Sol^n to Chapter 4

4.1 $q_\pi(11, \text{down}) = -1$

$q_\pi(7, \text{down}) = -1 + V(11) = -1 - 14 = -15$

$V(11)$ calculated by code.

0	-14	-20	-22
-14	-18	-20	-20
-20	-20	-18	-14
-22	-20	-14	0

V map

4.2.1 If dynamics of 13 unchanged

$V_\pi(15) = -1 + 0.25[-20 - 22 - 14 + V_\pi(15)]$

Solving $V_\pi(15) = -20$

For dynamic changed for 4.2 By running code we find that.
$V_\pi(15)$ is still -20
Also for rest states graph stays same.

4.3

eq 4.3 $V_\pi(s) = E_\pi[R_{t+1} + \gamma V_\pi(S_{t+1}) \mid S_t = s]$

Analogus $q_\pi(s,a) = E[R_{t+1} + \gamma \sum_{s',a'} q_\pi(s', a') \mid S_t = s, A_t = a]$

eq 4.4 $V_\pi(s) = \sum_a \pi(a|s) \sum_{s',r} p(s', r|s, a)[r + \gamma V_\pi(s')]$

$q_\pi(s,a) = \sum_{s',r} p(s', r|s, a)\left[r + \gamma \sum_{a'} \pi(a'|s') q_\pi(s', a')\right]$

eq 4.5 $V_{k+1}(s) = \sum_a \pi(a|s) \sum_{s',r} p(s', r|s, a)[r + \gamma V_k(s')]$

Q q_π ?