Math 11B Discussion Section

Evaluate each of the following integrals.

(1) $\int 4x\cos(2-3x)\,dx$

(2) $\int_0^{\pi} t^2\cos(4t)\,dt$

(3) Let $u^{(0)} = 4y^3 - 9y^2 + 7y + 3$ and $v^{(5)} = e^{-y}$, where $u^{(n)}$ means the n-th derivative of u (e.g. $\frac{d^2}{dy^2}u(y) = u^{(2)}(y)$). Complete the following table.

i	Sign	Derivatives $u^{(i)}$	Integrals v^{5-i}
0	+	$u^{(0)} = 4y^3 - 9y^2 + 7y + 3$	$v^{(5)} = e^{-y}$
1	-	$u^{(1)}$	$v^{(4)}$
2	+	$u^{(2)}$	$v^{(3)}$
3	-	$u^{(3)}$	$v^{(2)}$
4	+	$u^{(4)}$	$v^{(1)}$
5	-	$u^{(5)}$	$v^{(0)}$

Using this table, compute $\int(4y^3 - 9y^2 + 7y + 3)e^{-y}\,dy$.

Evaluate each of the following integrals.

(4) $\int \frac{4}{x^2+5x-14}\,dx$

(5) $\int \frac{8}{3z^3+7z^2+4z}\,dz$

Determine whether the following integrals converge or diverge. Evaluate any convergent integrals.

(6) $\int_0^{\infty}(1+2x)e^{-x}\,dx$

(7) $\int_{-\infty}^{0}(1+2x)e^{-x}\,dx$

(8) $\int_1^4 \frac{1}{x^2+x-6}\,dx$