

Word Problems and Common Sense¹

1. 79 books are placed on 2 shelves. One shelf has 3 more books than the other. How many books are there on each shelf?

Answer: Instead of using variables, the idea is to draw two bars of equal length and then 3 blocks hanging off them. $79 - 3 = 76$, so the two bars contain 76 books total, which means each bar is 38. The answer is 38 and 41

2. Hugo eats up a jar of strawberry jam in 15 days, and Celeste does the same in 10 days. How long would a jar of jam last if both Hugo and Celeste ate from it?

Answer: Instead of using variables, the idea is that in 30 days, Hugo can eat 2 jars and Celeste 3 jars. This can be drawn with 2 long bars end to end and 3 shorter bars end to end. So in the 30 days, they together each 5 jars, which means 6 days per jar. The answer is 6 days

¹From *Mathematical Circle Diaries* by Ana Burago

1 Picture Sums

1. The ages of two siblings add up to 53 years. The brother is 9 years older than the sister. How old is the brother?

Answer: 31

2. Jim, Bob, Tom, and Siegfried took part in a pie eating contest. Jim ate 1 less pie than Bob, Bob ate 1 less than Tom, and Tom ate 1 less than Siegfried. How many pies did each one eat if together they ate 90 pies?

Answer: 29, 30, 31

3. A mountain gnome has a collection of precious stones. His dream is to have three times as many stones as he has now. The gnome noticed that his dream will come true if he adds 18 stones to his collection. How many precious stones does he have now?

Answer: 9

Extra Problems

4. Max and Bella spent the same amount of money at the amusement park. Max went on 3 roller coaster rides and 1 merry-go-round ride, while Bella rode the roller coaster twice and the merry-go-round 4 times. Which ride is more expensive and how many times more expensive?

Answer: roller coaster is 3 times the price of the merry-go-round

5. There are 32 animals on the farm – all pigs and hens. Together, these animals have 104 legs. How many pigs and how many hens are there at the farm?

Answer: The idea is that all 32 animals have at least 2 legs, so $2 \times 32 = 64$. After subtracting 64 from 104, there are 40 legs left for the 4 legged animals' extra 2 legs 20 pigs, 12 hens

2 Working Together

1. It takes 2 days for a horse to finish 1 bale of hay, 3 days for a cow to eat the same amount of hay, and 6 days for a goat to do the same. In how many days would the three of them together consume 1 bale of hay?

Answer: 1 day

2. Two turtles are racing each other. It takes 9 hours for the first turtle to crawl 4 meters and 11 hours for the second one to crawl 5 meters. Which turtle will win the race?

Answer: The 11 hour turtle, because it can crawl 20 meters in 44 hours, but the other takes 45 hours to crawl the 20 meters

Extra Problems

3. It takes 12 months for Santa Claus to prepare all the gifts for the upcoming Christmas. It would take 20 months for Santa's apprentice to do the same job. If they work together, how long will it take for them to prepare all the gifts?

Answer: 7 and a half months

4. Last year, it took 3 weeks for Grandma Ethel to knit blue scarves as gifts for all the grandchildren. This year, she wants to give them red scarves, and her daughter Betty will help her with knitting. It would take Betty 11 weeks to knit all the scarves if she works on her own. How long will it take for the two of them to finish the job if they work together?

Answer: $\frac{33}{14}$ weeks, which is 2 weeks and 2.5 days

3 Miscellaneous

1. Jeannie and Max had the same number of cookies. Max gave Jeannie 2 of his cookies.
 - (a) How many more cookies than Max does Jeannie have now?
 - (b) If Max now has only half as many cookies as Jeannie, how many cookies did each of them have in the beginning?

Answer: 4 more, 6 at beginning

2. At Hogwarts last year, the number of wizards who passed the levitation test was the same as the number of witches who failed it. Which is greater: the number of witches who took the test or the total number of witches and wizards who passed it?

Answer: same number of both

3. 25 kids are on a swim team. Out of any 10 of them, at least one is a girl. Out of any 17 of them, at least one is a boy. How many girls and how many boys are on the swim team?

Answer: 9 boys and 16 girls

Extra Problems

4. Brenda the Beaver stumbled upon a pile of long logs. For several days, she cut the long logs into smaller pieces. She made a total of 83 cuts, and ended up with 100 short logs. How many logs were there at the start?

Answer: 17