4B Definitions

1.

Symbol	Sign can be + or -	Always positive
t	time	
delta t or $(t_f - t_i)$	change in time	elapsed time
x	position	
delta x or $(x_f - x_i)$	change in position	distance
$\frac{\text{delta x}}{\text{delta t}}$ or $\frac{(x_f - x_i)}{(t_f - t_i)}$	velocity	speed
$\frac{\text{delta v}}{\text{delta t}}$ or $\frac{(v_f - v_i)}{(t_f - t_i)}$	acceleration	magnitude of acceleration

2. Assume that the line below shows the position of an object in units of 1 m. Let the position of the object be called x. Determine the following:

a. Position of the object at A.
x = -11m

b. Position of the object at B.
x = -10m

c. Position of the object at C.
x = -1m

d. Position of the object at D.
x = 0m

e. Position of the object at E.
x = 1m

f. Position of the object at F.
x = 10m

g. Position of the object at G.
x = 11m

h. Distance between A and B. The change in position for object that moves from A to B.
D = 1m; $x_f - x_i$ = -10m - (-11m) = 1m

i. Distance between C and E. The change in position for object that moves from C to E.
D = 2m; $x_f - x_i$ = 1m - (-1m) = 2m

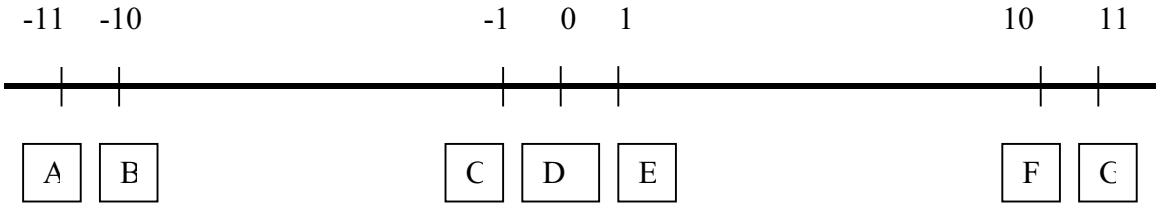
j. Distance between B and F. The change in position for object that moves from B to F.
D = 20m; $x_f - x_i$ = 10m - (-10m) = 20m

k. Distance between G and B. The change in position for object that moves from G to B.
D = 21m; $x_f - x_i$ = -10m - (11m) = -21m

l. Distance between B and A. The change in position for object that moves from B to A.
D = 1m; $x_f - x_i$ = -11m - (-10m) = -1m

m. Distance between A and D. The change in position for object that moves from D to A.
D = 11m; $x_f - x_i$ = -11m - (0m) = -11m

n. Distance between G and D. The change in position for object that moves from G to D.
D = 11m; $x_f - x_i$ = 0m - (11m) = -11m



3. Assume that the line in problem 2 shows the velocity of an object in units of 1 m/s. Let the velocity of the object be called v. Determine the following:

a. Velocity and speed of the object at A.
v = -11m/s; speed = 11m/s

b. Velocity and speed of the object at B.
v = -10m/s; speed = 10m/s

c. Velocity and speed of the object at C.
v = -1m/s; speed = 1m/s

d. Velocity and speed of the object at D.
v = 0m/s; speed = 0m/s

e. Velocity and speed of the object at E.
v = 1m/s; speed = 1m/s

f. Velocity and speed of the object at F.
v = 10m/s; speed = 10m/s

g. Velocity and speed of the object at G.
v = 11m/s; speed = 11m/s

h. Change in speed for an object that moves from A and B. The change in velocity for object that moves from A to B.
change in speed = 1m/s; change in velocity = $v_f - v_i$ = 1m/s

i. Change in speed for an object that moves from C and E. The change in velocity for object that moves from C to E.
change in speed = 2m/s; change in velocity = $v_f - v_i$ = 2m/s

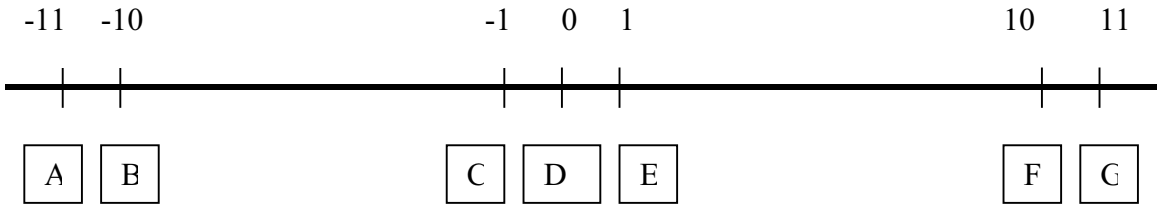
j. Change in speed for an object that moves from B and F. The change in velocity for object that moves from B to F.
change in speed = 20m/s; change in velocity = $v_f - v_i$ = 20m/s

k. Change in speed for an object that moves from G and B. The change in velocity for object that moves from G to B.
change in speed = 21m/s; change in velocity = $v_f - v_i$ = -21m/s

l. Change in speed for an object that moves from B and A. The change in velocity for object that moves from B to A.
change in speed = 1m/s; change in velocity = $v_f - v_i$ = -1m/s

m. Change in speed for an object that moves from A and D. The change in velocity for object that moves from D to A.
change in speed = 11m/s; change in velocity = $v_f - v_i$ = -11m/s

n. Change in speed for an object that moves from G and D. The change in velocity for object that moves from G to D.
change in speed = 11m/s; change in velocity = $v_f - v_i$ = -11m/s



4. Assume that the line in problem 2 shows the time of an object in units of 1 s. Let the time of the object be called t. Determine the following:

a. Time of the object at A.
t = -11s

b. Time of the object at B.
t = -10s

c. Time of the object at C.
t = -1s

d. Time of the object at D.
t = 0s

e. Time of the object at E.
t = 1s

f. Time of the object at F.
t = 10s

g. Time of the object at G.
t = 11s

h. Elapsed time between A and B. The change in time for object that moves from A to B.
elapsed time = 1s; change in time = $t_f - t_i = 1s$

i. Elapsed time between C and E. The change in time for object that moves from C to E.
elapsed time =2s; change in time = $t_f - t_i = 2s$

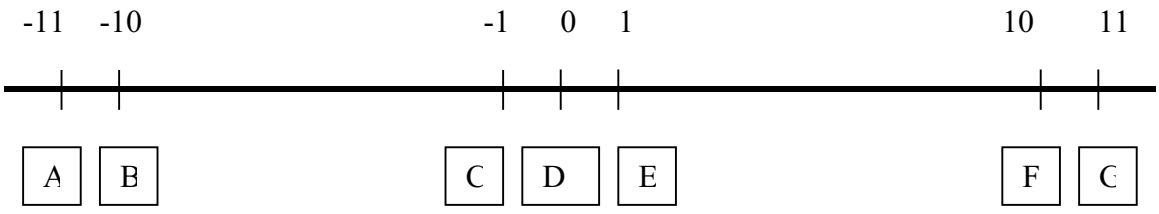
j. Elapsed time between B and F. The change in time for object that moves from B to F.
elapsed time = 20s; change in time = $t_f - t_i = 20s$

k. Elapsed time between G and B. The change in time for object that moves from G to B,
elapsed time = 21s; change in time = $t_f - t_i = -21s$

l. Elapsed time between B and A. The change in time for object that moves from B to A.
elapsed time = 1s; change in time = $t_f - t_i = -1s$

m. Elapsed time between A and D. The change in time for object that moves from D to A.
elapsed time = 11; change in time = $t_f - t_i = -11s$

n. Elapsed time between G and D. The change in time for object that moves from G to D.
elapsed time = 11s; change in time = $t_f - t_i = -111s$



5. Assume that the line in problem 2 shows the acceleration of an object in units of 1 m/s^2. Let the acceleration of the object be called a. Determine the following:

a. Acceleration and magnitude of the acceleration of the object at A.
a = $-11 m/s^2$; magnitude of acceleration = $11 m/s^2$

b. Acceleration and magnitude of the acceleration of the object at B.
a = $-10 m/s^2$; magnitude of acceleration = $10 m/s^2$

c. Acceleration and magnitude of the acceleration of the object at C.
a = $-1 m/s^2$; magnitude of acceleration = $1 m/s^2$

d. Acceleration and magnitude of the acceleration of the object at D.
a = $0 m/s^2$; magnitude of acceleration = $0 m/s^2$

e. Acceleration and magnitude of the acceleration of the object at E.
a = $1 m/s^2$; magnitude of acceleration = $1 m/s^2$

f. Acceleration and magnitude of the acceleration of the object at F.
a = $10 m/s^2$; magnitude of acceleration = $10 m/s^2$

g. Acceleration and magnitude of the acceleration of the object at G.
a = $11 m/s^2$; magnitude of acceleration = $11 m/s^2$

h. Change in magnitude of the acceleration for an object that moves from A and B. The change in acceleration for object that moves from A to B.
change in magnitude of acceleration = $1 m/s^2$; change in a = $a_f - a_i = 1 m/s^2$

i. Change in magnitude of the acceleration for an object that moves from C and E. The change in acceleration for object that moves from C to E.
change in magnitude of acceleration = $2 m/s^2$; change in a = $a_f - a_i = 2 m/s^2$

j. Change in magnitude of the acceleration for an object that moves from B and F. The change in acceleration for object that moves from B to F.
change in magnitude of acceleration = $20 m/s^2$; change in a = $a_f - a_i = 20 m/s^2$

k. Change in magnitude of the acceleration for an object that moves from G and B. The change in acceleration for object that moves from G to B.
change in magnitude of acceleration = $21 m/s^2$; change in a = $a_f - a_i = -21 m/s^2$

l. Change in magnitude of the acceleration for an object that moves from B and A. The change in acceleration for object that moves from B to A.
change in magnitude of acceleration = $1 m/s^2$; change in a = $a_f - a_i = -1 m/s^2$

m. Change in magnitude of the acceleration for an object that moves from A and D. The change in acceleration for object that moves from D to A.
change in magnitude of acceleration = $11 m/s^2$; change in a = $a_f - a_i = -11 m/s^2$

n. Change in magnitude of the acceleration for an object that moves from G and D. The change in acceleration for object that moves from G to D.
change in magnitude of acceleration = $11 m/s^2$; change in a = $a_f - a_i = -11 m/s^2$