

Question 2

Complete

Mark 1.00 out of 1.00

Find **g if**

g''(x) = 24x - 4

and

g(0) = g'(0) = 7.

Select one:

a. None of the others

b. $g(x) = 4x^3 - 2x^2 + 7x + 7$

c. $g(x) = 4x^3 + 2x^2 + x + 7$

d. $g(x) = 2x^3 - x^2 + 7x + 1$

Question 3

Complete

Mark 1.00 out of 1.00

A ladder 25 ft long rests against a vertical wall. If the bottom of the ladder slides away from the wall at a rate of 5 ft/s, how fast is the top of the ladder sliding down the wall when the bottom of the ladder is 16 ft from the wall?

A. 4/3 ft/s B. 9/4 ft/s C. 4ft/s D. 1 ft/s

Select one:

- a. A
- b. B
- c. C
- d. D

Question **4**

Complete

Mark 1.00 out of 1.00

For $a \neq 0$, find the limit $\lim\limits_{x \to a} \dfrac{x^2 - a^2}{x^4 - a^4}$

A. 0 B. $\dfrac{1}{a^2}$ C. $\dfrac{1}{2a^2}$ D. $\dfrac{1}{6a^2}$

Select one:

- a. B
- b. A
- c. C
- d. D

Question 5

Complete

Mark 0.00 out of 1.00

Suppose g(x) = f(x) + f(-x), where f(x) is a function defined on R. Then:

Select one:

a. g is an even function.

b. if f is odd, then so g is.

c. g is an odd function.

d. None of the others

Question **6**

Complete

Mark 0.00 out of 1.00

What is $\lim_{x\to 0}\frac{e^{2x}-1}{\tan x}$?

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

Select one:

- a. C
- b. B
- c. A
- d. D

Question 7

Complete

Mark 1.00 out of 1.00

If $\lim_{x\to 0}\frac{f(x)}{x^2}=5$. Find the limit (if any) $\lim_{x\to 0}\frac{f(x)}{x}$

A. -5 B. 5 C. 0 D. None of the others

Select one:

a. D

b. C

c. A

d. B

Question 8

Complete

Mark 1.00 out of 1.00

If $f(x)=\frac{4}{x-1}$ and $g(x)=2x$, then the solution set of $f(g(x))=g(f(x))$ is

A. $\left\{\frac{1}{3},2\right\}$ B. $\{3\}$ C. $\left\{\frac{1}{3}\right\}$ D. $\{2\}$

Select one:

- a. D
- b. A
- c. C
- d. B

Question 9

Complete

Mark 0.00 out of 1.00

Let $f(x)=\begin{cases}\dfrac{\sqrt{1+x^2}-1}{x^2} & ,x\neq 0\\ m & ,x=0\end{cases}$. Find the constant m that makes f continuous on R

A. 0 B. 1/2 C. 1/3 D. None of the others

Select one:

- a. D
- b. A
- c. C
- d. B

Question 10

Complete

Mark 1.00 out of 1.00

A particle moves in a straight line and has acceleration given by a(t) = 6t + 4. Its initial velocity is v(0) = -6 cm/s and its initial displacement is s(0) = 9 cm. Find its position function s(t)

A. $s(t) = t^3 + 2t^2 - 6t$

B. $s(t) = t^3 + 2t^2 - 6t + 9$

C. $s(t) = t^3 + 2t^2 + 9$

D. s(t) = $s(t) = t^3 + 2t^2 + 6t + 9$

Select one:

- a. B
- b. C
- c. D
- d. A

Question 11

Complete

Mark 1.00 out of 1.00

Find the most general anti-derivative of the function $f(x) = e^x - \frac{2}{\sqrt{x}}$

A. $F(x) = e^x - 2\sqrt{x} + C$

B. $F(x) = e^x - \frac{2}{x\sqrt{x}} + C$

C. $F(x) = e^x - 4\sqrt{x} + C$

D. $F(x) = e^x - \sqrt{x} + C$

Select one:

- a. A
- b. B
- c. C
- d. D

Question 12

Complete

Mark 1.00 out of 1.00

Let f and g be differentiable functions such that $f(1) = 2$, $f'(1) = 3$, $f'(2) = -4$

$g(1) = 2$, $g'(1) = -3$, $g'(2) = 5$. If $h(x) = f(g(x))$, then $h'(1) =$

A. -9 B. -4 C. 12 D. 15

Select one:

- a. A
- b. D
- c. C
- d. B

Question 13

Complete

Mark 1.00 out of 1.00

Find absolute min value of $f(x)=x^2(1-x)^3$ on $[0;2]$

A. -4 B. 0 C. -3/2 D. -2

Select one:

a. C

b. B

c. A

d. D

Question **14**

Complete

Mark 1.00 out of 1.00

Use Newton's Method with initial approximation $x_1 = 1$ to find x_3, the third approximation to the root of the equation $x^3 + x - 3 = 0$. Which is the result correct to 2 decimal places?

Select one:

- a. 1.23
- b. 1.31
- c. 1.21
- d. 1.25
- e. None of the others

Newton's method for finding the root of a function f(x) = 0.

from x_1, compute x_2,

from x_2 compute x_3,

from x_3 compute x_4,

How to compute? use the formula $x_{n+1} = x_n - f(x_n)/f'(x_n)$

Question 15

Complete

Mark 0.00 out of 1.00

Let f be the function defined by the following:

$$f(x)=\begin{cases}\sin x & ,x<0\\ x^2 & ,0\le x<1\\ 2-x & ,1\le x<2\\ x-3 & ,2\le x\end{cases}$$

For what values of x is f not continuous?

A. 2 only B. 1 only C. 0 and 2 only D. 0,1 and 2

Select one:

- a. A
- b. C
- c. D
- d. B

Question **16**

Complete

Mark 1.00 out of 1.00

Let $f(x)=x\sqrt[3]{(x-2)^2}$. Find all values of c such that $f'(c)=0$

A. 0 B. 1 C. 6/5 D. 2

Select one:

- a. C
- b. A
- c. D
- d. B

Question **17**

Complete

Mark 1.00 out of 1.00

Find the x-coordinate of the points of inflection of the function $y = x^3 - 9x^2 + 17x - 11$.

Select one:

- a. 1 and -1
- b. 0
- c. 3
- d. 1

Question 18

Complete

Mark 1.00 out of 1.00

If $3x^2 + 2xy + y^2 = 2$, then the value of dy / dx at $x = 1$ is

A. -2 B. 2 C. 0 D. Not defined

Select one:

- a. D
- b. B
- c. C
- d. A

Question **19**

Complete

Mark 0.00 out of 1.00

Find an equation of tangent to the curve $y = \dfrac{\sqrt{x}}{x^2+1}$ at $x = 1$

A. $y = -\dfrac{1}{4}x + \dfrac{3}{4}$

B. $y = \dfrac{1}{4}x + \dfrac{1}{4}$

C. $y = x - \dfrac{1}{2}$

D. $y = 4x - \dfrac{7}{2}$

Select one:

- a. A
- b. B
- c. D
- d. C

Question **20**

Complete

Mark 1.00 out of 1.00

A particle moves in the straight line with **position function** $s(t) = t^3 - 3t^2 + 11$, find its **velocity** when $t = 3$.

Select one:

- a. 7
- b. 12
- c. 3
- d. 9