

Answers to Exam 3

1. (a) .0.393469
(b) 0.606531
2. $y(1) = 4.3176$
3. (a) $\frac{dy}{dt} = ky \left(1 - \frac{y}{6000}\right)$, $y(0) = 100$
(b) $y = \frac{6000}{1 + 59 \left(\frac{729}{15989}\right)^{t/2}}$
(c) 5992.84
4. (a) $\frac{dy}{dt} = .5 - \frac{y}{10}$
(b) $y(t) = 5 - 5e^{-t/10}$
(c) 4.75 kg
(d) 5 kg
5. (a)
(b) area = $2xdy$, depth = y , density = $1000 \cdot 9.8$ so force on a slice is $2(2 - y)y \cdot 9800dy$
(c) 13066.67 N
6. $y = 5e^{x-x^2}$
7. (a) Yes, $P(x) = -1/x^2$ $Q(x) = 2xe^{-1/x}$
(b) $I(x) = e^{1/x}$
(c) $\int I(x)Q(x) dx = x^2 + C$
(d) $y = e^{-1/x}(x^2 + C)$
8. $\ln(\sqrt{2} + 1)$