SOLVING WORK PROBLEMS

1. **To solve work problems, you need to work with the same unit of measure within each problem. For example, you cannot mix hours and minutes in the same equation.**
2. **You need to find the fractional part of the job that would be done in one unit of time, such as 1 minute or 1 hour. If a person can do a complete job in 3 days, he can do 1/3 of it in 1 day.**
3. **The fractional part of the job one person can do in 1 day plus the fractional part another person can do in 1 day equals the fractional part of the job the two can do together in 1 day. Example: If Bill can build 1/3 of a dog house in 1 day and Gary can build 1/5 of it in 1 day, together they can build 1/3 + 1/5 of the dog house in 1 day.**
4. **Rate of work ∗ time = work done.**

Example: Mark can dig a ditch in 4 hours. Greg can dig the same ditch in 3 hours. How long would it take them to dig it together?

Solution: Let x = number of hours to dig the ditch together. If Mark takes 4 hours to dig the ditch, he can dig 1/4 of it in 1 hour. Greg can dig 1/3 of it in one hour. Mark's rate is 1/4 and Greg's rate is 1/3. If it takes them x hours to dig it together, they can dig 1/x part of it in 1 hour together. The total of the fractional part each can dig or 1/3 + 1/4 = the fractional part they can dig together in 1 hour.

$$1/3 + 1/4 \ = \ 1/x$$

Multiply be 12x to clear the fractions.

$$4x + 3x \ = \ 12$$
$$7x \ = \ 12$$
$$x \ = 12/7 \text{ or } 1 \ 5/7$$

Sample Problems:

1. If Lisa can type a paper in 5 hours and together she and Bill can type it in 2 hours, how long would it take Bill to type the same paper alone?
2. A swimming pool can be filled by an inlet pipe in 10 hours and emptied by an outlet pipe in 12 hours. One day the pool is empty and the owner opens the inlet pipe to fill the pool. However, he forgets to close the outlet. With both pipes open, how long will it take to fill the pool?
3. Joe and Fred are linemen. Joe can string 10 miles of line in 3 days while together they can string it in 1 day. How long would it take Fred alone to string the same line?
4. One machine can complete a job in 10 minutes. If this machine and an older machine do the same job together, the job can be completed in 6 minutes. How long would it take the older machine to do the job?
5. Mike and his dad are bricklayers. Mike can lay bricks for a fireplace and chimney in 5 days. With his father's help, he can build it in 2 days. How long would it take his father to build it alone?
6. It takes Joe 5 hours to cut and rake her lawn. It takes Sue and their 3 children 7 hours to do the same job. How long would it take if the whole family did the job together? (round to the nearest hour.)

Answers:
1.   3 1/3 hours
2.   60 hours
3.   1 1/2 days
4.   15 minutes
5.   3 1/3 days
6.   3 hours