PhyzExamples: Acceleration vs. Clock Reading

1. No motion (No motion is a special case of uniform motion with $v = 0$.)

a. Object at rest at 0.

b. Object at rest in the positive half of the universe.

c. Object at rest in the negative half of the universe.

2. Constant Velocity (Uniform Motion)

a. Object moves in positive direction starting at position 0.

b. Object moves more rapidly in positive direction starting at position 0.

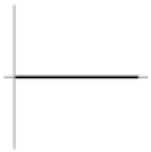
c. Object moves in positive direction starting at a position in the positive half of the universe.

d. Object moves in positive direction starting at a position in the negative half of the universe; ending at 0.

e. Object moves in negative direction starting at position 0.

f. Object moves more rapidly in negative direction starting at position 0.

g. Object moves in negative direction starting at a position in the negative half of the universe.



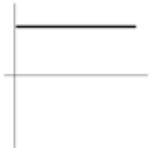
h. Object moves in negative direction starting at a position in the positive half of the universe; ending at 0.

Note: *Figures a, c, and d represent objects with the same positive velocity. Figures e, g, and h represent objects with the same negative velocity. Figures a, c, d, e, g, and h represent objects with the same speed.*

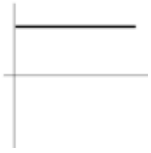
3. Speeding Up (Uniform Accelerated Motion—UAM—starting from rest)

a. Object accelerates in positive direction starting with 0 velocity at position 0.

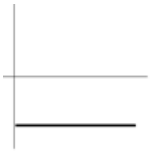
b. Object accelerates in positive direction starting with 0 velocity at a position in the positive half of the universe.



c. Object accelerates in positive direction starting with 0 velocity at a position in the negative half of the universe. Object ends at position 0.

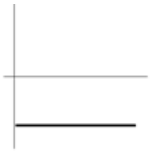


d. Object accelerates in positive direction starting with 0 velocity at a position in the negative half of the universe. Object ends at position in the positive half of the universe.



e. Object accelerates in negative direction starting with 0 velocity at position 0.

f. Object accelerates in negative direction starting with 0 velocity at a position in the negative half of the universe.



g. Object accelerates in negative direction starting with 0 velocity at a position in the positive half of the universe. Object ends at position 0.

h. Object accelerates in negative direction starting with 0 velocity at a position in the positive half of the universe. Object ends at position in the negative half of the universe.

Note: *Figures a, b, c, and d represent objects with the same positive acceleration. Figures e, f, g, and h represent objects with the same negative acceleration. Figures a— h represent objects with the same magnitude of acceleration.*

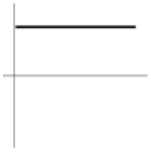
4. Slowing Down (UAM with acceleration and velocity in opposite directions)

a. Object accelerates in negative direction starting with positive velocity at position 0.

b. Object accelerates in negative direction starting with positive velocity at a position in the positive half of the universe.

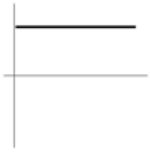
c. Object accelerates in negative direction starting with positive velocity at a position in the negative half of the universe. Object ends at position 0.

d. Object accelerates in negative direction starting with positive velocity at a position in the negative half of the universe. Object ends at position in the positive half of the universe.



e. Object accelerates in positive direction starting with negative velocity at position 0.

f. Object accelerates in positive direction starting with negative velocity at a position in the negative half of the universe.



g. Object accelerates in positive direction starting with negative velocity at a position in the positive half of the universe. Object ends at position 0.

h. Object accelerates in positive direction starting with negative velocity at a position in the positive half of the universe. Object ends at position in the negative half of the universe.

Note: *Figures a, b, c, and d represent objects with the same negative acceleration. Figures e, f, g, and h represent objects with the same positive acceleration. Figures a— h represent objects with the same magnitude of acceleration.*

Easy to believe: *Figures a, b, c, and d in part 4 represent objects with the same negative acceleration as those in figures e, f, g, and h of part 3. Figures e, f, g, and h of part 4 represent objects with the same positive acceleration as those in figures a, b, c, and d of part 3. All figures in parts 3 and 4 represent objects with the same magnitude of acceleration. Some are positive and some are negative; all have the same magnitude.*