



VIC SKEPTICS

Logic and Maths Puzzles 77 December 2018

1. Linda is a baby-sitter for five pre-school children: boys Brad, Danny and Tom and girls Kate and Sarah.

Each child is a different age; six months, one year, eighteen months, two years and three years.

Last week Linda minded a different child each day.

Danny (who didn't come on Thursday) is exactly one year older than Monday's child, who is exactly six months older than Sarah.

Brad is exactly six months older than Tuesday's child, who is exactly six months older than Kate.

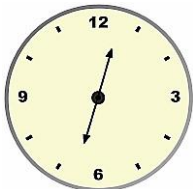
Linda minded Tom on Wednesday.

(a) How old is Tom?

(b) On what day was Kate minded?

	Brad	Danny	Kate	Sarah	Tom	6 months	1 year	18 months	2 years	3 years
Mon										
Tue										
Wed										
Thu										
Fri										
6 months										
1 year										
18 months										
2 years										
3 years										

2.



It's between noon and 1 pm. A clock's hour and minute hands are pointing directly away from each other. What is the time to the nearest minute?

3. Tommy wants to save \$12 to buy his mum a gift.

On Day 1 he puts 10 cents in his piggy bank, on Day 2 20 cents, on Day 3 30 cents and so on. Following this pattern, on which day will he reach his savings goal?



4. List the 6 prime numbers lower than 100 which have a "9" as one of their digits.

5. If you have 15 coins in 20 cent & 50 cent pieces, and the total amount you have is \$4.50, how many of each coin do you have?

6. Helen cut off $\frac{2}{5}$ of a piece of string.

Later, she cut off another 14 m.

The combined length of the cut string is three times that of the remaining string.

What is the length of the remaining string?

7. A toy boat is floating in a swimming pool.
Which will raise the level of the water in the pool higher?

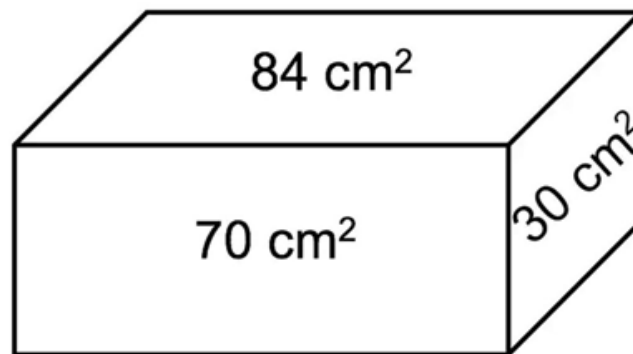
A. Dropping a 50c coin in the pool

B. Dropping a 50c coin in the boat

C. Both will raise the water level the same amount



8. The areas of the faces of a rectangular box are 84 cm^2 , 70 cm^2 and 30 cm^2 .

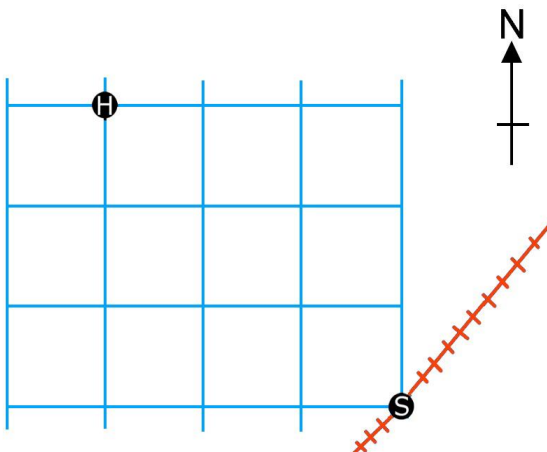


What is the volume of the box?

9. There are four numbers. If we leave out any one number, the average of the other three numbers will be 45, 60, 65 or 70, depending on the number we leave out.

Is the average of all four numbers: **A.** 50, **B.** 55, **C.** 60 or **D.** 65?

- 10.



The diagram at left is a map of your town. The blue lines represent streets, all laid out on a North-South grid.

If you want to walk from your home (H) to the station (S) by the shortest route, one way or another you will therefore travel six blocks.

How many alternative shortest routes do you have?

Answers:

- (a) 6 months (b) Thursday
- 12:33 pm
- Day 15
- 19, 29, 59, 79, 89, 97
- 5 X 50 cent pieces, 10 X 20 cent pieces.
- 10 m

Let the remaining length of string = x cm

Then the original uncut string is $x + 3x = 4x$ cm.

$$\frac{2}{5} \text{ of the original length of string} = \frac{2}{5} \times 4x = \frac{8x}{5}$$

The combined length of cut string is $\frac{8x}{5} + 14$ and is also $3x$

$$\frac{8x}{5} + 14 =$$

$$\frac{8x}{5} = 3x - 14$$

$$8x = 15x - 70$$

$$7x = 70$$

$$x = 10$$

- B. Dropping a coin in the boat.
- 420 cm³

This problem could be solved by trial and error if you assume that the box's length, width and height are whole numbers and that the box is drawn more or less to scale: length is greater than width which is greater than height. An algebraic solution follows:

Let the box's length, width and height be l cm, w cm and h cm respectively.

$$l \times w = 84 \quad - [1]$$

$$h \times w = 30 \quad - [2]$$

$$l \times h = 70 \quad - [3]$$

from [2], $w = 30/h$ substitute $30/h$ for w in [1]

$$l \times 30/h = 84$$

multiply both sides by h

$$lh \times 30 = 84h$$

$$30l = 84h$$

$$\text{But } lh = 70$$

Continued:

$$30 \times 70/h = 84h$$

Multiply both sides by h

$$84h^2 = 2100$$

$$h^2 = 2100 / 84 = 25$$

$$h = 5$$

$$\text{since } l \times h = 70$$

$$l = 14$$

$$\text{since } w \times h = 30$$

$$w = 6$$

$$\text{volume} = 14 \times 6 \times 5 = 420$$

9. C. 60

You COULD use simultaneous equations to work out the value of all four numbers, then take an average, but there's a sneakier way.

If the four numbers are a , b , c and d , then we know that

$$a + b + c = 45 \times 3$$

$$a + b + d = 60 \times 3$$

$$a + c + d = 65 \times 3$$

$$b + c + d = 70 \times 3$$

Now add these equations up to get

$$3a + 3b + 3c + 3d = (45 + 60 + 65 + 70) \times 3$$

Dividing through by 3

$$a + b + c + d = (45 + 60 + 65 + 70) = 240.$$

So their average is $240/4 = 60$

10. 20