Module 3 – Shyam Natarajan

1. The velocity increases roughly by 10 every second. This does not change with angle or mass. Distance increases faster as time increases. Velocity increases at a constant rate. Mass does not change distance, but increasing the angle increases distance since it makes the ramp longer for the same horizontal distance.
2. Distance increases faster with time.
3. It grows linearly, and this decreases very slightly with decreasing the time interval
4. It changes at a rate of 3, and all functions of the form ax+b increase by a units per unit time
5. The slope is roughly 4.9
6. Acceleration is constant and directly proportional to angle but independent of mass.
7. I would use an hourglass
8. Acceleration is constant
9. The rate of change of velocity is no longer constant.
10. The acceleration graph is a straight line, and v = at
11. We run a new simulation each time when we can just get the distance at time x from the simulation. A larger interval increases the value since our rate of change would cause the distance at the end of the interval to be increasing by more, so it’s not quite instantaneous.
12. We can use a known equation and plug in values and compare against which method yields better experimental results.
13. The Euler algorithm is used. Acceleration does not change.
14. They seem to follow this law, but their constant acceleration is lower.
15. The shadow velocity grows with a constant acceleration
16. The x velocity is constant
17. They both have straight line velocities i.e. their acceleration is constant. This follows our universal law.
18. X(t) and y(t) are functions of d(t) and theta and vice versa, so these statements are true.
19. We need the distance between the new X and Y positions which is the current x and y plus their change.
20. It does work. The x and y accelerations are constant.
21. The acceleration in the x direction
22. Since the ramp is at an angle, the downward vertical acceleration is redirected in the direction of the ramp. Some of this is horizontal.
23. The number of iterations is 2021. We can simply use an equation and solve it for the required height value.