



ACME 11Plus CHALLENGE

AMC11PLUS(08-09-18)-001

1. I have sixteen 1p stamps, six 7p stamps, and two 9p stamps. I wish to send a parcel costing 56p postage. What is the least number of my stamps I can use to send it?
2. If 12 men sit on a long bench, how many will have a man on each side of him?
3. In France, 1 kilogram of a certain brand of cheese costs 18 francs. What is the equivalent cost of 1 pound of this cheese in pence, to the nearest penny, if 1 kilogram is about 2.2 pounds, and £1 is worth 9 francs?
4. Two empty fish tanks have vertical sides and rectangular bases. The smaller tank has base measurements 40cm by 30cm, and its height is 20cm. The larger tank has base measurement 80cm by 60cm, and its height is 40cm. The smaller tank is filled completely with water, and then this is poured into the larger tank. What is the depth of the water in the larger tank?
5. A train leaves London at 10 am and travels at a speed of 60 km/hr to Reading, which is 60km from London. Another train leaves Reading at 10:30 am on the same day, and travels on a parallel track towards London at the same speed 60 km/hr. At what time do the trains pass each other?

END



Acme Maths Challenge solutions

- I have sixteen 1p stamps, six 7p stamps, and two 9p stamps. I wish to send a parcel costing 56p postage. What is the least number of my stamps I can use to send it? **10**

Solution:

Denomination		1p	7p	9p	Total
No. of stamps available		16	6	2	24
Case 1	No. of stamps	3	5	2	10 (smallest)
	Cost (p)	3	35	18	56
Case 2	No. of stamps	10	4	2	16
	Cost (p)	10	28	18	56
Case 3	No. of stamps	5	6	1	12
	Cost (p)	5	42	9	56

- If 12 men sit on a long bench, how many will have a man on each side of him? **10**

Solution:

MMMMMMMMMMMM

Each of the 10 men in the middle has a man on each side.

However, any of the two men seated at the ends do not have a man on each side.

- In France, 1 **kilogram** of a certain brand of cheese costs 18 **francs**. What is the equivalent cost of 1 **pound** of this cheese in **pence**, to the nearest penny, if 1 kilogram is about 2.2 pounds, and £1 is worth 9 francs? **45 pence**

Solution:

Weight of cheese	Cost in francs	Cost in pence
1 kg	18 francs	100 pence (£1)
2.2 pounds (same as 1kg)	18 francs	100 pence
1 pounds		$100 \div 2.2 = 45$ pence

- Two empty fish tanks have vertical sides and rectangular bases. The smaller tank has Base measurements 40cm by 30cm, and its height is 20cm. The larger tank has base measurement 80cm by 60cm, and its height is 40cm. The smaller tank is filled completely with water, and then this is poured into the larger tank. What is the depth of the water in the larger tank? **5 cm**

Solution:

Volume of water in smaller tank = (base area) × height = $40 \times 30 \times 20 \text{ cm}^3$

Volume of water in larger tank = $80 \times 60 \times (\text{water depth}) \text{ cm}^3$

The two volumes are equal

$$\text{Depth of water in larger tank} = \frac{\text{volume}}{\text{area}} = \frac{40 \times 30 \times 20}{80 \times 60} = 5 \text{ cm}$$

- A train leaves London at 10 am and travels at a speed of 60 km/hr to reading, which is 60km from London. Another train leaves Reading at 10:30 am on the same day, and travels on a parallel track towards London at the same speed 60 km/hr. At what time do the trains pass each other? **10:45 am**

Solution:

Both trains have same speed.

In 1 hour (60 minutes) Train 1 can cover 60 km

In 30 minutes Train 1 can cover 30 km

Therefore, at 10:30 am Train 1 is 30 km from London

It has another 30 km to cover to reach Reading

At 10:30 am the two trains are 30 km apart and are going at the same speed at each other

Therefore, they should meet at half way point that is 15 km away

60 km takes 60 minutes

15 km takes 15 minutes

Therefore, the trains pass each other at 10:30 + 15 minutes

The trains pass each other at **10:45 am**