SPECIAL May 2020 – PUZZLES No 13
Logic & Maths (With Solutions)

1. Four sites, each in a different state of Australia were excavated by archaeologist Digby Midden. He found evidence of human occupation dating back to different periods in prehistory for each site.

- The site in New South Wales was either the site discovered in 2016 or the site that was dated to 12,000 years ago
- Dr Midden studied the Victorian site in 2013
- Of the site in New South Wales and the Tasmanian site, one was excavated in 2008 and the other was dated to 15,000 years ago
- The site that was dated to 21,000 years ago was found in 2016.

	NSW	QLD	TAS	VIC	2008	2012	2013	2016
21,000								
18,000								
15,000								
12,000								
2008								
2012								
2013								
2016								

a. In which state was the oldest site?

b. Which state's site did Dr Midden excavate in 2012?

c. How many years ago was the Victorian site found to be occupied in prehistory?

2. Beverley wants to save $50 to buy her mum a gift.

On Day 1 she puts 10 cents in her piggy bank.

On Day 2 she puts 10 cents plus a further 20 cents in her piggy bank.

On Day 3 she puts 10 cents plus 20 cents plus a further 30 cents in her piggy bank, and so on.

Following this pattern, on which day will she pass her savings goal?

3. In order to complete a DIY concreting job I first carried some sand to the job site as full buckets.

I mixed in five sixths of the sand, (which was not quite enough) so I added another half bucket.

On finishing the job I still had a bucket of sand left over.

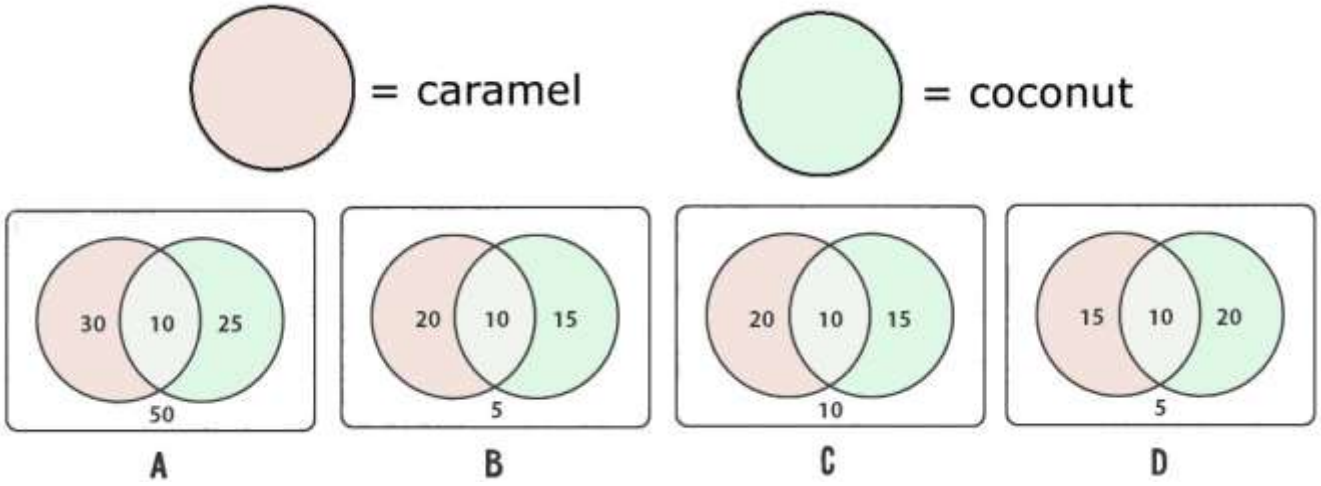
How many buckets of sand did I carry to the job site?

4. The three Smith children decide to shell a kilogram of peas. Working by themselves, it takes the eldest child 20 minutes, the middle child 25 minutes and the youngest child 50 minutes to shell that many peas.

How long should it take (to the nearest minute) if they work cooperatively?

5. There are 50 chocolates in a box; 30 have caramel in their filling; 25 have coconut in their filling; 10 have both caramel and coconut, and the rest are plain; no filling.

Which of the following Venn diagrams best illustrates that: A, B, C or D?



6. Zig and Zag have 15 ice creams between them.

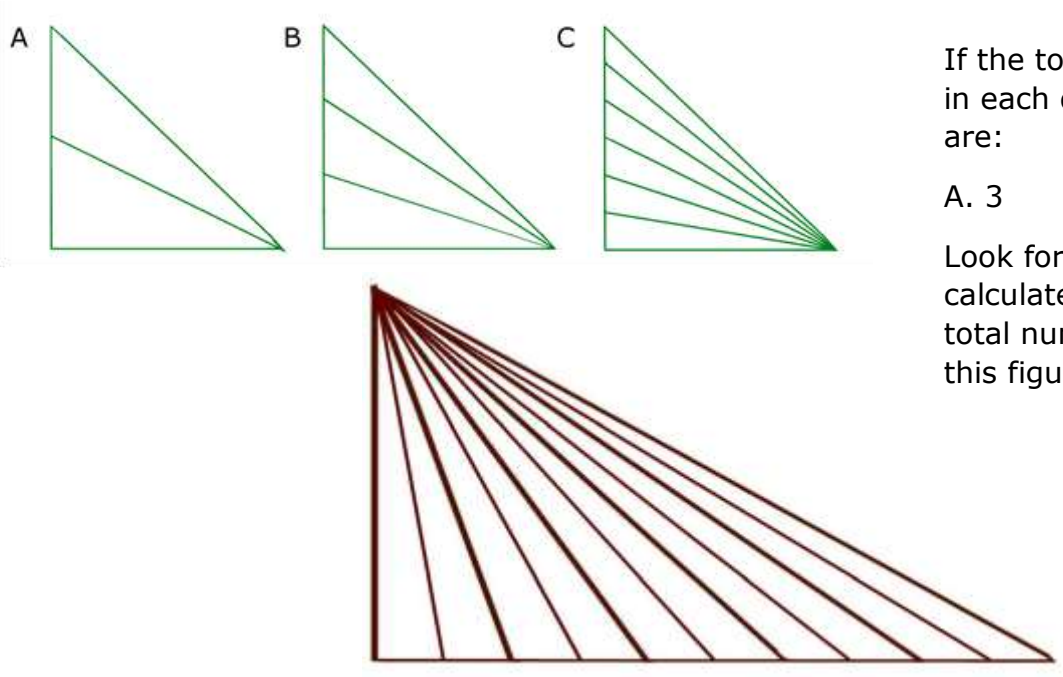
If Zig managed to increase his ice cream tally by 50% he would have five more than Zag has now.

How many ice creams do they each have?

7. One half of a certain number plus one quarter of the same number equals three less than the number. What is the number?

8. Eight times a certain number exceeds half that number by 15. What's the number?

9.

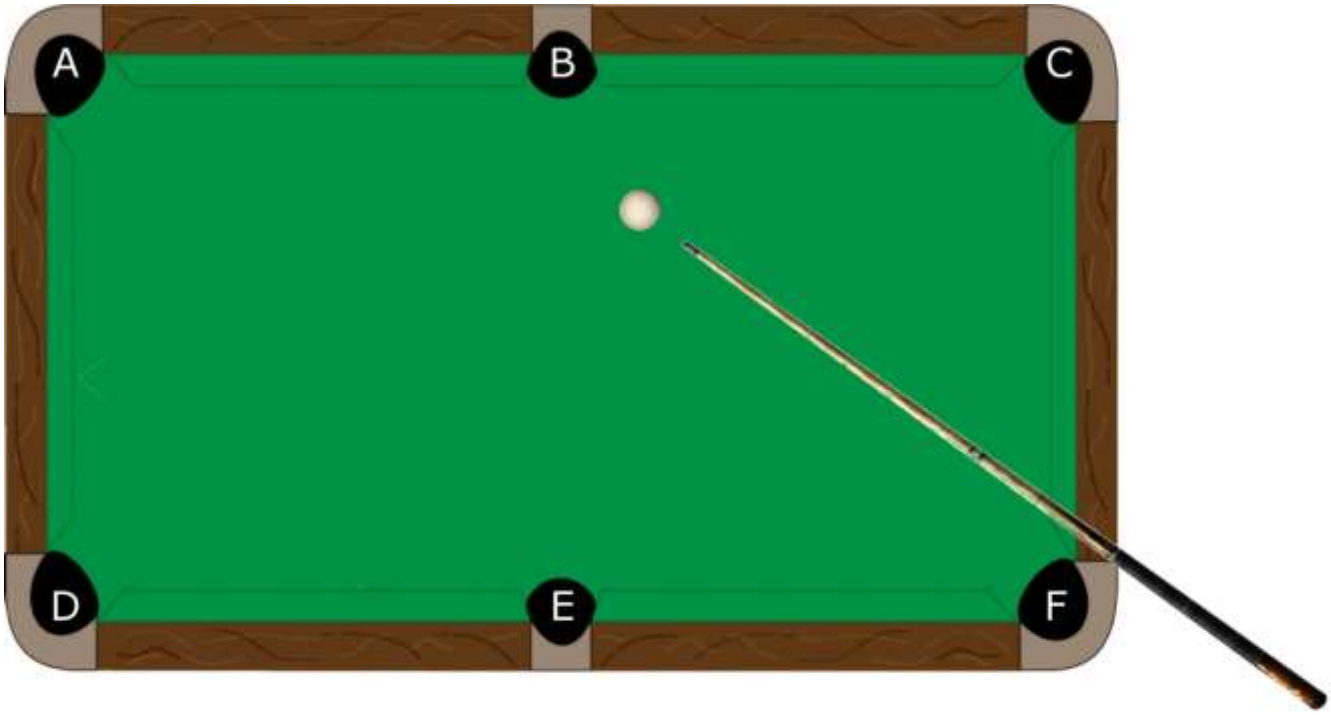


If the total number of triangles in each diagram on the left are:

A. 3 B. 6 C. 21

Look for a pattern or rule, then calculate (don't count) the total number of triangles in this figure

10.



Assuming it is struck with correct weight and no “side” and the cushions are playing true, into which pocket will the cue ball drop?

Answers:

1. a. Queensland b. Tasmania c. 18,000 years

2. Day 14

3. 9 Buckets

Let the number of buckets I allowed to equal b

Then $5b/6 + ½ + 1 = b$

$5b/6 + 1½ = b$

Multiplying through by 6:

$5b + 9 = 6b$

$6b - 5b = 9$

$b = 9$

4. 9 minutes

First calculate the relative rate at which each child can shell peas. The amount of peas able to be shelled in a given time is additive.

One possible approach is as follows:

Oldest child shells 1000g of peas in 20 minutes. That's 1000 ÷ 20 = 50g / min
Middle child shells 1000g of peas in 25 minutes. That's 1000 ÷ 25 = 40g / min
Youngest child shells 1000g of peas in 50 minutes. That's 1000 ÷ 50 = 20g / min

So working together they can shell 50 + 40 + 20 = 110 g / min

It will take them 1000 ÷ 110 = 9.09 minutes to shell 1 kg of peas.

5. Diagram B

If 30 chocolates contain caramel, and 10 contain a mixture of caramel and coconut, then to calculate the ones containing JUST caramel = 30 – 10 = **20**.

If 25 chocolates contain coconut, and 10 contain a mixture of caramel and coconut, then to calculate the ones containing JUST coconut = 25 – 10 = **15**.

So the sum of the chocolates that contain JUST caramel + the chocolates that contain JUST coconut + the chocolates that contain a mixture of caramel and coconut = 20 + 15 + 10 = **45**.

The number of plain chocolates = 50 – 45 = **5**

6. Zig has 8 ice creams, Zag has 7

Let the number of ice creams Zig and Zag now have be Z_i and Z_a respectively.

Then $Z_i + Z_a = 15$

And $3Z_i/2 = Z_a + 5$

Substituting $Z_i = 15 - Z_a$

$3 \times (15 - Z_a) / 2 = Z_a + 5$

$45 - 3Z_a = 2Z_a + 10$

35 = 5 Z_a

Z_a = 7

So Zag has 7 ice creams, Zig has 8

Proof: If Zig increased his ice creams by 50% he would have 12, which is 5 more than Zag has

7. 12

8. 2

9. 55 (10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 = 55)

10.