

MA 241 - Exam 3
(Total = 100 points)
Show all work!!!

July 24, 2003

1. (5 pts.) If $\cos \theta = \frac{2}{5}$ and $0 < \theta < \pi/2$, then $\tan \theta =$ (pick one):
a) $\frac{2}{\sqrt{21}}$ b) $\frac{5}{2}$ c) $\frac{5}{\sqrt{21}}$ d) $\frac{\sqrt{21}}{5}$ e) $\frac{\sqrt{21}}{2}$.
2. (5 pts.) $\sec(\tan^{-1} 2) =$ (pick one):
a) $\frac{1}{2}$ b) $\frac{2}{\sqrt{5}}$ c) $\frac{\sqrt{5}}{2}$ d) $\sqrt{5}$ e) $\frac{1}{\sqrt{5}}$.
3. (15 pts.) A dam has the shape of an inverted isosceles triangle with base 50 feet and height 30 feet. The top of the dam is at the surface of the water. Find the force on the dam exerted by the water. Express your answer in terms of δ , the weight density of water.
4. (15 pts.) Using Euler's method, approximate $y(.1)$ and $y(.2)$, where $y(x)$ is the solution to $y' = -\frac{x}{y}$ with initial condition $y(0) = 2$, using $h = .1$.
5. Use separation of variables to find the general solution to each of the following differential equations (15 pts. each):

a) $y' = y^2(1 + x)$ b) $y' = e^{x+y}$.

5. Find the general solution to each of the following problems (15 pts. each):

a) $y'' + 4y' + 4y = 0$ b) $y'' - 4y' + 13y = 0$.