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Lesson 120: Age Word Problems

1) A man is 13 times as old as his son. In 10 years, he will be 3 times as old as his son will be. How old are they now?

	Now	+10 yrs
Man	$M = 26$	$M+10$
Son	$S = 2$	$S+10$ ←

$$\begin{cases} M = 13S \\ M+10 = 3(S+10) \end{cases}$$

$$135 - 10 = 3S + 30$$
$$105 = 30$$
$$S = 2$$

2) Five years ago, Brenda was $\frac{4}{5}$ as old as Layton. Ten years from now she will be $\frac{7}{8}$ as old as Layton. How old is each now?

	Now	−5 yrs	+10 yrs
Brenda	$B = 25$	$B-5$	$B+10$
Layton	$L = 30$	$L-5$	$L+10$

$$\begin{cases} B-5 = \frac{4}{5}(L-5) \\ B+10 = \frac{7}{8}(L+10) \end{cases}$$

$$[5B - 25 = 4L - 20] \cdot 8$$
$$[8B + 80 = 7L + 70] \cdot 5$$

$$\begin{cases} 40B - 200 = 32L - 160 \\ -40B - 400 = -35L - 350 \end{cases}$$
$$-600 = -3L - 510$$
$$3L = 90$$
$$L = 30$$

$$B - 5 = \frac{4}{5}(25)$$
$$B - 5 = 20$$
$$B = 25$$

3) Thirty years ago Barbie was 1 year older than twice Mary's age. Twenty years ago Mary was $\frac{4}{5}$ as old as Barbie was then.

	Now	−30 yrs	−20 yrs
Barbie	$B = 35$	$B-30$	$B-20$
Mary	$M = 32$	$M-30$	$M-20$

$$\begin{cases} B - 30 = 2(M-30) + 1 \\ M - 20 = \frac{4}{5}(B-20) \end{cases}$$

$$\begin{cases} B - 30 = 2M - 59 \\ 4B - 80 = 5M - 100 \end{cases}$$
$$[B - 2M = -29] \cdot -4$$
$$4B - 5M = -20$$

$$\begin{cases} -4B + 8M = +116 \\ 4B - 5M = -20 \end{cases}$$

$$3M = 96$$
$$M = 32$$
$$4B - 160 = -20$$
$$4B = 140$$
$$B = 35$$

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