Exercise 3.2-1:

$\because \forall n_1 < n_2, f(n_1) < f(n_2), g(n_1) < g(n_2)$

$\therefore \forall n_1 < n_2, f(n_1) + g(n_1) < f(n_2) + g(n_2)$

$\because \forall n_1 < n_2, g(n_1) < g(n_2)$

$\therefore f(g(n_1)) < f(g(n_2))$

$\therefore \forall n_1 < n_2, f(g(n_1)) < f(g(n_2))$

$\therefore f(n) + g(n)\ and\ f(g(n))\ are\ monotonically\ increasing.$

$If\ f(n)\ and\ g(n)\ are\ both\ non-negative.$

$\therefore f(n_1) < f(n_2), g(n_1) < g(n_2)$

$\therefore f(n_1)g(n_1) < f(n_2)g(n_2)$

$\therefore f(n)g(n)\ is\ monotonically\ increasing.$