

Q1. What is the sum of the first 10 prime numbers less the sum of the next three primes?

ATTEMPTS

--	--	--	--	--

Q2. The year 1881 looks exactly the same as itself when rotated 180° about its centre. Name the next year after 1881 which also does this.

ATTEMPTS

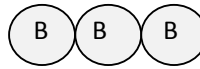
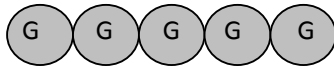
--	--	--	--	--

Q3. A two digit number, when read from right to left, is four and a half times as large as when read from left to right. Find the number.

ATTEMPTS

--	--	--	--	--

Q4



A bag contains 10 marbles, 5 green, 3 blue and 2 red. Given that you have already drawn one blue marble from the bag, what is the probability that if two more marbles are drawn from the bag, one at a time without replacement, that neither marble is blue?

ATTEMPTS

--	--	--	--	--

Q5. The sum of x and y is 13 and the product is 30. What is the value of $\frac{1}{x} + \frac{1}{y}$?

ATTEMPTS

--	--	--	--	--

Q6. The number seven can be expressed in binary(base 2) as 111_2

2^2	2^1	2^0
1	1	1

And the number 13 is 1101_2

2^3	2^2	2^1	2^0
1	1	0	1

What is $101_2 \times 1011_2$? Give your answer in binary form.

ATTEMPTS

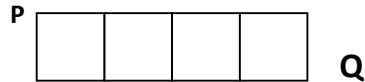
--	--	--	--	--

Q7. Rusty, from the US, was boasting that his car was really economical. In America it would do 40 mpg (that is 40 miles to a gallon of petrol). Moira, a Kiwi, reckoned that her car was more economical as it used 7 litres per 100km in New Zealand. If one US gallon is 4 NZ litres, and 1 mile is 1.6km, whose car is most economical AND by how many mpg? Answer to nearest mpg.

ATTEMPTS

--	--	--	--	--

Q8



Saffron lives at point P, 4 blocks from work at point Q. She randomly chooses the route to work each time she reaches a junction, though she never goes back over any route she has already travelled. What is the probability she takes the longest route to work? Write your answer as a fraction in its simplest form.

ATTEMPTS

--	--	--	--	--

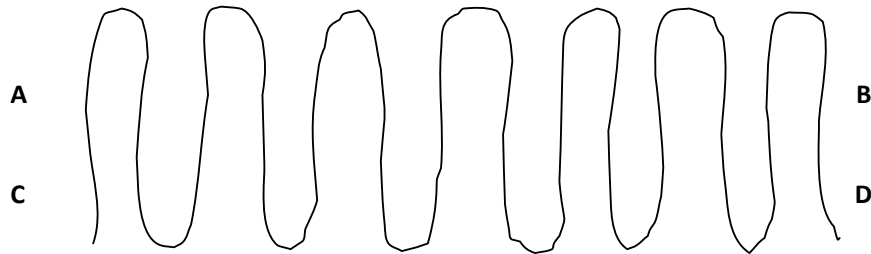
Q9. A high powered rifle fires a bullet at 3600km/hr horizontally towards a target 180m away. The rifle is aimed directly at the bulls-eye. As the bullet travels to the target it drops (because of gravity) a vertical distance d in metres given by $d = 4.9t^2$, where t is the time in seconds to reach the target.

By the time the bullet reaches the target, how many centimetres (to the nearest cm) has the bullet dropped?

ATTEMPTS

--	--	--	--	--

Q10. A string, 210cm long, is laid out as below:



It is cut through the centre, along the line joining A to B. The top half is folded over and laid directly on top of the bottom half. The string is then cut in half again along the line joining C to D.

Each piece of string is then joined by a knot to every other piece until there is one piece of string again. If each knot shortens the string by 2cm, what percentage of the old string is the new string?

ATTEMPTS

--	--	--	--	--

Q 11. A boat, which can travel at 2km/hr in still water, sets off from a wharf on one side of a river bank to a wharf directly opposite on the bank of the river 800 metres away. It aims at 90° to the river bank at all times. Unfortunately, a current travelling at 1.6km/hr at right angles to the boat is dragging it downstream.

If the boat remains pointed directly at the opposite bank, how far downstream from the wharf on the opposite bank will it be when it reaches the opposite bank?

ATTEMPTS

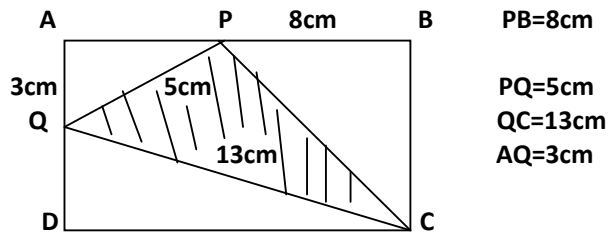
--	--	--	--	--

Q12. Conway had a V 8 engine which weighed 310kg. One day, for an experiment, he put the engine in his son's 2 metre diameter circular pool. While the engine was underwater, he weighed the engine and found it to weigh 40kg. How far had the water risen up the side of the pool once the engine had been lowered in? Answer to the nearest millimetre.
 Note: 1 litre of displaced water weighs 1kg.

ATTEMPTS

--	--	--	--	--

Q13.



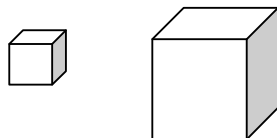
ABDC is a rectangle and QPC is a triangle.

What percentage of rectangle ABCD (to the nearest %)
 is the shaded triangle QPC?

ATTEMPTS

--	--	--	--	--

Q14



The ratio of the surface area of the smaller cube to the surface area of the larger cube is 12:27
 What is the ratio of the volume of the smaller cube to the volume of the larger cube in its simplest form?

ATTEMPTS

--	--	--	--	--

Q15. Resistance to a boat moving through water is a cubic relationship. For example, if a craft doubles its speed, then the water resistance increases by a factor of $2^3 = 8$ hence needing 8 times the power.

If a 15hp outboard motor can push a boat through the water at 24 knots, how much horsepower would be needed to drive the same boat at 40 knots? Round to the nearest ten.

ATTEMPTS

--	--	--	--	--

Q16. Three brothers Paddy, Sean and Seamus were given a tree topping job for the day.

Paddy earned 80% of Sean's wage.

Sean earned 120% of Seamus's wage.

The three men earned a total of \$474.

How much did Sean earn?

ATTEMPTS

--	--	--	--	--

Q17. The average rainfall in Te Puke for the first 30 days of January was measured to be 4mm per day. How much rain must fall on the 31st of January to increase the monthly average to 6mm per day?

ATTEMPTS

--	--	--	--	--

Q18. In 1969 when Buzz Aldrin was on the moon, he collected three round rocks of diameter 6cm, 4cm and 2cm respectively for his family.

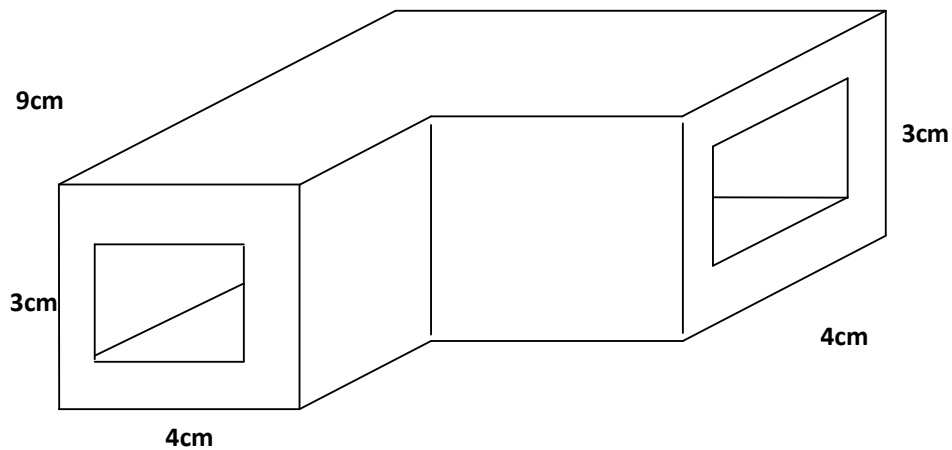


The total weight of all three he measured to be 3.6kg. When he returned to Earth (where everything is six times heavier than on the moon) he kept the 4cm diameter rock for himself and gave the other two to his family. What did his 4cm diameter rock now weigh?

ATTEMPTS

--	--	--	--	--

Q19. This section of pipe is hollow, with the walls $\frac{1}{2}$ cm thick.
9cm



What is the total surface area of this section of pipe, both inside and outside?

ATTEMPTS

--	--	--	--	--

Q20. Using the numbers 1 to 9, fill in the 3x3 square so that the sum of any 2x2 square (like the shaded square) is always the same. Three of the nine numbers have been filled in for you.

1		
		7
		4

ATTEMPTS

--	--	--	--	--