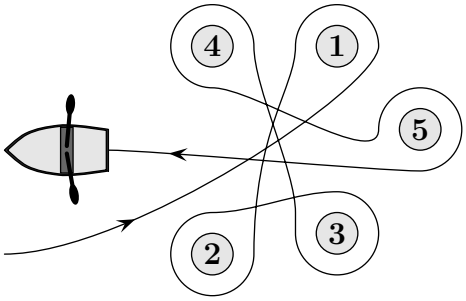
CANADIAN MATH KANGAROO CONTEST PROBLEMS

PART A: EACH CORRECT ANSWER IS WORTH 3 POINTS

1. Meike paddled around five buoys, as shown.



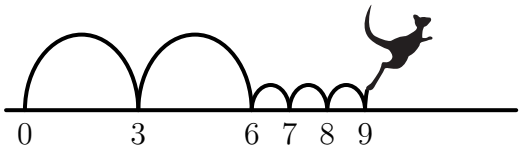
Which buoys did Meike paddle around in a clockwise direction?

(A) 2, 3 and 4 **(B)** 1, 2 and 3 **(C)** 1, 3 and 5 **(D)** 2, 4 and 5 **(E)** 2, 3 and 5

2. Beate rearranges the five pieces with numbers shown below to display the smallest possible nine-digit number. Which piece does she place at the right-hand end?

(A) $\boxed{4}$ **(B)** $\boxed{8}$ **(C)** $\boxed{31}$ **(D)** $\boxed{59}$ **(E)** $\boxed{107}$

3. Kengu enjoys jumping on the number line. He always makes two large jumps followed by three small jumps, as shown, and then repeats this process over and over again. Kengu starts his jumping routine on 0.



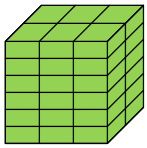
On which of these numbers will Kengu land during his routine?

(A) 82 **(B)** 83 **(C)** 84 **(D)** 85 **(E)** 86

4. How many positive integers between 100 and 300 have only odd digits?

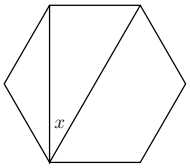
(A) 25 **(B)** 50 **(C)** 75 **(D)** 100 **(E)** 150

5. Rob the Builder has identical bricks whose shortest edge is 4 cm. He uses several such bricks to build the cube shown. What are the dimensions, in cm, of his brick?



(A) $4 \times 6 \times 12$ **(B)** $4 \times 6 \times 16$ **(C)** $4 \times 8 \times 12$ **(D)** $4 \times 8 \times 16$ **(E)** $4 \times 12 \times 16$

6. A triangle is drawn inside a regular hexagon as shown.
The value of x, in degrees, is:



(**A**) 15 (**B**) 30 (**C**) 45 (**D**) 50 (**E**) 60

7. In the equality below there are five empty spaces. Sanja wants to fill four of them with plus signs and one with a minus sign so that the equality is correct.

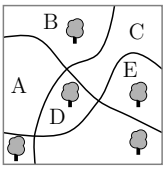
$$6\square 9\square 12\square 15\square 18\square 21=45$$

Where should she place the minus sign?

(**A**) Between 6 and 9 (**B**) Between 9 and 12 (**C**) Between 12 and 15

(**D**) Between 15 and 18 (**E**) Between 18 and 21

8. There are five big trees and three paths in a rectangular park. The paths connect opposite sides of the park. In which region of the park should a new tree be planted so that for each path, there is the same number of trees on both sides?



(**A**) A (**B**) B (**C**) C (**D**) D (**E**) E

9. The distance between two successive shelves in the cupboard in Monica's kitchen is 36 cm. She knows that a stack of 8 of her favorite glasses is 42 cm tall and that a stack of 2 glasses is 18 cm tall. What is the maximum number of glasses that can be stacked and still fit onto a shelf?

(**A**) 3 (**B**) 4 (**C**) 5 (**D**) 6 (**E**) 7

10. Gerard wrote down the sum of the squares of two numbers, as shown.

$$(23\square)^2 + (1\square 2)^2 = 7133029$$

Unfortunately some of the digits cannot be seen because they are covered by ink.

What is the last digit of the first number?

(**A**) 3 (**B**) 4 (**C**) 5 (**D**) 6 (**E**) 7

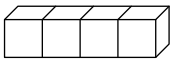
PART B: EACH CORRECT ANSWER IS WORTH 4 POINTS

11. A walrus and a polar bear had a swimming competition around an iceberg. They jumped into the water at the same time. One full lap around the iceberg took the bear half an hour, and it took the walrus 6 minutes less. The competition ended when one animal was one lap ahead of the other.

How many minutes did the competition take?

(**A**) 48 (**B**) 96 (**C**) 120 (**D**) 150 (**E**) 180

12. On a standard dice, the sum of the numbers of dots on opposite faces is always 7. Four standard dice are glued together, as shown.



What is the minimum number of dots that could lie on the whole surface?

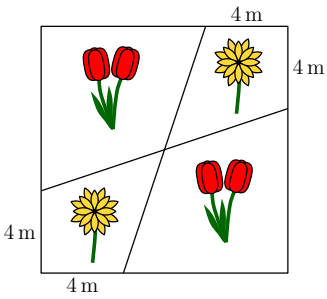
(**A**) 52 (**B**) 54 (**C**) 56 (**D**) 58 (**E**) 60

13. Three sisters, whose average age is 10, each have different ages. When they get together in pairs, the average ages of two such pairs are 11 and 12.

What is the age of the eldest sister?

(**A**) 10 (**B**) 11 (**C**) 12 (**D**) 14 (**E**) 16

14. Tony the Gardener planted tulips  and daisies  in a square flowerbed with side-length 12 m, arranged as shown.



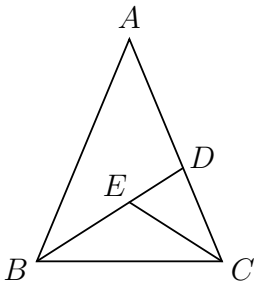
What is the total area of the regions in which he planted daisies?

(**A**) 48 m^2 (**B**) 46 m^2 (**C**) 44 m^2 (**D**) 40 m^2 (**E**) 36 m^2

15. There are two clocks in my office. One clock gains one minute every hour and the other clock loses two minutes every hour. Yesterday I set them both to the correct time but when I looked at them today, I saw that the time shown on one clock was 11:00 and shown on the other clock was 12:00. What time was it when I set the clocks?

(**A**) 23:00 (**B**) 19:40 (**C**) 15:40 (**D**) 14:00 (**E**) 11:20

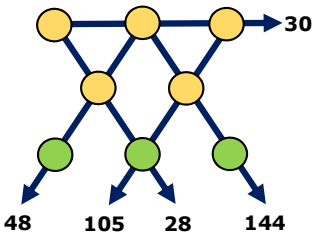
16. An isosceles triangle ABC, with $AB = AC$, is divided into three smaller isosceles triangles, so that $AD = DB$, $CE = CD$, and $BE = EC$. (Note that the diagram is not drawn to scale.)



What is the size, in degrees, of angle BAC?

(A) 24 **(B)** 28 **(C)** 30 **(D)** 35 **(E)** 36

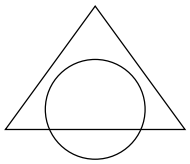
17. The numbers 1 to 8 are placed, once each, in the circles shown. The numbers pointed by the arrows show the products of the three numbers in the circles on that straight line.



What is the sum of the numbers in the three circles at the bottom of the figure?

(A) 11 **(B)** 12 **(C)** 15 **(D)** 17 **(E)** 19

18. The area of the intersection of a circle and a triangle is 45% of the area of their union. The area of the triangle outside the circle is 40% of the area of their union.



What percentage of the circle lies outside the triangle?

(A) 20% **(B)** 25% **(C)** 30% **(D)** 35% **(E)** 15%

19. Jenny decided to write numbers into the cells of a 3×3 table so that the sum of the numbers in all four possible 2×2 squares be the same. She has already written the numbers in three of the corner cells, as shown.

2		4
?		3

Which number should Jenny write in the fourth corner cell?

(A) 0 **(B)** 1 **(C)** 4 **(D)** 5 **(E)** 6

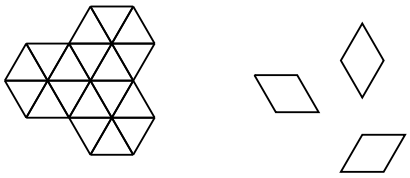
20. Marc always cycles at the same speed and he always walks at the same speed. He can cover the round trip from his home to school in 20 minutes when he cycles and in 60 minutes when he walks. Yesterday Marc started cycling to school but stopped and left his bike at Eva's house on the way before finishing his journey on foot. On the way back, he walked to Eva's house, collected his bike and then cycled the rest of the way home. His total travel time was 52 minutes.

What fraction of his journey did Marc make by bike?

(A) $\frac{1}{6}$ **(B)** $\frac{1}{5}$ **(C)** $\frac{1}{4}$ **(D)** $\frac{1}{3}$ **(E)** $\frac{1}{2}$

PART C: EACH CORRECT ANSWER IS WORTH 5 POINTS

21. In how many ways can the shape on the left be completely covered using nine tiles of the three types that differ by their orientation as shown on the right?

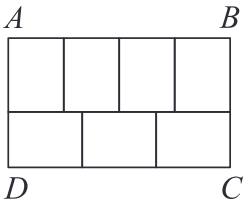


(**A**) 1 (**B**) 6 (**C**) 8 (**D**) 9 (**E**) 12

22. Mowgli asks a zebra and a panther what day it is.
The zebra always lies on Monday, Tuesday and Wednesday.
The panther always lies on Thursday, Friday and Saturday.
The zebra says, "Yesterday was one of my lying days."
The panther says "Yesterday was also one of my lying days."
What day is it?

(**A**) Thursday (**B**) Friday (**C**) Saturday (**D**) Sunday (**E**) Monday

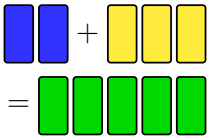
23. The large rectangle $ABCD$ is divided into seven identical rectangles.



What is the ratio $\frac{AB}{BC}$?

(**A**) $\frac{1}{2}$ (**B**) $\frac{4}{3}$ (**C**) $\frac{8}{5}$ (**D**) $\frac{12}{7}$ (**E**) $\frac{7}{3}$

24. A painter wanted to mix 2 litres of blue paint with 3 litres of yellow paint to make 5 litres of green paint. However, by mistake he used 3 litres of blue paint and 2 litres of yellow paint so that he made the wrong shade of green.



What is the smallest amount of this green paint that he must throw away so that, using the rest of his green paint and some extra blue and/or yellow paint, he could make 5 litres of paint of the correct shade of green?

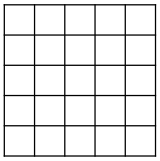
(**A**) $\frac{5}{3}$ litres (**B**) $\frac{3}{2}$ litres (**C**) $\frac{2}{3}$ litre (**D**) $\frac{3}{5}$ litre (**E**) $\frac{5}{9}$ litre

25. Werner wrote several positive numbers smaller than 7 on a piece of paper. Ria then crossed out all Werner's numbers and replaced each of them with their difference from 7. The sum of Werner's numbers was 22. The sum of Ria's numbers is 34.

How many numbers did Werner write down?

(**A**) 7 (**B**) 8 (**C**) 9 (**D**) 10 (**E**) 11

26. What is the smallest number of cells that need to be colored in a 5×5 square so that any 1×4 or 4×1 rectangle lying inside the square has at least one cell colored?



(**A**) 5 (**B**) 6 (**C**) 7 (**D**) 8 (**E**) 9

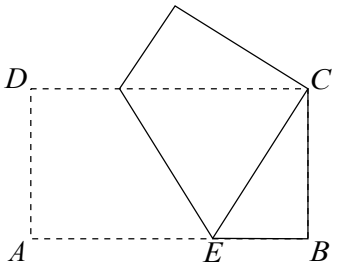
27. A cube with edge 4 units is constructed from small cubes with edge 1 unit. What is the least number of small cubes that need to be taken out to increase the figure's surface area by 1.5 times?

(**A**) 6 (**B**) 8 (**C**) 10 (**D**) 12 (**E**) 32

28. Several points are marked on a line. Renard then marked another point between each two adjacent points on the line. He repeated this process three more times. There are now 225 points marked on the line. How many points were marked on the line initially?

(**A**) 10 (**B**) 12 (**C**) 15 (**D**) 16 (**E**) 25

29. The paper rectangle $ABCD$ is folded such that A is brought to C. The point where the side AB folds is E. We know that the angle ECB is $30°$ and the area of triangle ECB is 15 cm^2.



What is the area of the paper rectangle $ABCD$?

(**A**) 90 cm^2 (**B**) 45 cm^2 (**C**) $30\sqrt{3}$ cm^2 (**D**) $25\sqrt{3}$ cm^2 (**E**) $45\sqrt{3}$ cm^2

30. There are 2022 kangaroos and some koalas living in seven parks. In each park the number of kangaroos is equal to the total number of koalas in all the other parks.

How many koalas live in the seven parks in total?

(**A**) 288 (**B**) 337 (**C**) 576 (**D**) 674 (**E**) 2022

CMKC 2022 Grade 7-8 Answers

PART A					
1	A	B	C	D	**E**
2	A	**B**	C	D	E
3	A	B	**C**	D	E
4	**A**	B	C	D	E
5	A	B	**C**	D	E
6	A	**B**	C	D	E
7	A	B	C	**D**	E
8	A	**B**	C	D	E
9	A	B	C	**D**	E
10	A	B	**C**	D	E

PART B					
11	A	B	**C**	D	E
12	A	B	C	**D**	E
13	A	B	C	D	**E**
14	**A**	B	C	D	E
15	A	B	**C**	D	E
16	A	B	C	D	**E**
17	A	B	C	**D**	E
18	A	**B**	C	D	E
19	A	**B**	C	D	E
20	A	**B**	C	D	E

PART C					
21	A	B	C	**D**	E
22	**A**	B	C	D	E
23	A	B	C	**D**	E
24	**A**	B	C	D	E
25	A	**B**	C	D	E
26	A	**B**	C	D	E
27	A	B	C	**D**	E
28	A	B	**C**	D	E
29	**A**	B	C	D	E
30	A	**B**	C	D	E