

#### 4-1 Recurrence examples

Give asymptotic upper and lower bounds for  $T(n)$  in each of the following recurrences. Assume that  $T(n)$  is constant for  $n \leq 2$ . Make your bounds as tight as possible, and justify your answers.

a.  $T(n) = 2T(n/2) + n^3.$

b.  $T(n) = T(9n/10) + n.$

c.  $T(n) = 16T(n/4) + n^2.$

d.  $T(n) = 7T(n/3) + n^2.$

e.  $T(n) = 7T(n/2) + n^2.$

f.  $T(n) = 2T(n/4) + \sqrt{n}.$

g.  $T(n) = T(n-1) + n.$

h.  $T(n) = T(\sqrt{n}) + 1.$