Dawson College: Calculus II: 201-NYB-05-C1: Winter 2008

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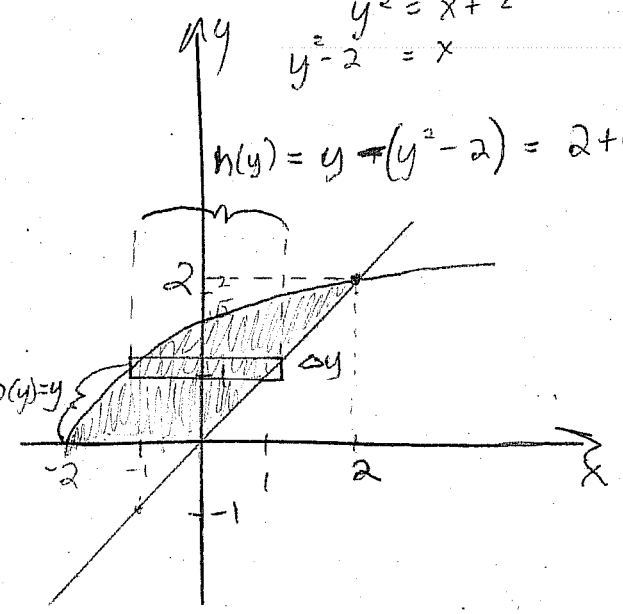
Quiz 8

This quiz is graded out of 10 marks. No books, graphing calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 2. §7.3#20 *(10 marks)*
Set up and evaluate the integral that gives the volume of the solid generated by revolving the plane region about the x-axis. The plane region is defined by $y=\sqrt{x+2}, y=x, y=0$.

$y=\sqrt{x+2}$
$y^2=x+2$
$y^2-2=x$



$h(y)=y-(y^2-2)=2+y-y^2$

Intersection at
$x=\sqrt{x+2}$
$x^2=x+2$
$0=x^2-x-2$
$0=(x-2)(x+1)$
$\therefore$ int at $x=2, x=-1$

$\Delta V=2\pi p(y)h(y)\Delta y$
$=2\pi y(2+y-y^2)\Delta y$
$=2\pi(2y+y^2-y^3)\Delta y$

$$V=\int_0^2 2\pi(2y+y^2-y^3)\,dy$$
$$=2\pi\left[y^2+\frac{y^3}{3}-\frac{y^4}{4}\right]_0^2$$
$$=2\pi\left[2^2+\frac{(2)^3}{3}-\frac{(2)^4}{4}\right]$$
$$=2\pi\left[4+\frac{8}{3}-4\right]$$
$$=\frac{16\pi}{3}$$