Question 1:

(a)[6 points] Water pours into a tank at a rate of $r(t) = 4 + t^2$ L/min where $t \geq 0$. How much water enters the tank during the first two minutes? State units with your answer.

(b)[7 points] Determine the average value of $f(x) = e^{\sin(x)} \cos(x)$ over the interval $[0, \pi/2]$.

Question 2 [10 points]: Evaluate $\int \arccos(x)\, dx$

Question 3 [10 points]: Evaluate $\int \frac{x^3}{\sqrt{x^2+4}}\,dx$

Question 4 [10 points]: Evaluate $\displaystyle\int \frac{3x-5}{x^2+5x-14}\,dx$

Question 5 [7 points]: Find a function f and the value of the constant a such that

$$2\int_a^x f(t)\,dt = 2\sin(x) - 1$$