

1) $d = rt$ $t = \frac{d}{r}$ 20% refers to distance

$$t_{20\%} + t_{80\%} = t_{100\%}$$

$$\frac{.2}{40} + \frac{.8}{x} = \frac{1}{75}$$

mult. by LCD = 600x

$$600x \left(\frac{.2}{40} + \frac{.8}{x} = \frac{1}{75} \right)$$

$$.2(15x) + .8(600) = 8x$$

$$3x + 480 = 8x$$

$$5x = 480$$

$$x = 96$$

average $96 \frac{\text{km}}{\text{hr}}$

2) $d = rt$ $t = \frac{d}{r}$

situation 1: $\frac{10}{30} + \frac{30}{15} = \frac{7}{3} \text{ hr}$

$\frac{7}{3} - 2 = \frac{1}{3} \text{ hr}$ or 20 minutes

situation 2: $\frac{40}{20} = 2 \text{ hr}$

3) $45 \text{ min} = 270 \text{ sec}$ add times for total time; distance up = distance down

$d = rt$ $t = \frac{d}{r}$

$$\frac{d}{4} + 90 + \frac{d}{5} = 270$$

$$\frac{9d}{20} = 180$$

$d = 400 \text{ meters}$

$$\frac{d}{4} + \frac{d}{5} = 180$$

$$9d = (180)(20)$$

4) Same as #1

5) $d = rt$ $t = \frac{d}{r}$

$$\frac{240}{x} + 12 + \frac{240}{x+1} = 120$$

$r_{\text{up}} = x$

$$\frac{240}{x} + \frac{240}{x+1} = 108$$

$r_{\text{down}} = x+1$

$x = 4 \frac{\text{m}}{\text{s}}$

$$x(x+1) \left(\frac{240}{x} + \frac{240}{x+1} \right) = 108$$

$$(240x + 240) + (240x) = 108x^2 + 108x$$

$$108x^2 - 372x - 240 = 0$$

$$9x^2 - 31x - 20 = 0$$

$$(9x+5)(x-4) = 0$$

~~$x = -\frac{5}{9}$~~ or $x = 4$

6) $d = rt$ $t = \frac{d}{r}$ $\frac{1}{2}$ of trip (50%) refers to distance

$$t_{1st} + t_{2nd} = t_{total}$$

$$\rightarrow \text{LCD: } 180x \left(\frac{.5}{36} + \frac{.5}{x} = \frac{1}{45} \right)$$

$$X = 60 \text{ mph}$$

$$\frac{0.5}{36} + \frac{0.5}{x} = \frac{1}{45}$$

$$2.5x + 90 = 4x$$

$$1.5x = 90$$

$$x = 60$$

7) $d = rt$ $t = \frac{d}{r}$ $\frac{d}{5} + 51 + \frac{d}{8} = 90$

$$\frac{d}{5} + \frac{d}{8} = 39$$

$$\frac{13d}{40} = 39$$

$$d = 120 \text{ m}$$

8) $x = \text{grams of } 45\% \text{ sol.}$

$y = \text{grams of } 70\% \text{ sol.}$

$$\text{mixture} = \frac{\text{Part}}{\text{whole}} = \frac{.45x + .7(100-x)}{x + (100-x)} = \frac{50}{100}$$

OR

$$x + y = 100 \text{ g}$$

$$.45x + .45y = 45$$

$$\Rightarrow .45x + .7y = 50$$

$$.25y = 5$$

$$y = 20 \text{ g}$$

$$x = 80 \text{ g}$$

$$.45x - .7x + 70 = 50$$

$$-.25x = -20$$

$$x = 80 \text{ g}$$

$$y = 20 \text{ g}$$

9) $300(.32) = 96$ liters of salt

$x = \text{amount of water added}$

$$\frac{\text{amount of salt}}{\text{amount of liters}} = \% \text{ salt solution}$$

checking work: $\frac{96}{480} = 0.2$ ✓

$$\frac{96}{300+x} = 0.2$$

$$96 = 60 + 0.2x$$

$$.2x = 36$$

$$x = 180 \text{ liters of water}$$

10) acid + acid = acid $10 + 30 = 40$ liters

$$10(.2) + 30(.3) = 40(x)$$

$$2 + 9 = 40x$$

$$11 = 40x$$

$$x = 0.275$$

$$x = 27.5\% \text{ acid solution}$$

11) a) $X = \text{lbs of Columbian coffee}$

$$X(.7) + 10(.9) = (X+10)(.75)$$

$$.7X + 9 = .75X + 7.5$$

$$.05X = 1.5$$

$$X = 30 \text{ pounds}$$

$$\frac{\text{Part}}{\text{whole}} = \frac{.7X + 10(.9)}{10 + X} = \frac{75}{100}$$

OR

$$900 + 70X = 750 + 75X$$

$$150 = 5X$$

$$X = 30 \text{ pounds}$$

b) $X(.7) + 10(.9) = (X+10)(.8)$

$$.7X + 9 = .8X + 8$$

$$.1X = 1$$

$$X = 10 \text{ pounds}$$

c) $X(.7) + 10(.9) = (X+10)(.85)$

$$.7X + 9 = .85X + 8.5$$

$$.15X = .5$$

$$X = 3\frac{1}{3} \text{ or } \frac{10}{3} \text{ pounds}$$

12) $X = \text{Feed A (lbs)}$ $y = \text{Feed B (lbs)}$

$$y = 100 - X$$

$$X + y = 100$$

$$.12X + .08y = 100(.1)$$

OR

$$\frac{\text{Part}}{\text{whole}} = \frac{.12X + .08(100-X)}{X + (100-X)} = \frac{10}{100}$$

$$.12X + .12y = 12$$

$$- (.12X + .08y = 10)$$

$$.04y = 2$$

$$y = 50 \text{ lbs}$$
$$X = 50 \text{ lbs}$$

$$.12X + .08(100-X) = 10$$

$$.04X + 8 = 10$$

$$.04X = 2$$

$$X = 50 \text{ lbs}$$
$$y = 50 \text{ lbs}$$