IB$_2$ **Test 3** Friday 24 Jan 2025

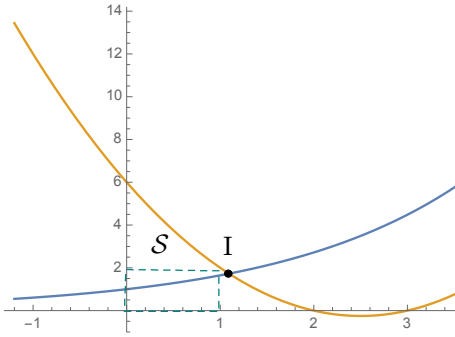
Subject : *Antiderivatives & Integrals* Name:

Tot: /24 _____

Problem 1 (IB Paper 2 question) [8 marks]

The picture show the graph of the functions

$f(x)=e^{\frac{x}{2}}$ and $g(x)=x^2-5x+6$



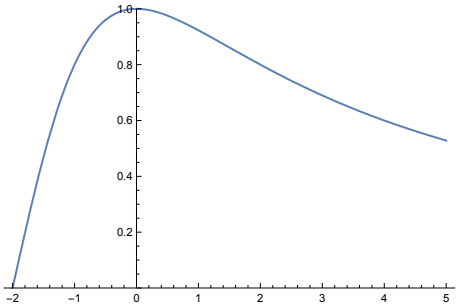
The intercept I is at $x=1.0937$

i) Find the *area* of the surface $\mathcal{S}$ between the two curves and the $x-$axis.

ii) Compare this result with the area of the rectangle (size $x=1$ & $y=2$)

Problem 2 (IB Paper 2 question) [10 marks]

The picture on the left shows the a part of the curve of the function $y=\frac{4x+8}{x^2+4x+8}$, for $1\leqslant x\leqslant 5$



(a) Find x et y intercepts of the curve

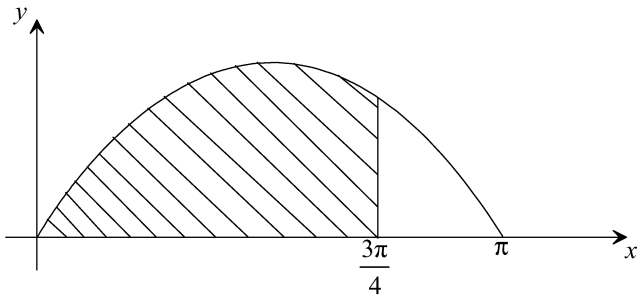
(b) Show the region $\mathcal{R}$ that correspond to

$$\int_0^4 \frac{4x+8}{x^2+4x+8}\,dx$$

(c) Find the area of $\mathcal{R}$

Problem 3 (IB Paper 1 question) [6 marks]

The diagram shows part of the curve $y=\sin x$. The shaded region is bounded by the curve and the lines $y=0$ and $x=\frac{3\pi}{4}$.



Given that $\sin\frac{3\pi}{4}=\frac{\sqrt{2}}{2}$ and $\cos\frac{3\pi}{4}=-\frac{\sqrt{2}}{2}$, calculate the **exact** area of the shaded region.