

King Fahd University of Petroleum and Minerals
Math Dept
Test 2 Math 101-1
Sum 2001

Instructions:

Show all of your work

All questions have equal grades

Question #	1	2	3	4	5	6	7	8	9	10	Total
Grade											

Name: _____ I.D.#: _____ Serial #: _____

1. Find the slope of the tangent to the curve $y = 2x - 1 + \frac{4}{3} \sec^3 \sqrt{x^3 - 1}$, at $x = 1$.

2. Let $s(t) = 2t^3 - 3t^2 - 12t + 10$, $t \in [-3, 3]$, be a position function of a particle moving along a coordinate line. on the interval $[-3, 3]$, describe where the particle moves to the right or left, and sketch a diagram describing the motion.

3. Let $f(x) = x^{\frac{4}{3}} - 4x^{\frac{1}{3}}$, find all the critical numbers. Give the intervals where $f(x)$ is

- Increasing
- Decreasing
- Concave up
- Concave down.

4. Let $f(x) = x^4 - 4x^2$, sketch a complete graph of $f(x)$ showing symmetry, increasing - decreasing, concavity, and relative extrema.

5. Find the points on the parabola $y = 2x^2$, closest to the point $P(1, 0)$.

6. water is running out of an inverted conical tank so that the height of the water is changing at a rate of $2\text{ft}/\text{min}$. At what rate the volume is changing when the height of the water is 6ft . The height of the tank is 10ft and the radius of the tank is 5ft . $V = \frac{1}{3}r^2h$

7. If y is defined implicitly by $x^2y - xy^2 = 2$, then estimate the change in y at the point $P(1,1)$, if x changes from 1 to 0.9.

8. Use Newton's method to approximate where the two graphs $y = x$, and $y = \cos x$ intersect.

9. Find $\frac{d}{dx} f(5\sqrt{x})$ if $\frac{df}{dx} = 2x^2$.

10. Find all the critical numbers of $f(x) = \cos 2x - 2 \cos x$ $x \in [0, 2\pi]$.