Schwenker Assignment 13

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$$\int x4e^{-7x}dx$$

u = -7x du/dx = d/dx(-7x) = -7 du = -7dx =

$$\int 4e^{-7x}dx = \int -1/7(-7)4e^{-7x}dx$$

=

$$-1/7\int x4e^{-7x}(-7dx) = \int -1/7(-7)4e^{u}du$$

$$-4/7\int e^{u}du = -(4/7)e^{u} + c$$

replace u with -7x -(4/7)e^{-7x} + c

Biologists are treating a pond contaminated with bacteria. The level of contamination is changing at a rate of dN/dt = 3150/t^4 -220 bacteria per cubic centimeter per day, where t is the number of days since treatment began. Find a function N(t) to estimate the level of contamination if the level after 1 day was 6530 bacteria per cubic centimeter.

$$N(t) = dn/dt = \int (3150t4220)dt$$

$$N(t) = 1050/t^3 - 220t + c$$

$$N(t) = 1050/t^3220t + C$$

$$N(1) = 1050220 + C = 6530$$

C = 5700

$$N(t) = 1050/t^3220t + 5700$$

3. Find the total area of the red rectangles in the figure below, where the equation of the line is f (x) = 2x 9.

$$Area = \int 8.54.5(2x9)dx$$

Area=(8.52−9(8.5)+C)−(4.52−9(4.5)+C)=16

4. Find the area of the region bounded by the graphs of the given equations. y=x2−2x−2,y=x+2

x+2=x2−2x−20=x2−3x−40=(x−4)(x+1)

$$\int_1^4 (x + 2)(x22x2)dx$$

$$\int_{-1}^4 (x2 + 3x + 4)dx$$

$−x^{3/3+3x}2/2+4x|4−1 $(-4^{3/3+3(4)}2/2+4(4))−(− −1^{3/3+3(-1)}2/2+4(−1))=20.83333

5. A beauty supply store expects to sell 110 flat irons during the next year. It costs $3.75 to store one flat iron for one year. There is a fixed cost of $8.25 for each order. Find the lot size and the number of orders per year that will minimize inventory costs. Without knowing the sales rate, 1 order will always be the lowest cost. If it were know who long it takes to sell a flat iron once it comes in, then daily storage rates could be calculated

```
OrderYCostAll=vector()
Orders = vector()
for (i in 1:110){
  x=i
YCostStorage = 3.75*(x*(110/x))
YOrderCost = 8.25*(x)
OrderYCost = YCostStorage+YOrderCost
Orders = c(OrderYCostAll,x)
OrderYCostAll=c(OrderYCostAll,OrderYCost)}

print(paste("number of orders",1,"costs ",min(OrderYCostAll)))
```

```
## [1] "number of orders 1 costs  420.75"
```

$$\int ln(9x) * (x^6)dx$$

u=9x , du/dx = 1/x

$$dv/dx = x^6, v = \int x^6 dx = 1/7x^7$$

$$\int u\frac{dv}{dx}dx = uv - \int v\frac{du}{dv}dx$$

$$\int ln(9x)x^6 dx = \frac{1}{7}x^6 dx$$

$$\frac{7}{49}x^7 ln(9x) - \frac{1}{49}x^7 + c$$

$$\frac{1}{49}(7ln(9x) - 1) + c$$

Determine whether f(x) is a probability density function on the interval

$$[1, e^6] If not, determine the value of the definite integral.$$

$$f(x) = \frac{1}{6}$$

$$\int_{e^6} 1\frac{1}{6x}dx = \frac{1}{6}ln(x)|e^6 1$$

$$\frac{1}{6}ln(e^6) - \frac{1}{6}ln(1) = 1$$