WMATH1010 Problem Set 3

Ben Crause || Aayush Bajaj

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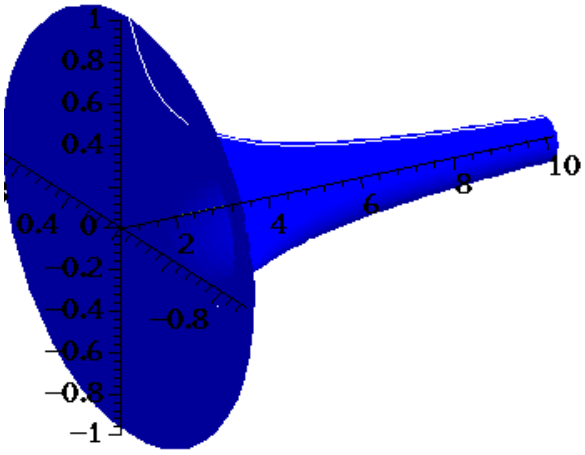
Question 1

$$2\ln(x+2)+\frac{3}{2}\ln(x^2+6x+13)+\frac{1}{2}\arctan(\frac{x}{2}+\frac{3}{2})+C$$

Question 2

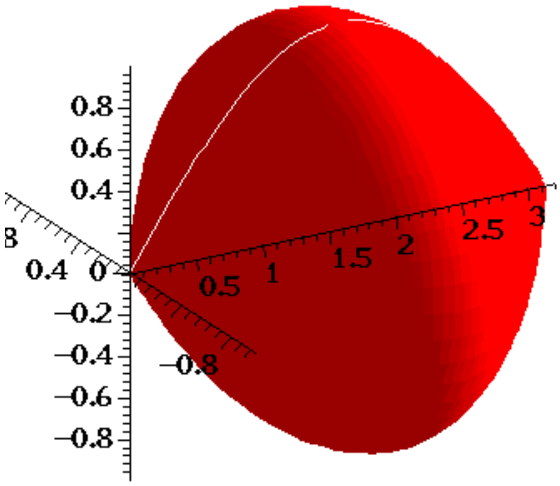
a)

$$V=\frac{9\pi}{10}u^3$$



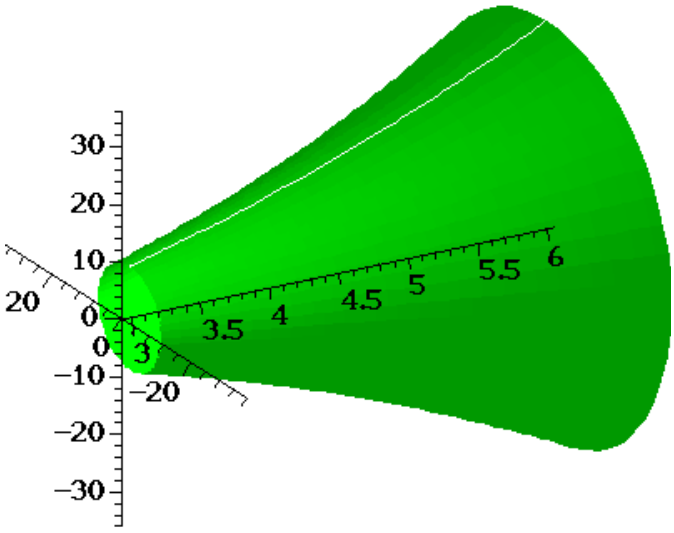
b)

$$V = \frac{\pi^2}{2} u^3$$



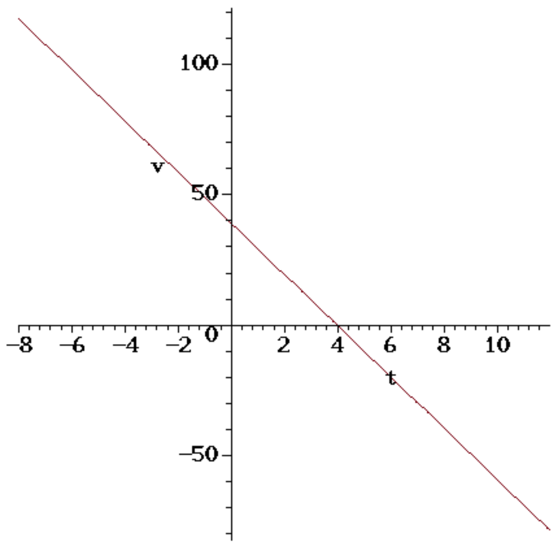
c)

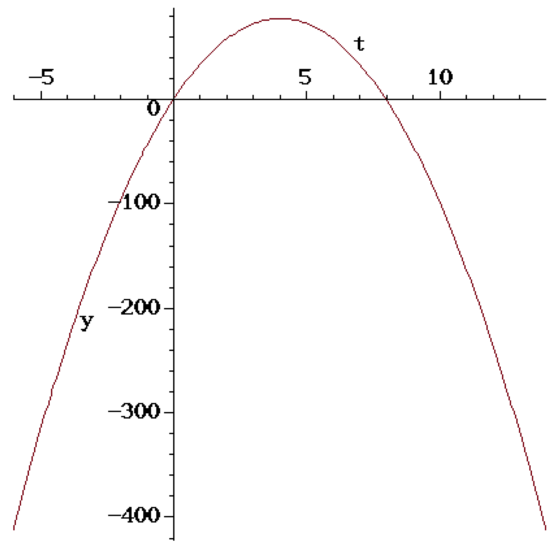
$$V = \frac{7533\pi}{5} u^3$$



Question 3

$$
\begin{aligned}
y_{\text{max}} &= 77.60m \\
t_{\text{total}} &= 7.96s \\
v &= 39 - 9.8t \\
y &= 39t - 4.9t^2
\end{aligned}
$$





Question 4

A Bernoulli differential equation is of the form:

$$
y' + p(x)y = q(x)y^n
$$

Hence:

$$
\begin{aligned}
p(x) &= x^5 \\
q(x) &= x^{12} \\
n &= 0
\end{aligned}
$$