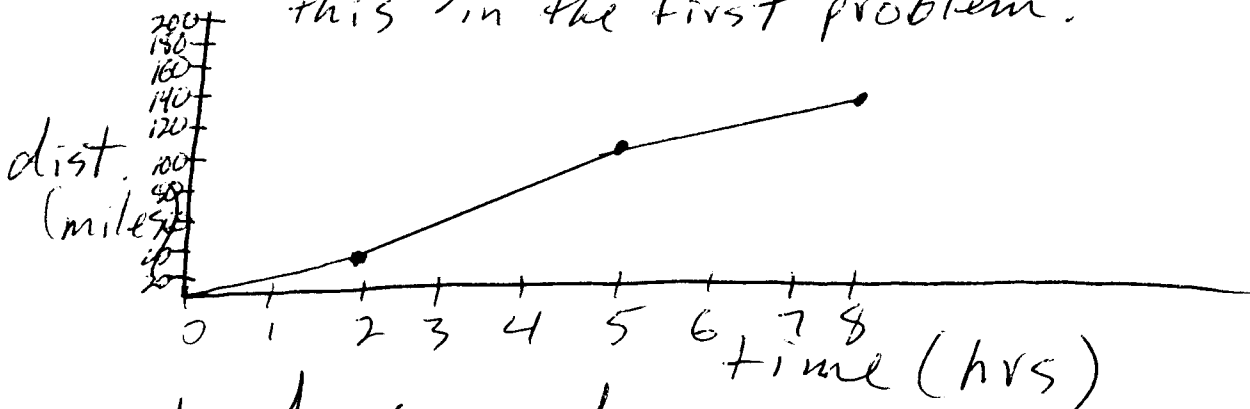


17) For these problems, it is helpful to draw a diagram of the motion, I will do this in the first problem.



$$r \times t = d \quad \therefore r = \frac{d}{t} = \frac{40 \text{ mi}}{2 \text{ hr}} + \frac{80 \text{ mi}}{3 \text{ hr}} + \frac{40 \text{ mi}}{3 \text{ hr}} = 20 \frac{\text{mi}}{\text{hr}} + 27 \frac{\text{mi}}{\text{hr}} + 13 \frac{\text{mi}}{\text{hr}} = 60 \frac{\text{mi}}{\text{hr}}$$

$$\text{Average} = \frac{\text{Add rates}}{3} = \frac{60 \frac{\text{mi}}{\text{hr}}}{3} = \boxed{20 \frac{\text{mi}}{\text{hr}}}$$

$$18) \quad r = \frac{d}{t} = \frac{20 \text{ Km}}{1 \text{ hr}} + \frac{65 \text{ Km}}{2 \text{ hrs.}} + \frac{85 \text{ Km}}{1 \text{ hr.}}$$

$$20 \frac{\text{Km}}{\text{hr}} + 33 \frac{\text{Km}}{\text{hr}} + 85 \frac{\text{Km}}{\text{hr}} = 138 \frac{\text{Km}}{\text{hr}}$$

$$\text{Average} = \frac{138 \frac{\text{Km}}{\text{hr}}}{3} = 46 \frac{\text{Km}}{\text{hr}}$$

$$d = r \times t$$

$$18) \quad d_{\text{total}} = \left(20 \frac{\text{Km}}{\text{hr}} \cdot 1 \text{ hr}\right) + \left(65 \frac{\text{Km}}{\text{hr}} \cdot 2 \text{ hr}\right) + \left(85 \frac{\text{Km}}{\text{hr}} \cdot 1 \text{ hr}\right) = 235 \text{ Km}$$

$$r = \frac{d}{t} = \frac{235 \text{ Km}}{4 \text{ hr.}} = \boxed{58.75 \frac{\text{Km}}{\text{hr}} = 6 \times 10^2 \frac{\text{Km}}{\text{hr}}}$$

$$19) t = \frac{d}{r} = \left( \frac{800 \text{ m}}{10 \frac{\text{m}}{\text{s}}} \right) + \left( \frac{500 \text{ m}}{5 \frac{\text{m}}{\text{s}}} \right) + \left( \frac{1200 \text{ m}}{13 \frac{\text{m}}{\text{s}}} \right) =$$

$$80 \text{ s} + 100 \text{ s} + 92 \text{ s} = 272 \text{ s}$$

$$r = \frac{d}{t} = \frac{2500 \text{ m}}{272 \text{ s}} = \boxed{9.19 \frac{\text{m}}{\text{s}}}$$

$$20) t = \frac{d}{r} = \frac{700 \text{ m}}{8 \frac{\text{m}}{\text{s}}} + \frac{600 \text{ m}}{90 \text{ s}} = 87.5 \text{ s}$$

$$r = \frac{d}{t} = \frac{600 \text{ m}}{90 \text{ s}} = \boxed{6.7 \frac{\text{m}}{\text{s}}}$$

$$r \times t = d = \left( 21 \frac{\text{m}}{\text{s}} \right) \cdot 50 \text{ s} = 1050 \text{ m}$$

$$r_{\text{avg}} = \frac{700 \text{ m} + 600 \text{ m} + 1050 \text{ m}}{87.5 \text{ s} + 90 \text{ s} + 50 \text{ s}} = \frac{2350 \text{ m}}{227.5 \text{ s}} =$$

$$\boxed{10.32 \text{ s}}$$

$$21) r = \frac{d}{t} = \frac{100 \text{ km}}{2 \text{ hr.}} + \frac{200 \text{ km}}{4 \text{ hrs}} + \frac{0 \text{ km}}{.5 \text{ hr}} =$$

$$\frac{50 \text{ km}}{\text{hr}} + \frac{50 \text{ km}}{\text{hr}} + \frac{0 \text{ km}}{\text{hr}} =$$

$$\frac{100 \text{ km} + 200 \text{ km} + 0 \text{ km}}{2 \text{ hr} + 4 \text{ hr} + .5 \text{ hr}} = \frac{300 \text{ km}}{6.5 \text{ hr.}} =$$

$$\boxed{46.2 \frac{\text{km}}{\text{hr.}}}$$

3

558 km/hr

r = d\_total / t\_total = (1200 km + 1500 km + 1000 km) / (4 hr + 3 hr + 2.5 hrs) = 5300 km / 9.5 hr

1500 km / 500 km/hr = 3 hr

1000 km / 400 km/hr = 2.5 hrs

t = d / r = 2800 km / 700 km/hr = 4 hr

23) First find time for each leg.

avg = 429 km/hr

avg = d\_total / t\_total = (600 km + 400 km + 2000 km) / (2 hr + 1 hr + 4 hr) = 3000 km / 7 hr

500 km/hr, 4 hr = 2000 km

300 km/hr, 2 hr = 600 km; 400 km/hr, 1 hr = 400 km

22) r = d\_total / t\_total = 7

$$24) t_1 = \frac{2100 \text{ Km}}{500 \frac{\text{Km}}{\text{hr}}} = 4.20 \text{ hr}$$

$$d_2 = 400 \frac{\text{Km}}{\text{hr}} \cdot 3 \text{ hr} = 1200 \text{ Km}$$

$$r = \frac{d}{t} = \frac{(2100 \text{ Km} + 1200 \text{ Km} + 400 \text{ Km})}{(4.20 \text{ hr} + 3 \text{ hr} + ? \text{ hr})} = 440 \frac{\text{Km}}{\text{hr}}$$

$$= \frac{3700 \text{ Km}}{7.2 \text{ hr} + X} = 440 \frac{\text{Km}}{\text{hr}}$$

~~$$7.2 \text{ hr} \cdot X \cdot 440 \frac{\text{Km}}{\text{hr}} = 3700 \text{ Km}$$~~

~~$$X = \frac{3700 \text{ Km}}{7.2 \text{ hr} \cdot 440 \frac{\text{Km}}{\text{hr}}} = \frac{3700}{3168} =$$~~

$$(7.2 \text{ hr} + X) 440 \frac{\text{Km}}{\text{hr}} = 3700 \text{ Km}$$

$$3168 \text{ Km} + 440 \frac{\text{Km}}{\text{hr}} \cdot X = 3700 \text{ Km}$$

$$440 \frac{\text{Km}}{\text{hr}} \cdot X = 532 \text{ Km}$$

$$X = \frac{532 \text{ Km}}{440 \frac{\text{Km}}{\text{hr}}} = 1.2 \text{ hr.}$$

$$r = \frac{400 \text{ Km}}{1.2 \text{ hr}}$$

$$\boxed{333 \frac{\text{Km}}{\text{hr}}}$$

$$25) v = \frac{d}{t} = \frac{(400\text{m} + 400\text{m} + 800\text{m})}{(80\text{s} + 70\text{s} + 130\text{s})} = \frac{1600\text{m}}{280\text{s}}$$

$$v_{\text{avg}} = 5.7 \frac{\text{m}}{\text{s}}$$

$$26) v = \frac{d}{t} \quad D = \left( \frac{180\text{km}}{\text{hr}} \cdot 7\text{hr} \right) + \left( \frac{200\text{km}}{\text{hr}} \cdot 4\text{hr} \right) + \left( \frac{120\text{km}}{\text{hr}} \cdot 6\text{hr} \right)$$

$$D_{\text{total}} = 360\text{km} + 800\text{km} + 720\text{km}$$

$$D_{\text{total}} = 1880\text{km}$$

$$v_{\text{avg}} = \frac{d_{\text{total}}}{t_{\text{total}}} = \frac{1880\text{km}}{12\text{hr}} = 157 \frac{\text{km}}{\text{hr}}$$

$$27) v_{\text{avg}} = \frac{d_{\text{total}}}{t_{\text{total}}} = \frac{(120\text{km} + 0\text{km} + 180\text{km})}{(2\text{hr} + 0.5\text{hr} + 2\text{hr})}$$

$$t_1 = \frac{120\text{km}}{60 \frac{\text{km}}{\text{hr}}} = 2\text{hr}$$

$$t_2 = 0.5\text{hr}$$

$$t_3 = \frac{180\text{km}}{90 \frac{\text{km}}{\text{hr}}} = 2\text{hr}$$

$$v_{\text{avg}} = \frac{300\text{km}}{4.5\text{hr}} = 66.7 \frac{\text{km}}{\text{hr}}$$

$$= 67 \frac{\text{km}}{\text{hr}}$$

$$28) v_{avg} = \frac{600 \text{ km}}{8 \text{ hrs.}} = \boxed{75 \frac{\text{km}}{\text{hr}}}$$

$$\cancel{v} = t_1 = \frac{d}{v} = \frac{120 \text{ km}}{60 \frac{\text{km}}{\text{hr}}} = 2 \text{ hr}$$

$$d_3 = 600 \text{ km} - 120 \text{ km} - 180 \text{ km} =$$

$$d_3 = 300 \text{ km}$$

$$\text{last time} = 8_{\text{hr}} - 2 \text{ hr} - 2 \text{ hr} = 4 \text{ hr}$$

$$v_{\text{last leg}} = \frac{300 \text{ km}}{4 \text{ hr}} = \boxed{75 \frac{\text{km}}{\text{hr}}}$$