6-5)

$m = 1700$ kg    $v_i = 20$ m/s    $v_f = 0$ (car stops)
$a_{MAX} = -5a_g = -50$ m/s$^2$

Use NII in the horizontal direction.  The only force is the spring force:

$F_{SPRING} = ma$
$-kx = ma$
$-kx_f = ma_{MAX}$
$x_f = -[m/k]a_{MAX}$

WE Theorem:

$W_N = 0$   F is perpendicular to the path.
$W_g$ = conservative
$W_{SP}$ = conservative

$W_{NC} = ½ mv_f^2 – ½ mv_f^2 + gmy_f – gmy_f + ½ kx_f^2 – ½ kx_i^2$

$0 = - ½ mv_f^2 + ½ kx_f^2$

$^1/_2kx_f^2 = {}^1/_2mv_i^2$

Let's combine these results:

$^1/_2k[m/k]^2a_{MAX}^2 = {}^1/_2mv_i^2$
$[m/k]a_{MAX}^2 = v_i^2$

a)

$k = ma_{MAX}^2/v_i^2 = 1700*(-50)^2/20^2 =$ 10,625 N/m

b)

$x_f = -[m/k]a_{MAX} = -(1700/10,625](-50) =$ 8m

c)

The car will bounce back into traffic.