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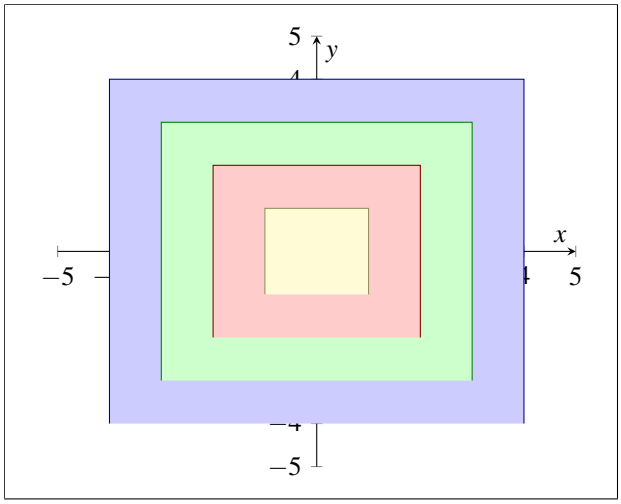
PHYS 211X
HW 1, Due Friday, 1/27/2023 23:59; #19,28,35,40,43,47

19. Write a short description of the motion of a real object for which FIGURE EX.1.19 would be a realistic position-versus-time graph.

An elevator brings its occupants up 100 meters before stopping to let them off. It then shoots up another 200 meters to the top story of the building.



28. Compute the following numbers, applying the significant figure rules adopted in this textbook.

a. $33.3 \times 25.4 = \boxed{846}$

b. $33.3 - 25.4 = \boxed{28.9}$

c. $\sqrt{(33.3)} = \boxed{5.77}$

d. $333.3 \div 25.4 = \boxed{13.1}$

35. A jetplane is cruising at 300 m/s when suddenly the pilot turns the engines up to full throttle. After traveling 4.0 km, the jet is moving with a speed of 400 m/s. What is the jet's acceleration as it speeds up?

$$\vec{a} = \frac{\Delta v}{\Delta t} = \frac{100}{\Delta t}$$
$$\Delta t = \frac{\Delta s}{\vec{v}} = \frac{4000}{350} = 11.4$$
$$\vec{a} = \frac{100}{11.4} = \boxed{8.77\text{m/s}^2}$$

40. A motorist is traveling at 20 m/s. He is 60 m from a stoplight when he sees it turn yellow. His reaction time, before stepping on the brake, is 0.50 s. What steady deceleration while braking will bring him to a stop right at the light?

$$d_{sl} = 60 - 20(0.5) = 50m \quad \vec{v}_0 = 20\text{m/s}$$
$$\vec{a} = \frac{\Delta v}{\Delta t} = \frac{-20}{\Delta t}$$
$$\Delta t = \frac{d_{sl}}{\vec{s}} = \frac{50}{10} = 5$$
$$\vec{a} = -\frac{20}{4} = boxed - 4\text{m/s}^2$$

43.