King Fahd University of Petroleum and Minerals
Department of Mathematics & Statistics
Math 101(10 & 16) Class Test III Summer 2017(163)

ID#:_____ NAME:_____

1. If $y = 10^{x^2} + (x^2)^{10}$, then $y'(1) =$

2. Let $f(x) = \dfrac{1}{ax+1}$, where a is a non zero constant. If $f^{(5)}(0) = -(4!)$, then $a^5 =$

3. If c is the number satisfying the conclusion of the Mean Value Theorem for $f(x) = 4 + \sqrt{3x+1}$ on the interval $[1, 5]$, then $c =$

4. Which one of the following statements is **TRUE** about the graph of the function $f(x) = x^2 - 18 \ln x$?

   (a) The graph has no inflection points.

   (b) The graph is concave upward on $(-\infty, -3)$ only.

   (c) The graph is concave downward on $(3, \infty)$ only.

   (d) The graph has two inflection points.

   (e) The graph is concave downward on $(-3, 3)$.

5. The function $f(x) = 3 \sin x - \sin^3 x$, $\frac{\pi}{2} < x < 2\pi$, has

   ..... Critical Points

6. The graph of the function $f(x) = \dfrac{x^2 - 3}{x^3}$ is decreasing on the intervals

7. The asymptotes of the graph of the function $f(x) = \dfrac{x^4 - x^3 - 2x^2}{x^3 + x^2 + x + 1}$ are

8. If $x_1 = 2$ is an approximation to one of the real roots of the equation $x^3 + 2x - 13 = 0$, then the next approximation x_2 given by Newton's Method is

9. If $f'(x) = \left(\sqrt{x} - \dfrac{1}{x}\right)^2$ and $f(4) = \dfrac{1}{4}$, then $f(1) =$

10. If $y = L$ and $y = M$ are the equations of the horizontal asymptotes to the graph of the function $f(x) = \dfrac{\pi}{2} - \cos^{-1}\left(\dfrac{x+1}{\sqrt{4x^2+1}}\right)$, then $L + M =$

11. The equation of the tangent line to the graph of $y = -\pi + 4\tan^{-1}\left(\frac{2}{x}\right)$ at $x = 2$ is

12. The sum of all values of x for which the function $f(x) = \dfrac{e^{3x+1}}{e^{4x} - 13e^{2x} + 36}$ is discontinuous, is

13. If $y = (3x+1)^{3/2}\sqrt{\dfrac{2x+2}{x^2+3}}$, then $y'(1) =$

14. The Linearization $L(x)$ of $f(x) = (5+3x)^{2/3}$ at $a = 1$ is

15. $\left[\cosh\left(\frac{2x}{3}\right)+\sinh\left(\frac{2x}{3}\right)\right]^{3/4}=$

16. $\frac{d}{dx}\left[2x\sinh^{-1}(3x)-\frac{2}{3}\sqrt{1+9x^2}\right]=$

17. $\lim_{x\to 0}\left(e^x+2x\right)^{3/x}=$

18. $\lim_{x\to(1/3)^+}\left[\frac{1}{\ln 3x}-\frac{1}{3x-1}\right]=$

19. The product of two positive real numbers is 4. If the sum of the square of one of the numbers and the square of twice of the other number is minimum, then the sum of the numbers is

20. A particle moves in a straight line and has velocity given by $v(t) = \sinh t$. If the initial displacement is $s(0) = \frac{1}{2}$ then $s(2 \ln 2) =$

21. If $x^2 + y^3 = 10$, then the value of $\dfrac{d^2y}{dx^2}$ at the point $(3, 1)$ is

22. Which one of the following statements is **True** about the function
$f(x) = -3x^4 + 8x^3 - 10$?

(a) f(x) has a local maximum and absolute maximum.

(b) f(x) has a local minimum and absolute minimum.

(c) f(x) has a local maximum and no absolute maximum.

(d) f(x) has a local minimum and no absolute minimum.

(e) f(x) has neither absolute maximum nor absolute minimum.