Practice on Integration by Parts

Evaluate each of the following integrals.

1) $\displaystyle\int x\sin(2x)\,dx$

2) $\displaystyle\int_0^1 \arctan(x)\,dx$

3) $\displaystyle\int \cos^2(3x)\,dx$

4) $\displaystyle\int \sin(\ln(x))\,dx$

5) $\displaystyle\int x^9\cos(x^5)\,dx$ (First make a substitution).