Final Exam – Math 101
Section 22

Q1. Let $g\ x \quad x^2 \quad \sqrt{8 \quad x^3}$ .Find $g \quad x$ and $g \quad 1$.

6 *points*

Q2. Determine whether the limit exists or not:

$$\lim_{x\ 2} \frac{x^3 \quad 2^3}{x \quad 2}.$$

5 *points*

Q3. $\dfrac{\cos 2x}{\sqrt{1 \quad \sin 2x}}\ dx$

5 *points*

Q4. A stone is thrown upward ,it takes 8 seconds to reach the surface of the ground again

a. Find the maximum height the stone could attain.

b. What is the speed of the stone 2 seconds after it is thrown?
use g 32 ft

6 *points*

Q5. Find the values of a and b so that the following function is continuous at $x \quad 2$

$$f\,x \quad \left\{ \begin{array}{lll} x^2 \quad ax \quad 2 & \text{if} & x \quad 2 \\ 5 \quad b & if & x \quad 2 \\ bx \quad 4 & if & x \quad 2 \end{array} \right\}$$

6 *points*

Q6. Sketch the function with the following properties:

$f\ x \quad \frac{x^2}{x^2 \quad x \quad 6} \quad \frac{x^2}{x \quad 3 \quad x \quad 2}$,$f\ x \quad 0, \quad if \quad x \quad 0$

$f\ x \quad \frac{x^2 \quad 12x}{x^2 \quad x \quad 6\ ^2}, and \quad f\ x \quad 0, \quad if \quad x \quad 0 \quad or \quad x \quad 12$

$f\ x \quad \frac{2x^3 \quad 36x^2 \quad 72}{x^2 \quad x \quad 6\ ^3}, \quad and \quad f\ x \quad 0, \quad if \quad x \quad 18.11$

$f\ 0 \quad 0, \quad f\ 12 \quad 0.960, \quad f\ 18.11 \quad 0.964$

Show assymtotes and give table of signs of $f\ x \quad \& \quad f\ x$.

6 *points*

Q7. Evaluate the integrals :

5 *points each*

a. $\int_1^2 \left(\frac{1}{x}\right)^2 \frac{1}{x^2}\, dx$

b. $\int_{-3}^{3} 4\sqrt{9 - x^2}$

Q8. .

6 *points*

Q9. Let $f\,x \quad x\sqrt{4 \quad x^2}$. Find the local extrema of $f\,x$ and the intervals where $f\,x$ is increasing or decreasing , and sketch the graph of $f\,x$.

7 *points*

Q10. If $f\,x \quad 2\sin x \quad \cos 2x$, find equations of tangent and normal lines to the graph of $f\,x$ at the point $(\frac{}{4}, \frac{2}{\sqrt{2}}$.

5 *points*

Q11. $\lim_{x \to 0} \frac{3x \quad 1 \quad \cos^2 x}{\sin x}$

6 *points*

Q12. A merchant sells shoes at 100 Riyals per pair if fewer than 10 pairs ordered .If 10 or more pairs are ordered (up to 50) , the price per pair is reduced by one Riyal times the number ordered . What size order will produce the maximum amount of money for the wholesaler ?

6 *points*

Q13.

6 *points*