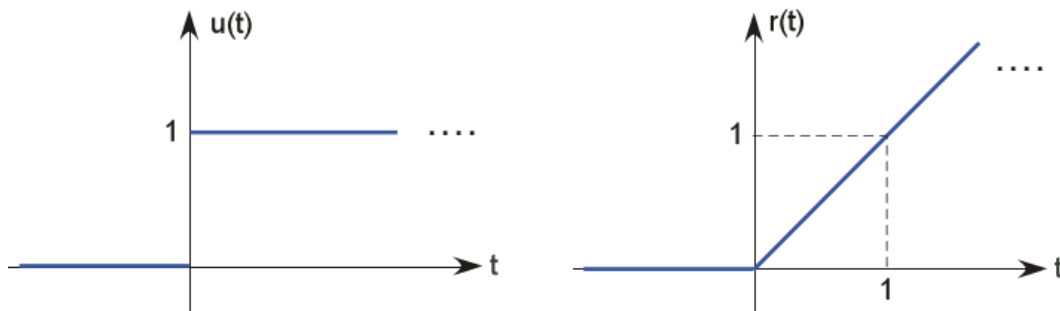# Feedback — Superposition Exercises

You submitted this homework on **Wed 3 Apr 2013 2:04 PM CDT -0500**. You got a score of **0.00** out of **4.00**. You can attempt again, if you'd like.

What follows are a set of ungraded exercises to test your ability to construct complicated signals by the superposition of weighted and delayed unit-step $u(t)$ and ramp $r(t)$ signals.

The key to "seeing" the superposition is to scan the signal from left to right and focus on the times when amplitude changes occur (must be a step equal to the size of the discontinuity there) and when slope changes occur (must be a ramp there having a gain equal to the slope change).

Question 1

Express the depicted signal as a superposition of unit-step $u(t)$ and ramp $r(t)$ signals.
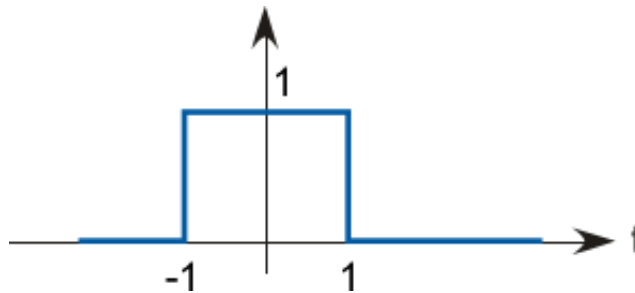
Your Answer	Score	Explanation
● $u(t-1) - 2u(t-1)$		

○ $u(t + 1) - 2u(t - 1)$
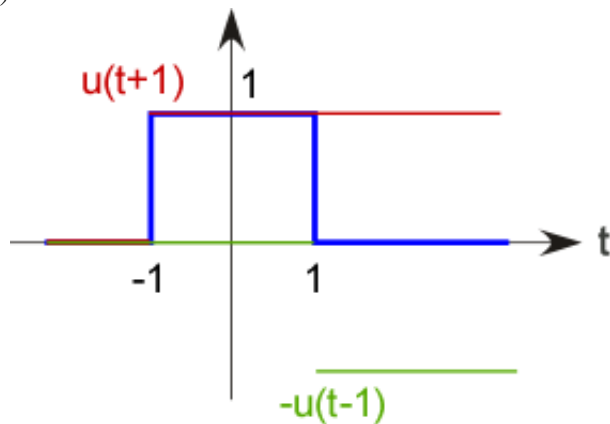
○ $u(t + 1) - u(t - 1)$

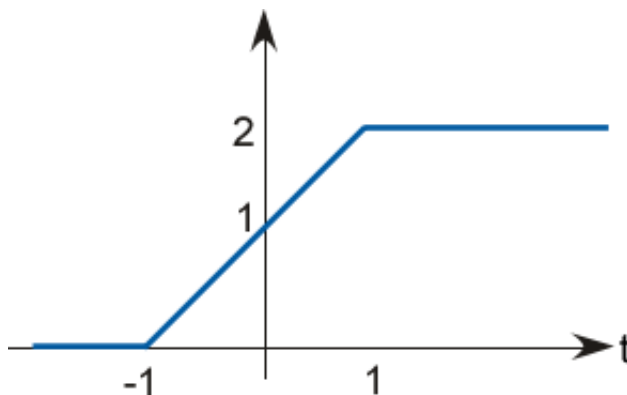Total   0.00 / 1.00

Question Explanation

$u(t + 1) - u(t - 1)$

Question 2

Express the depicted signal as a superposition of unit-step $u(t)$ and ramp $r(t)$ signals.

Your Answer	Score	Explanation
○ $r(t + 1) - u(t - 1)$		
○ $r(t + 1) - 2r(t - 1)$		
○ $r(t + 1) - r(t - 1)$		

Total	0.00 / 1.00

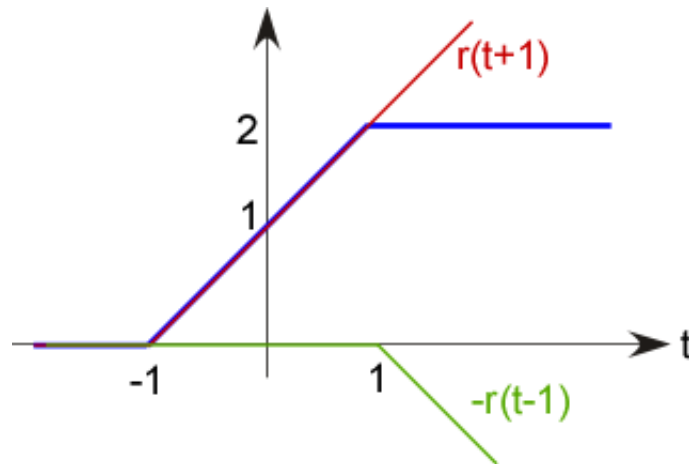
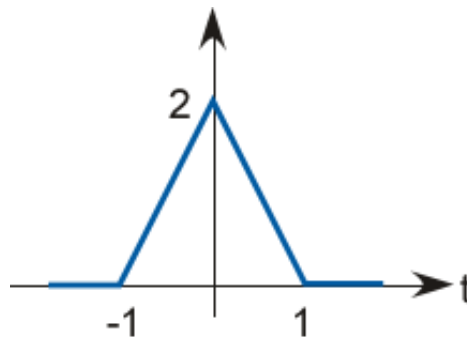**Question Explanation**

$r(t+1) - r(t-1)$. Note that this signal is the integral of the signal in the previous question.

Question 3

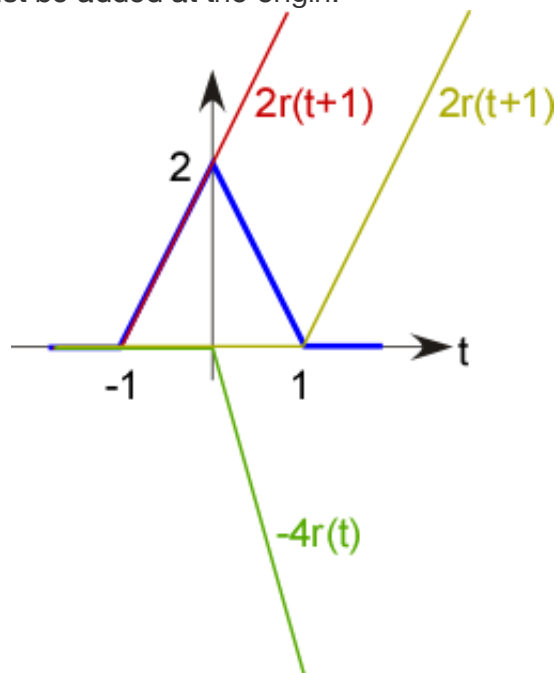Express the depicted signal as a superposition of unit-step $u(t)$ and ramp $r(t)$ signals.

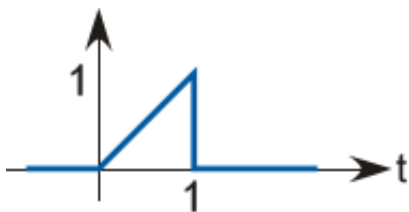| Your Answer	Score	Explanation
⬤ $2r(t+1) - 2r(t) + r(t-1)$		
⬤ $2r(t+1) - 4r(t) + 2r(t-1)$		
⬤ $2r(t+1) - 2r(t)$		
Total	0.00 / 1.00	

Question Explanation

$2r(t + 1) - 4r(t) + 2r(t - 1)$. Note that between $t = -1$ and $t = 0$, the slope is $+2$ and that between $t = 0$ and $t = 1$, the slope is -2. Consequently, a ramp having slope -4 must be added at the origin.

Question 4

Express the depicted signal as a superposition of unit-step $u(t)$ and ramp $r(t)$ signals.

Your Answer	Score	Explanation
⬤ $r(t) - r(t - 1) - u(t - 1)$		
⬤ $r(t) - u(t - 1)$		
⬤ $r(t) - r(t - 1)$		
Total	0.00 / 1.00	

Question Explanation

$r(t) - r(t - 1) - u(t - 1)$. Ramps and unit-steps can appear at the same time (when both the slope and amplitude change).