M.A.T. RELAY COMPETITION
UPPER SECONDARY [Year 9 - 10] SAMPLE

1.

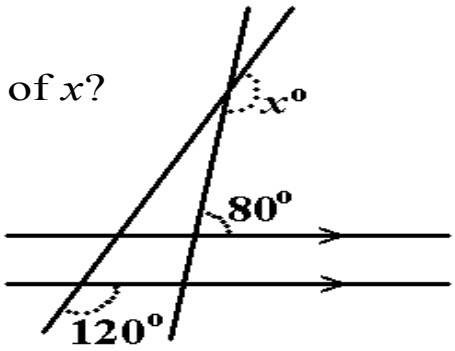
In 2004 Anzac Day (April 25th) fell on a Sunday. This happens again in 2010. What will be the next year it happens after 2010?

ANSWER	5 MARKS

M.A.T. RELAY COMPETITION
UPPER SECONDARY [Year 9 - 10] SAMPLE

2.

What is the value of x?



ANSWER	5 MARKS

M.A.T. RELAY COMPETITION
UPPER SECONDARY [Year 9 - 10] SAMPLE

3. After 5 cricket innings a batsman's average (mean score) is 38.
The batsman has three more innings to play in the season. What score must he average in his remaining innings if he wishes to have an average of 50 runs for the season?

ANSWER	**5 MARKS**

M.A.T. RELAY COMPETITION
UPPER SECONDARY [Year 9 - 10] SAMPLE

4. A number is **abundant** if the sum of its factors is greater than the number itself.
12 is the first abundant number because its factors are; 1, 2, 3, 4, and 6
And when we total these numbers:

$$1 + 2 + 3 + 4 + 6 = 16$$

which is bigger than 12.

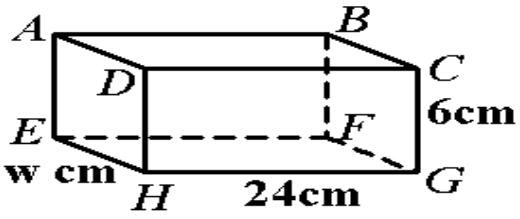
What is the next abundant number?

ANSWER	**5 MARKS**

M.A.T. RELAY COMPETITION
UPPER SECONDARY [Year 9 - 10] SAMPLE

5.

A rectangular box $ABCDEFGH$ has length 24 cm, Height 6 cm and body diagonal (AG) 26 cm. What is its width, w, in cm?



ANSWER	10 MARKS

M.A.T. RELAY COMPETITION
UPPER SECONDARY [Year 9 - 10] SAMPLE

6.

Solution A contains 30% ethanol.
Solution B contains 40% ethanol.
If 20 litres of A is mixed with 30 litres of B, what is the percentage of ethanol in the resulting mixture?

ANSWER	10 MARKS

M.A.T. RELAY COMPETITION
UPPER SECONDARY [Year 9 - 10] SAMPLE

7. *a*, *b*, *c*, *d*, *e* and *f* are numbers in increasing order. The average of *a*, *b*, *c*, *d* and *e* is 22.6 and the average of *b*, *c*, *d*, *e* and *f* is 25.0. If *f* = 31, what is *a*?

ANSWER	10 MARKS

M.A.T. RELAY COMPETITION
UPPER SECONDARY [Year 9 - 10] SAMPLE

8. Given that $3! = 3 \times 2 \times 1$

$4! = 4 \times 3 \times 2 \times 1$

$5! = 5 \times 4 \times 3 \times 2 \times 1$

and so on,

what is the value of $\dfrac{25!}{24! + 23!}$?

ANSWER	15 MARKS

M.A.T. RELAY COMPETITION
UPPER SECONDARY [Year 9 - 10] SAMPLE

9. Geoff can run at 8 m/s. Joe can run at 7 m/s. One day Geoff and Joe begin running around a circular track 400m in length. How far has Joe run by the time that Geoff 'laps' him? (To 'lap' means to be one lap in front.)

ANSWER	15 MARKS

M.A.T. RELAY COMPETITION
UPPER SECONDARY [Year 9 - 10] SAMPLE

10. An aircraft is running low on fuel. The pilot must re-plan his flight in order to reach the nearest airstrip which is 300 km away. He is currently flying at the slowest possible speed (5 km/min). At this speed his fuel will last for 40 mins.
If he increases his speed his fuel will be consumed at a faster rate. For every extra km/min that he increases his speed his fuel reserves will last 2 minutes less.

Find the speeds between which the pilot could fly the aircraft and still safely reach the landing strip.

ANSWER	20 MARKS