## WORKSHEET V: TAKING COEFFICIENTS IN GENERATING FUNCTIONS

## FEBRUARY 23, 2006

Use the formulas from the handout entitled "WORKSHEET IV: examples of generating functions" and the techniques we learned in class to find the coefficients in the following generating functions.
(1) coefficient of $q^{7}$ in $2 q^{2} /(1-q)^{5}$
(2) coefficient of $q^{8}$ in $\left(1+q+2 q^{2}\right) /(1-q)^{2}$
(3) coefficient of $q^{7}$ in $1 /(1+2 q)^{3}$
(4) coefficient of $q^{4}$ in $(1+q) /\left(1-q-q^{2}\right)$
(5) coefficient of $q^{7}$ in $\left(1-q^{7}\right)\left(1-q^{3}\right) /(1-q)^{2}$
(6) coefficient of $q^{10}$ in $1 /\left(1-q-q^{2}\right)$
(7) coefficient of $q^{6}$ in $1 /\left((1-2 q)\left(1-q^{3}\right)\right)$
(8) coefficient of $q^{3}$ in $(1+5 q)(1+q)^{3}$
(9) coefficient of $q^{7}$ in $(1+5 q)(1+q)^{3}$
(10) coefficient of $q^{6}$ in $\left(q+q^{2}\right) /(1-q)^{3}$
(11) coefficient of $q^{12}$ in $\left(1-q^{4}\right) /(1-q)^{3}$

