

Word Problems WS: "Solve."

KEY

② Let x = time together

$$\frac{x}{20} = \text{portion of job Sam does}$$

$$\frac{x}{15} = \text{portion of job Paul does}$$

$$\frac{x}{20} + \frac{x}{15} = 1$$

$$3x + 4x = 60$$

$$7x = 60$$

$$x = \frac{60}{7} = 8\frac{4}{7} \approx 8.57 \text{ min.} \approx 8 \text{ min } 34 \text{ sec.} \rightarrow \boxed{\text{YES}}$$

③ Let x = rate pushed

$$t_{\text{pushed}} + t_{\text{driven}} = t_{\text{total}} \quad t = \frac{d}{r}$$

$$\frac{1}{x} + \frac{132}{12x} = 3$$

$$x = 4 \rightarrow \boxed{4 \text{ mph pushed}}$$

ck
 pushed 1 mile = 15 min.
 3 hrs - 15 min = 2.75 hrs. drive
 $4 \times 12 = 48 \text{ mph driving}$
 $48 \times 2.75 = 132 \text{ miles } \checkmark$

④ $\frac{1}{20}$ = portion old does in 1 hr.

let x = time takes together

$$\frac{x}{20} + \frac{x}{20} + \frac{2x}{20} = 1$$

$$4x = 20$$

$$x = 5 \text{ hrs together.}$$

ck

old	old	new	
$\frac{5}{20}$	$\frac{5}{20}$	$\frac{10}{20}$	$= 1$
\uparrow	\uparrow	\uparrow	\uparrow
$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	Whole job

\uparrow portion of job
 \nwarrow new is faster, does more work

⑤ Let x = time it takes

$$\frac{x}{2} - \frac{x}{10} = 1$$

$$x = \frac{20}{8} = \boxed{2\frac{1}{2} \text{ hrs}}$$

⑧ Let x = amt time experienced

$$3x = \text{amt time apprentice}$$

use $\frac{\text{total time}}{\text{indiv. time}}$

$$\frac{6}{x} + \frac{6}{3x} = 1$$

$$x = 8 \text{ hrs.}$$

$\boxed{\text{experienced} = 8 \text{ hrs.}}$
 $\boxed{\text{apprentice} = 24 \text{ hrs}}$

ck
 $\frac{6}{8} = \frac{3}{4}$ of job by exp
 $\frac{6}{24} = \frac{1}{4}$ of job by apprentice

Another Look at Problem Solving

③ Let $x = ht$ of rope $h=d \rightarrow t = \frac{d}{r}$

time_{up} + time_{down} = total time

$$\frac{x}{3.2} + \frac{x}{4.8} = 6.25$$

$$x = 12 \rightarrow \text{rope is 12 meters}$$

④ Let $x =$ time B works

A	B	
$\frac{x+3}{15}$	$+$	$\frac{x}{10} = 1$

$$2(x+3) + 3x = 30$$

$$5x = 24$$

$$x = \frac{24}{5} = 4\frac{4}{5} \text{ hrs.}$$

B takes $4\frac{4}{5}$ hrs. (faster)
A takes $7\frac{4}{5}$ hrs.

ck:

B: $\frac{4\frac{4}{5}}{10} = \frac{12}{25} \leftarrow$ B completes $\frac{12}{25}$ of job

A: $\frac{7\frac{4}{5}}{15} = \frac{13}{25} \leftarrow$ A completes $\frac{13}{25}$ of job.

⑤ Let $x =$ Betty's time alone
 $2x =$ Carl's time alone

Betty	Carl	Al	
$\frac{12}{x}$	$+$	$\frac{12}{2x}$	$+$
			$\frac{12}{30} = 1$

$$x = 30 \rightarrow \text{Carl takes 60 hrs}$$

⑧ Let $x =$ width of cement walk
 $(10+2x)(50+2x) = 864 + 500$ pool area

$$4x^2 + 120x - 864 = 0$$

$$x = 6, x = -36 \text{ omit}$$

$$\text{width of walk} = 6 \text{ m}$$

⑥ Let $x =$ time A takes (since A started before B)

$$\frac{x}{12} + \frac{x-2}{8} = 1$$

$$x = 6 \text{ hrs.}$$

total time = 6 hrs.

⑨ Let $x =$ # liters of 100% acid

$$.45(12) + 1(x) = .63(12+x)$$

$$.37x = 2.16$$

$$37x = 216$$

$$x = \frac{216}{37} = 5\frac{31}{37} \text{ liters}$$

⑦ Let $x =$ rate of tailwind
 $500+x =$ rate with tailwind
 $500-x =$ rate against tailwind

$$t_{\text{with}} = 2(t_{\text{against}})$$

$$\frac{390}{500+x} = 2\left(\frac{180}{500-x}\right)$$

$$x = 20$$

tailwind is 20 km/h.