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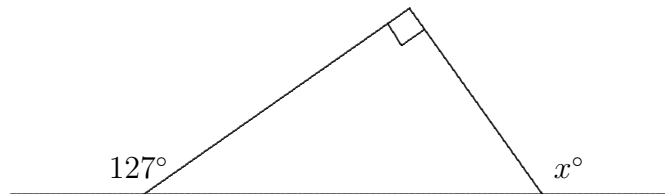
Intermediate Division

Questions 1 to 10, 3 marks each

1. The value of $2011 - 1102$ is

- (A) 1111 (B) 1191 (C) 1001 (D) 989 (E) 909
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2. In the diagram, the value of x is

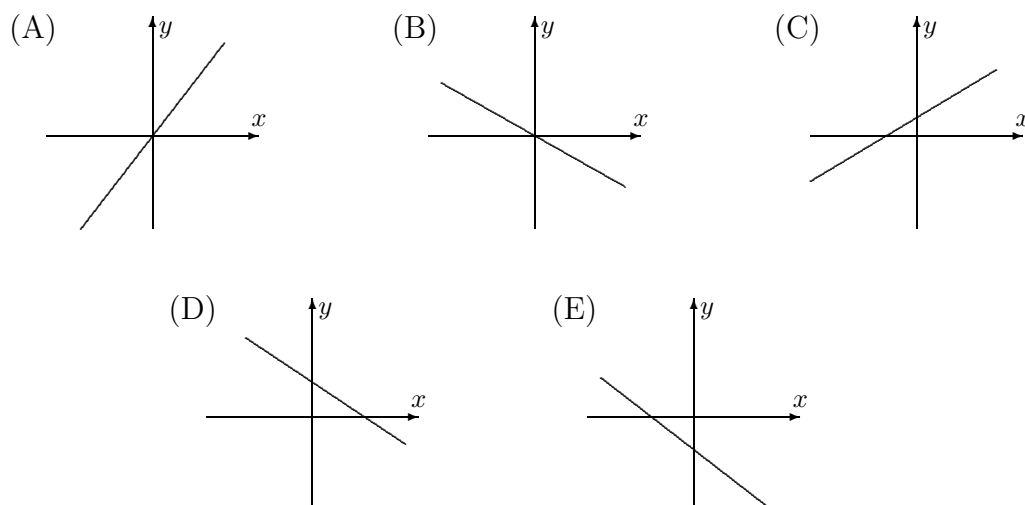


- (A) 143 (B) 127 (C) 90 (D) 153 (E) 37
-

3. The value of $14 \div 0.4$ is

- (A) 3.5 (B) 35 (C) 5.6 (D) 350 (E) 0.14
-

4. Which of the following could be the graph of $y = 2x + 1$?



5. The expression $8x - 4y - 3x + 2y$ equals

- (A) $4x - y$ (B) $5x - 2y$ (C) $5x - 6y$ (D) $11x - 2y$ (E) $11x - 6y$
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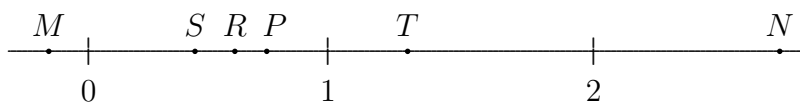
6. By what number must $\frac{1}{3}$ be divided to obtain 4 as a result?

- (A) $\frac{1}{12}$ (B) 6 (C) $1\frac{1}{3}$ (D) $\frac{1}{4}$ (E) 12

7. Which one of the following is *not* equal to 3^9 ?

- (A) $(3^3)^3$ (B) $3^3 \times 3^3 \times 3^3$ (C) 27^3 (D) $9^3 \times 27$ (E) 9^4

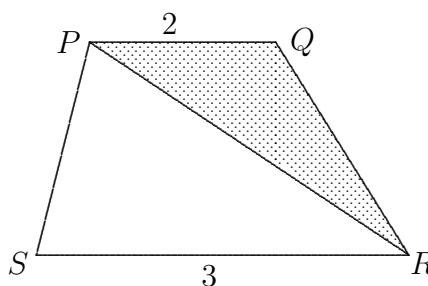
8. The numbers represented by points R and P on the number line below are multiplied. Which point would best represent the product of these two numbers?



- (A) M (B) N (C) P (D) S (E) T

9. $PQRS$ is a trapezium in which $PQ = 2$ units and $RS = 3$ units. What fraction of the trapezium is shaded?

- (A) $\frac{1}{5}$ (B) $\frac{1}{4}$ (C) $\frac{1}{3}$
 (D) $\frac{2}{5}$ (E) $\frac{1}{2}$



10. An $8 \times 8 \times 8$ hollow cube is constructed from $1 \times 1 \times 1$ cubes so that its six walls are 1 cube thick. The number of $1 \times 1 \times 1$ cubes needed to make the hollow cube is

- (A) 169 (B) 296 (C) 298 (D) 384 (E) 512

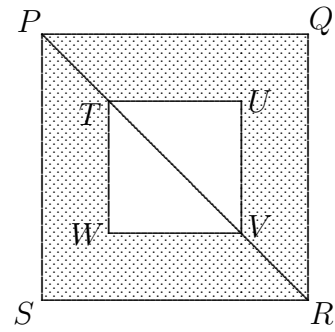
Questions 11 to 20, 4 marks each

11. In my neighbourhood, 90% of the properties are houses and 10% are shops. 10% of the houses are for sale and 30% of the shops are for sale. What percentage of the properties for sale are houses?

- (A) 9% (B) 80% (C) $33\frac{1}{3}\%$ (D) 75% (E) 25%

- 12.** $PQRS$ is a square. $TUVW$ is a smaller square placed inside as shown with $PR = 2TV$. The ratio of the shaded area to the area of the square $PQRS$ is

- (A) 2 : 3 (B) 3 : 4 (C) 1 : 3
(D) 1 : 2 (E) 2 : 5



- 13.** The numbers on the six faces of this cube are consecutive even numbers.



If the sums of the numbers on each of the three pairs of opposite faces are equal, find the sum of all six numbers on this cube.

- (A) 196 (B) 188 (C) 210 (D) 186 (E) 198

- 14.** The positive integers are arranged in a zigzag fashion across five rows as follows:

A	1	9	17		
B	2	8	10	16	18
C	3	7	11	15	19
D	4	6	12	14	
E	5		13		

In which row will 2011 appear?

- (A) A (B) B (C) C (D) D (E) E

- 15.** Two tourists are walking 12 km apart along a flat track at a constant speed of 4 km/h. When each tourist reaches the slope of a mountain, she begins to climb with a constant speed of 3 km/h.



What is the distance, in kilometres, between the two tourists during the climb?

- (A) 16 (B) 12 (C) 10 (D) 9 (E) 8

16. The six faces of a dice are numbered $-3, -2, -1, 0, 1, 2$. If the dice is rolled twice and the two numbers are multiplied together, what is the probability that the result is negative?

(A) $\frac{1}{2}$ (B) $\frac{1}{4}$ (C) $\frac{11}{36}$ (D) $\frac{13}{36}$ (E) $\frac{1}{3}$

17. A 36 cm by 24 cm rectangle is drawn on 1 cm grid paper such that the 36 cm side contains 37 grid points and the 24 cm side contains 25 grid points. A diagonal of the rectangle is drawn. How many grid points lie on that diagonal?

(A) 10 (B) 12 (C) 13 (D) 15 (E) 21

18. Three people play a game with a total of 24 counters where the result is always that one person loses and two people win. The loser must then double the number of counters that each of the other players has at that time.

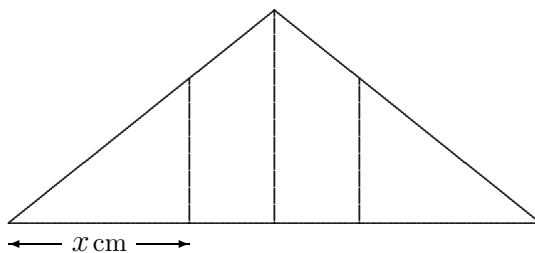
At the end of three games, each player has lost one game and each person has 8 counters. At the beginning, Holly had more counters than either of the others. How many did she have at the start?

(A) 9 (B) 11 (C) 13 (D) 16 (E) 24

19. Mary has 62 square blue tiles and a number of square red tiles. All tiles are the same size. She makes a rectangle with red tiles inside and blue tiles on the perimeter. What is the largest number of red tiles she could have used?

(A) 62 (B) 182 (C) 210 (D) 224 (E) 240

20. An isosceles triangle has a horizontal base of length 12 centimetres. It is divided into four equal areas by three parallel lines as shown.



What is the value of x ?

(A) $3\sqrt{2}$ (B) 4 (C) 4.5 (D) 3 (E) $3\sqrt{3}$

25. An arrangement of numbers has *different differences* when the differences between neighbours are all different. For example, the numbers

$$\boxed{1} \boxed{4} \boxed{2} \boxed{3}$$

have differences 3, 2 and 1 – all different.

If the numbers from 1 to 6 are arranged with different differences, and with 3 in the third position,

$$\square \square \boxed{3} \square \square \square$$

what is the sum of the last three digits?

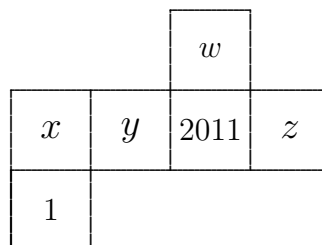
- (A) 12 (B) 13 (C) 14 (D) 15 (E) 16

For questions 26 to 30, shade the answer as an integer from 0 to 999 in the space provided on the answer sheet.

Question 26 is 6 marks, question 27 is 7 marks, question 28 is 8 marks, question 29 is 9 marks and question 30 is 10 marks.

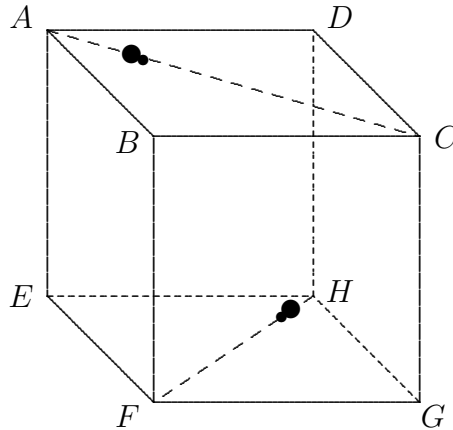
26. The first digit of a six-digit number is 1. This digit 1 is now moved from the first digit position to the end, so it becomes the last digit. The new six-digit number is now 3 times larger than the original number. What are the last three digits of the original number?

27. The diagram shows the net of a cube. On each face there is an integer: 1, w , 2011, x , y and z .



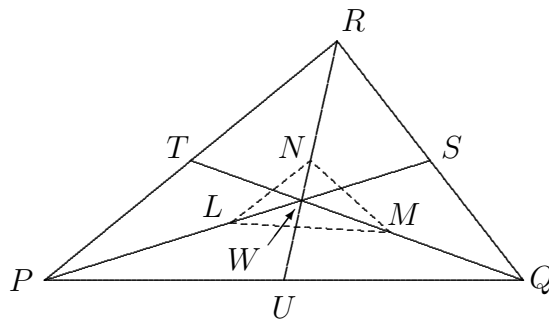
If each of the numbers w , x , y and z equals the average of the numbers written on the four faces of the cube adjacent to it, find the value of x .

28. Two beetles sit at the vertices A and H of a cube $ABCDEFGH$ with edge length $40\sqrt{110}$ units. The beetles start moving simultaneously along AC and HF with the speed of the first beetle twice that of the other one.



What will be the shortest distance between the beetles?

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29. In the diagram, $\triangle PQR$ has an area of 960 square units. The points S , T and U are the midpoints of the sides QR , RP and PQ , respectively, and the lines PS , QT and RU intersect at W .



The points L , M and N lie on PS , QT and RU , respectively, such that $PL : LS = 1 : 1$, $QM : MT = 1 : 2$ and $RN : NU = 5 : 4$. What is the area, in square units, of $\triangle LMN$?

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30. A 40×40 white square is divided into 1×1 squares by lines parallel to its sides. Some of these 1×1 squares are coloured red so that each of the 1×1 squares, regardless of whether it is coloured red or not, shares a side with at most one red square (not counting itself). What is the largest possible number of red squares?
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