1. Find the following. Simplify your answers.

[3] (a)
$$\int (t^2 - 4t + 5) dt$$

[2] (b)
$$\int x (x^2 - 3) dx$$

[2] (c) $\int_{0}^{\pi} (4-x) dx$ (Hint: use the area formula for the area of a geometric shape.)

[2] (d)
$$\int_{0}^{3} (3-x) dx$$
 (Hint: use the area formula for the area of a geometric shape.)

[3] (e)
$$\int_{0}^{1} 2(t^{1/2} - t) dt$$

[3] (f)
$$\int_{1}^{4} (5y\sqrt{y} + 3\sqrt{y}) dy$$

- [7] 2. Farmer Bob is fencing in a rectangular field adjacent to a river. Farmer Bob wants to have a 700 m² field. Putting in fencing along the river costs \$5 per meter, and the fencing away from the river costs \$2 per meter. What are the dimensions of the field that minimize Farmer Bob's costs? (You must include a labelled sketch and a justification for full marks.)
- [7] 3. Farmer Bob is fencing in a rectangular field adjacent to a river. Farmer Bob wants to have a 1,500 m² field. Putting in fencing along the river costs \$7 per meter, and the fencing away from the river costs \$3 per meter. What are the dimensions of the field that minimize Farmer Bob's costs? (You must include a labelled sketch and a justification for full marks.)