The Product Stays the Same

PR03-V1 · storyboard · PR03 Inverse proportion. Read each picture with its sentences.

Picture 1

p and q are inversely proportional, and $p = 7$ when $q = 24$. Find p when $q = 12$.

$$pq = 7 \times 24 = 168 \quad \text{the constant product}$$

$$\boxed{12p = 168, \quad p = 14}$$

Check: $q \div 2,\ p \times 2$ ✓

1. p and q are inversely proportional, and p is 7 when q is 24.
2. Find p when q is 12.
3. The product stays the same: 7 times 24 is 168.
4. So 12 p equals 168, and p is 14.
5. Check: q was halved, so p doubled.
6. 7 times 2 is 14.

Picture 2

Trap $p = 7,\ q = 24 \to q = 12$

$$\times\ \frac{p}{12} = \frac{7}{24},\ p = 3.5$$

$$\checkmark\ \ 12p = 168,\ p = 14$$

7. Watch for the trap: treating it as direct.
8. Here the product stays the same, not the ratio.

Picture 3

A trip takes 2 hours at 60 km/h. How long does it take at 80 km/h?

$$\text{speed} \times \text{time} = 120$$ same trip: inverse

$$\boxed{120 \div 80 = 1.5 \text{ hours}}$$

9. A trip takes 2 hours at 60 kilometres per hour.
10. How long does it take at 80 kilometres per hour?
11. For the same trip, speed times time is the same: 120 kilometres.
12. Faster means less time.
13. So 120 divided by 80 is 1.5 hours.

Picture 4

Trap $pq = 168$

$\times\ p = 168$

✓ $p = 168 \div 12 = 14$

14. One more trap: stopping at the constant.
15. 168 is the product.
16. Divide it to get the answer.