Ratios That Change

RP06-V1 · storyboard · RP06 Ratios that change. Read each picture with its sentences.

Picture 1

The ratio of girls to boys in a club is $3 : 5$. Then 6 more girls join, and the ratio becomes $1 : 1$. How many boys are in the club?

$$\text{girls} = 3k, \quad \text{boys} = 5k$$ the amounts at the start

$$3k + 6 = 5k$$ after: as many girls as boys

$$\boxed{k = 3}$$

$$\boxed{\text{boys} = 5 \times 3 = 15}$$

Check: $9 + 6 = 15$ ✓

1. The ratio of girls to boys in a club is 3 to 5.
2. Then 6 more girls join, and the ratio becomes 1 to 1.
3. How many boys are in the club?
4. Let the girls be 3 times k, and the boys 5 times k, for some number k.
5. After 6 girls join, there are as many girls as boys: 3k + 6 = 5k.
6. So 2k = 6, and k = 3.
7. The boys are 5 times 3, which is 15.
8. Check: 9 girls and 6 more is 15 girls, as many as the boys.

Picture 2

Trap $3:5,\ \ 6$ girls join

$\times\ (3+6):5$

✓ $(3k+6):5k$

9. Watch for the trap: changing the ratio numbers.
10. 3 and 5 are not the numbers of girls and boys.
11. Change the amounts: 3k + 6.

Picture 3

How many marbles were there?

$$\frac{g}{g+r} = \frac{2}{5}$$ green to all

$$3g = 2r$$ clear the fractions

$$g + 4 = 2(r - 10)$$ after

$$\boxed{g = 12, \quad r = 18}$$ 30 marbles

Check: $\frac{12}{30} = \frac{2}{5}, \quad 16 = 2 \times 8$ ✓

12. Two fifths of the marbles in a bag are green, and the rest are red.
13. Add 4 green and take out 10 red, and now there are twice as many green as red.
14. How many marbles were there?
15. Green to all the marbles is two fifths: g over g + r.
16. Clear the fractions: 5g = 2g + 2r, so 3g = 2r.
17. After: g + 4 is twice r − 10.
18. Solve the system: 12 green and 18 red, 30 marbles.
19. Check in the story: 12 out of 30 is two fifths, and 16 is twice 8.

Picture 4

Trap $\frac{2}{5}$ are green

$$\times \quad \frac{g}{r} = \frac{2}{5}$$

$$\checkmark \quad \frac{g}{g+r} = \frac{2}{5}$$

20. Watch for the trap: writing part to whole as part to part.
21. Two fifths compares the green marbles with all the marbles, not with the red ones.