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| Course's Name :Calculus I | Palestine Technical University - Kadoorie | Instructor's Name : |
| Course's Number :15010101 | | Student's Name: |
| Exam's Period : 1 hour | | Student's Number: |
| Questions' Number : 4 | | Section's Number: |
| Total Mark : 60 | | Exam's Date :17 / 4 / 2017 |
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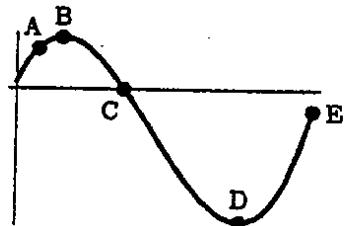
Q1) 20 pts (2 pts each)

Choose the correct answer :

1) If $f(x) = \sqrt{\sin x + 4}$, then $f'(0) =$

- | | |
|------------------|------------------|
| a) $\frac{1}{2}$ | b) $\frac{1}{4}$ |
| c) 0 | d) 2 |

2) The figure below shows the velocity of a moving particle as a function of time . At which of the points is the greatest speed



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|------|------|
| a) B | b) D |
| c) A | d) E |
- 3) The absolute maximum value of $f(x) = 3x^2 - x^3$ is :

- | | |
|------|------|
| a) 0 | b) 2 |
| c) 4 | d) 1 |

4) The slope of the tangent line to the curve of $f(x) = 2 \sec x$ at $x = \frac{\pi}{4}$ is :

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|----------------|-------------------------|
| a) $2\sqrt{2}$ | b) $\frac{2}{\sqrt{2}}$ |
| c) 4 | d) 2 |

- 5) At what value of x does the graph of $f(x)=x^4+x^2$ have a point of inflection
- a) $\frac{1}{6}$ b) 6
 c) 0 d) At no value of x
- 6) If $y=\sqrt{t}$ and $x=t^2+1$, then $\frac{dy}{dx}$ at $t=1$ is :
- a) $\frac{1}{4}$ b) 1
 c) $\frac{1}{2}$ d) 2
- 7) If the position function of a moving particle at time t is $s(t)=t^3-t^2+4t+6$
 Then the acceleration $a(t)$ is :
- a) $3t^2-2t+4$ b) $3t-2$
 c) $6t-2$ d) 6
- 8) If $y=u^2+3$ and $u=2x-1$, then $\frac{dy}{dx}=:$
- a) $12x^3$ b) $24x^5-12x^2$
 c) $24x^3-12x$ d) $6x^2$
- 9) If $y=\tan x-\cot x$, then $\frac{dy}{dx}=$
- a) $\sec^2 x-\csc^2 x$ b) $\sec x-\csc x$
 c) $\sec x+\csc x$ d) $\sec^2 x+\csc^2 x$
- 10) Let f and g be differentiable functions such that $f(1)=4$, $f'(1)=-4$,
 $f'(3)=-5$, $g(1)=3$, $g'(1)=-3$, $g'(3)=2$, then $(f \circ g)'(1)=$
- a) -9 b) -5
 c) 15 d) -12

Q2) 10 pts

- a) If $f(x)=x^3$, find the value of $c \in (-1,2)$ that satisfy the conclusion of the Mean value theorem . (5 pts)

- b) If $x+y=xy$, find $\frac{dy}{dx}$ at the point (2,2) (5pts)

Q3) 10 pts

A ladder (سلم) 10 feet long leans against (يسند على) a vertical wall . The bottom of the ladder moves away from the wall at 2 feet per second . How fast is the top sliding down the wall when it is 6 feet above the ground

Q4) 20 pts

If $f(x) = x^4 + \frac{4}{3}x^3 - 6$ on the interval $[-2,2]$, then find the following :

1) The critical points of f (3 pts)

2) The intervals on which f is increasing and decreasing (4 points)

3) Local and absolute extrema (4 pts)

4) Determine concavity (6 pts)

5) The points of inflection (3 pts)

Good luck