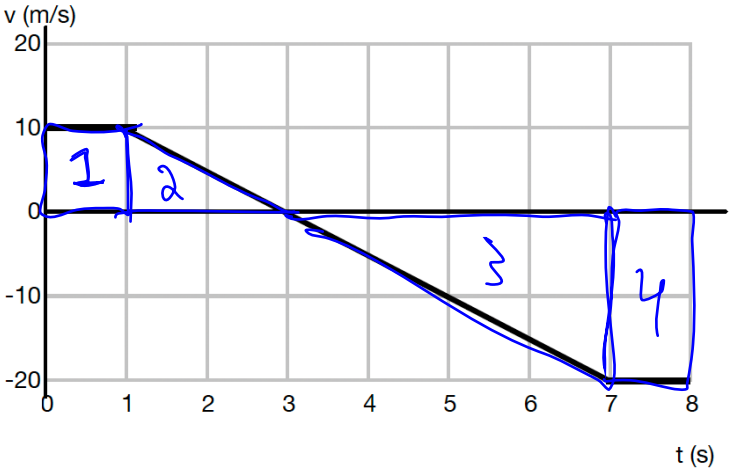
Motion Graphs Review

3 & 4 negative because it's below the y-axis!



total change in position calculation

1: 10 × 1 — rectangle — Area = 10 · 1 = 10

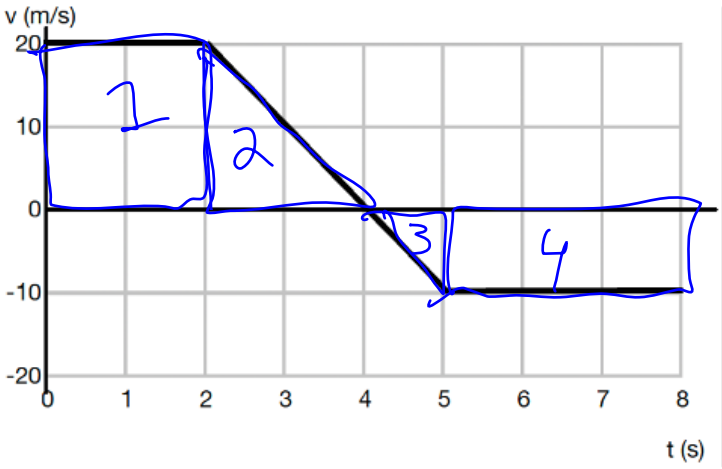
2: 10 × 2 — triangle — Area = $\frac{1}{2}$ · 10 · 2 = 10

3: 4 × 10 — triangle — Area = $\frac{1}{2}$ · 10 · 4 = -20

4: 20 × 1 — rectangle — Area = 20 · 1 = 20

10 + 10 - 20 - 20 = **-20m**

from when to when	description (words)	acceleration calculation
0 to 1	constant velocity of 10m/s	0
1 to 3	slow down to rest	$\frac{rise}{run} = \frac{-10}{2} = -5$ m/s/s
3 to 7	speed up to 20m/s to the left	$\frac{rise}{run} = \frac{-20}{4} = -5$ m/s/s
7 to 8	constant velocity of -20m/s	0



total change in position calculation

1: 20 × 2 — rectangle — Area = 20 · 2 = 40

2: 20 × 2 — triangle — Area = $\frac{1}{2}$ · 20 · 2 = 20

3: 1 × 10 — triangle — Area = $\frac{1}{2}$ · 10 · 1 = -5

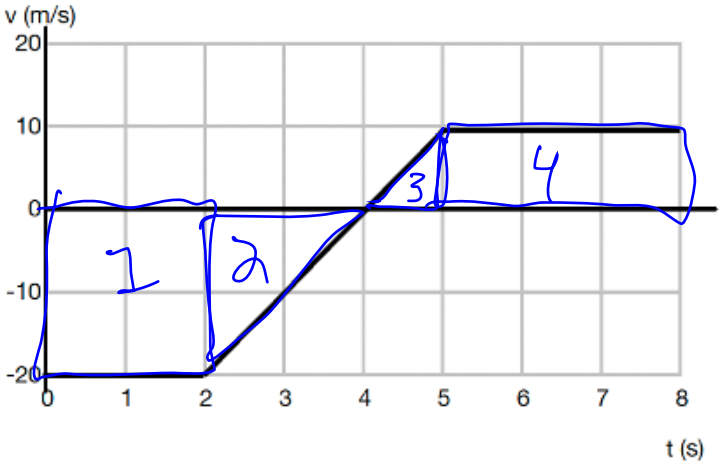
4: 10 × 3 — rectangle — Area = 3 · 10 = -30

negative!

40 + 20 - 5 - 30 = **25 m**

from when to when	description (words)	acceleration calculation
0 to 2	constant velocity of 20 m/s	0
2 to 4	slow down to rest	$\frac{rise}{run} = \frac{-20}{2} = -10$ m/s/s
4 to 5	speed up to 10m/s to the left	$\frac{rise}{run} = \frac{-10}{1} = -10$ m/s/s
5 to 8	constant velocity of -10m/s	0

Motion Graphs Review



total change in position calculation

1: rectangle, 20 × 2, Area = 20·2 = −40 (negative)

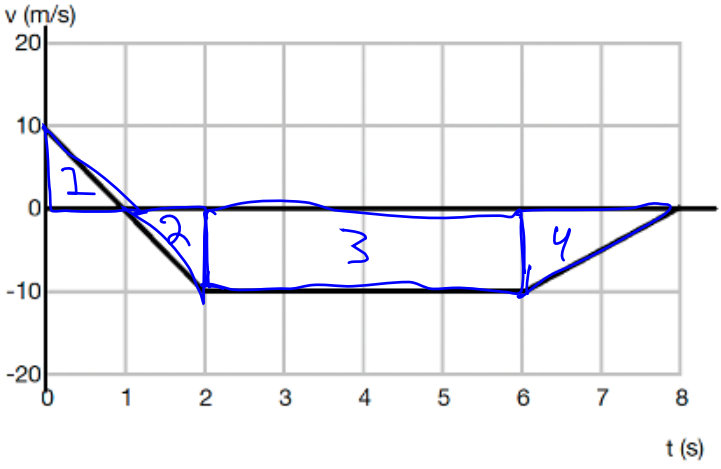
2: triangle, base 2, height 20, Area = $\frac{1}{2}\cdot 20\cdot 2$ = −20

3: triangle, base 1, height 10, Area = $\frac{1}{2}\cdot 10\cdot 1 = 5$

4: rectangle, 10 × 3, Area = 10·3 = 30

−40 − 20 + 5 + 30 = **−25 m**

from when to when	description (words)	acceleration calculation
0 to 2	constant velocity of −20 m/s	0
2 to 4	slow down to rest	$\frac{\text{rise}}{\text{run}} = \frac{20}{2} = +10$ m/s/s
4 to 5	speed up to +10 m/s	$\frac{\text{rise}}{\text{run}} = \frac{10}{1} = +10$ m/s/s
5 to 8	constant velocity of +10 m/s	0



total change in position calculation

1: triangle, base 1, height 10, Area = $\frac{1}{2}\cdot 10\cdot 1 = 5$

2: triangle, base 1, height 10, Area = $\frac{1}{2}\cdot 10\cdot 1 = 5$

3: rectangle, 4 × 10, Area = 10·4 = −40 (negative!)

4: triangle, base 2, height 10, Area = $\frac{1}{2}\cdot 10\cdot 2 = -10$

5 − 5 − 40 − 10 = **−50 m**

from when to when	description (words)	acceleration calculation
0 to 1	slow down to rest	$\frac{\text{rise}}{\text{run}} = \frac{-10}{1} = -10$ m/s/s
1 to 2	speed up to −10 m/s	$\frac{\text{rise}}{\text{run}} = \frac{-10}{1} = -10$ m/s/s
2 to 6	constant velocity of −10 m/s	0
6 to 8	slow down to rest	$\frac{\text{rise}}{\text{run}} = \frac{10}{2} = +5$ m/s/s