Working Together

PR10-V1 · storyboard · PR10 Working together. Read each picture with its sentences.

Picture 1

Sam paints a fence in 12 h, Pippin in 8 h. Sam starts at 1 p.m.; Pippin joins at 3 p.m. When do they finish?

$$2 \times \frac{1}{12} = \frac{1}{6}$$ Sam alone

$$\frac{1}{12} + \frac{1}{8} = \frac{5}{24}$$ together, per hour

$$\boxed{\frac{5}{24}t = \frac{5}{6}, \quad t = 4}$$ 7 p.m.

1. Sam paints a fence in 12 hours, Pippin in 8.
2. Sam starts at 1 pm and Pippin joins him at 3 pm.
3. When do they finish?
4. Sam paints one twelfth an hour, so by 3 pm he has done one sixth.
5. Together their rates add: five twenty-fourths of the fence each hour.
6. Five sixths are left, so t is 4 hours.
7. They finish at 7 pm.

Picture 2

Trap Sam's head start

$$\times\ 1 \div \frac{5}{24} = 4.8 \text{ h}$$

$$\checkmark\ \frac{5}{6} \div \frac{5}{24} = 4 \text{ h}$$

8. Watch for the trap: forgetting the head start.
9. Sam has already done one sixth.

Picture 3

Brenda digs a ditch in 5 hours; with Jack it takes 3. How long would Jack take alone?

$$\frac{1}{3} - \frac{1}{5} = \frac{2}{15}$$ Jack's rate

$$\boxed{1 \div \frac{2}{15} = 7.5 \text{ h}}$$

10. Brenda digs a ditch in 5 hours.
11. With Jack's help it takes 3.
12. How long would Jack take alone?
13. Take away Brenda's rate from the team's: one third minus one fifth is two fifteenths.
14. So Jack alone takes 7.5 hours.

Picture 4

Trap $5\text{ h and }3\text{ h}$

$\times\ 5-3=2\text{ h}$

✓ $\frac{1}{3}-\frac{1}{5}=\frac{2}{15}$

15. Watch for the second trap: adding or taking away times.
16. Always work with the rates.