Differ'nt.

John & Sam

can do it in 10 hrs

can do it in 7 hours

How long will it take if they work together?

In one Hour $\frac{1}{10} + \frac{1}{7} = \frac{1}{x}$ Book

where x = the total time it takes to finish if they work together.

One Job Done $\frac{1}{10}x + \frac{1}{7}x = 1$ My way. More flexible.

Now, Suppose John is an hour late for work. How many hours does he end up working, if he joins Sam late?

x = the # of hours John spends working.

$$\frac{1}{10}x + \frac{1}{7}(x+1) = 1$$

Clint says:

x = the # of hours SAM spends working

$$\underbrace{\frac{1}{10}(x-1)}_{\text{John's Time.}} + \frac{1}{7}x = 1$$

x = John's time version

$$\left(\frac{1}{10}x + \frac{1}{7}(x+1) = 1\right)(70)$$

LCD = 70

$$7x + 10(x+1) = 70$$

$$7x + 10x + 10 = 70$$

$$17x = 60$$

$$\boxed{x = \frac{60}{17}\text{hrs} = \text{time John spent}}$$

which is what was asked for.

x = Sam's time version

$$\left(\frac{1}{10}(x-1) + \frac{1}{7}x = 1\right)(70)$$

LCD = 70

$$7(x-1) + 10x = 70$$

$$7x - 7 + 10x = 70$$

$$17x = 77$$

$x = \frac{77}{17}$ = Amt of time Sam spent.

We want John's #:

$$x - 1 = \frac{77}{17} - 1 = \boxed{\frac{60}{17}}\text{hrs.}$$

How many liters of a 15% alcohol solution and how many liters of 10% alcohol solution shoujld be mixed to obtain 15 liters of a 14% solution?

	Volume	Pure Alcohol
15%	x	This $.15x$
		plus
10%	$y = 15 - x$	~~this~~ $.10y = .10(15-x)$
		equals
14%	$15 = x + y$	this $.14(x+y) =$
	$y = 15 - x$	$.14(x + 15 - x) = .14(15)$

Let $x =$ the amt of 15% alcohol used (in liters)

$y =$ " " " " " " " "

$.15x + .10(15 - x) = .14(15)$

Sep 7-8:10 AM

$v_0 = 20$ ft/s v- nought $= v_0 =$ v-sub-zero

$s_0 = 6$ ft

$s(t) = -\frac{1}{2}gt^2 + v_0 t + s_0$, where

g = gravity, v_0 = initial velocity, s_0 = initial height.

up is positive
Down is negative.

$\frac{88\text{ ft}}{s} = 60$ mph

$s(t) = -16t^2 + v_0 t + s_0$

$s(t) = -16t^2 + 20t + 6$ is our model,

when t = time in seconds

when will ball hit the ground?

Find t such that $s(t) = 0$

Solve $-16t^2 + 20t + 6 = 0$ for t.

$-8t^2 + 10t + 3 = 0$

$(8)(-3) = -24$ $\boxed{\cancel{8t^2 - 10t - 3 = 0}}$

$(-12)(2) = -24$

$-12 + 2 = -24$ → $8t^2 - 12t + 2t - 3 = 0$

$4t(2t - 3) + 1(2t - 3) = 0$

$4t ☺ + 1 ☺$

$= ☺(4t + 1)$

$= (2t - 3)(4t + 1) = 0$

$2t - 3 = 0$ $4t + 1 = 0$

$2t = 3$ $4t = -1$

$\boxed{t = \frac{3}{2}}$ $t = -\frac{1}{4}$ → Go faster than the speed of light to travel in time th...

Check:

$-16\left(\frac{3}{2}\right)^2 + \cancel{20}^{10}\left(\frac{3}{\cancel{2}_1}\right) + 6$

$= -\frac{\cancel{16}^4}{1} \cdot \frac{9}{\cancel{4}_1} + 30 + 6$

$= -36 + 30 + 6 = 0$ ✓

$$\boxed{8t^2 - 10t - 3 = 0}$$

$a = 8,\ b = -10,\ c = -3$

$b^2 - 4ac = (-10)^2 - 4(8)(-3)$

$= 100 + 96$

$= 196$ $\quad \left(\sqrt{196} = 14 \right)$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{10 \pm 14}{2(8)} = \frac{10 \pm 14}{16}$$

$\frac{10+14}{16} = \frac{24}{16} = \frac{3}{2}$

$\cancel{t = -\frac{1}{4}}$

$t = \frac{3}{2}$ sec.

Find equation of the line thru (2,5), (-3,7)

(i) Point-Slope form $y - y_1 = m(x - x_1)$

(ii) Slope-Intercept Form $y = mx + b$

(iii) Standard Form $Ax + By = C$

$A, B, C \in \mathbb{Z}$ = Integers

$(x_1, y_1) = (2,5)$, $(x_2, y_2) = (-3,7)$

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7-5}{-3-2} = \frac{2}{-5} = -\frac{2}{5}$

Scratch

$\left(-\frac{2}{5}\right)(-2) =$

$\left(\frac{2}{5}\right)\left(\frac{2}{1}\right) = \frac{4}{5}$

$\frac{4}{5} + \frac{5}{1} \cdot \frac{5}{5}$

$= \frac{4+25}{5}$

(i) $\boxed{y - 5 = -\frac{2}{5}(x-2)}$

(ii) $y - 5 = -\frac{2}{5}x + \frac{4}{5}$

$+5 = \quad +5$

$\boxed{y = -\frac{2}{5}x + \frac{29}{5}}$

(iii) $5y = -2x + 29$

$\boxed{2x + 5y = 29}$

Line parallel to the above, thru $(77, -2\pi)$

$y - y_1 = m(x - x_1)$

$m_{\parallel} = m$

$\boxed{y + 2\pi = -\frac{2}{5}(x - 77)}$

Line perpendicular to it, thru $(77, -2\pi)$

$\boxed{y + 2\pi = \frac{5}{2}(x - 77)}$

$m_{\perp} = -\frac{1}{m}$

Flip it!

Solve by completing the square.

$x^2 + 6x - 16 = 0$

$x^2 + 6x = 16$

$x^2 + 6x + 3^2 = 16 + 9$

$(x+3)^2 = 25$

$x + 3 = \pm\sqrt{25} = \pm 5$

$x = -3 \pm 5$ → 2, -8

$x = -8, 2$

$x \in \{-8, 2\}$