

HORIZON MATHEMATICS COMPETITION

HMC 2008 SECOND ROUND

INSTRUCTIONS

- Do not turn over this booklet until told to do so.
- This examination paper consists of 30 multiple choice questions of mathematics, logical deduction, and analytical reasoning. Each question is followed by answers marked a, b, c, d and e. Only one of these is correct.
- The final answers must be entered in the correct circle on the ANSWER SHEET which is supplied separately.
- The correct answers will be counted; there is no penalty for the incorrect answers.
- Exam duration is 75 minutes and no extra time will be given.
- Calculators or any other computing devices are NOT allowed.
- Rough paper, pen, pencil, and rubber are permitted.
- Start when the invigilator tells you to do so. Good luck!



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1. $14 - 5 - (3 - 1) = ?$

- a) 4
- b) 5
- c) 6
- d) 7
- e) 8

2. $\frac{0.19}{0.0038} = ?$

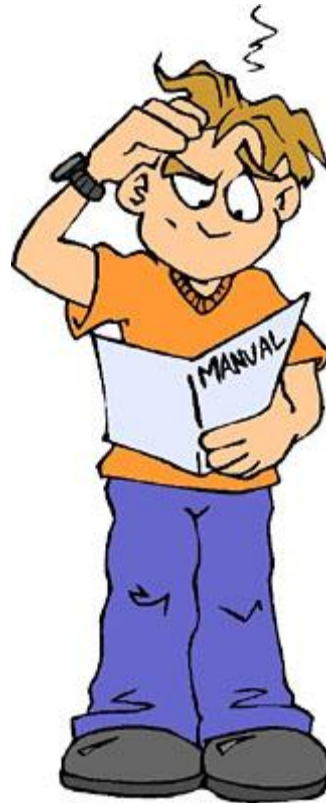
- a) 500
- b) 100
- c) 50
- d) 20
- e) 10

3. $11 - 2 \times (3 + 12) \div 3 = ?$

- a) 1
- b) 45
- c) 9
- d) 13
- e) 5

4. $\frac{3}{5} + \frac{1}{3} = ?$

- a) $\frac{1}{2}$
- b) $\frac{14}{15}$
- c) $\frac{11}{15}$
- d) $\frac{1}{5}$
- e) 1



5. If 18 people out of 40 people in a bus were female, what percentage of the people on the bus was male?

- a) 40
- b) 45
- c) 55
- d) 60
- e) 70



6. If an operation \oplus defined as $a \oplus b = \left(\frac{1}{a} \div \frac{2}{b} \right) - \frac{a}{b}$ find the value of $2 \oplus 3$

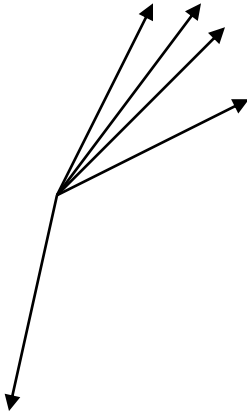
- a) 1
- b) $\frac{1}{2}$
- c) $\frac{1}{7}$
- d) $\frac{5}{7}$
- e) $\frac{1}{12}$

7. Which one of the followings is the correct order of $+, -, \times$ (addition, subtraction, or multiplication) signs between the following numbers, so that the equality would be true? (Do not use parentheses.)

$$7 \ 3 \ 2 \ 5 \ 8 = 10$$

- a) $+$; $-$; \times ; $+$
- b) $-$; \times ; $+$; $-$
- c) \times ; $+$; $-$; $-$
- d) $-$; $+$; \times ; $-$
- e) $+$; \times ; $+$; $-$

8. How many obtuse angles are there in the figure alongside?



- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

9. In a weekend holiday how many minutes are there in between Friday 3:30 pm and Monday 7:45 am?

- a) 3855 minutes
- b) 3825 minutes
- c) 3135 minutes
- d) 3105 minutes
- e) 2415 minutes

10. When I was 9 years old my father was 31. Now he is twice as old as I am.
How old I am?

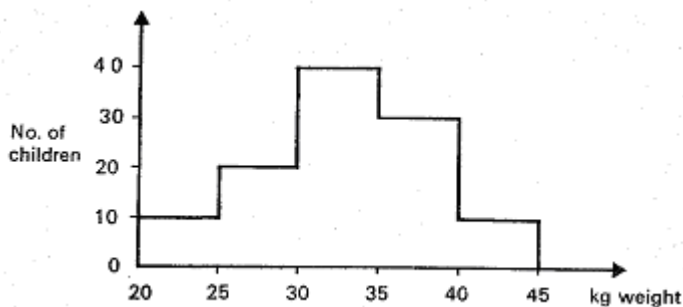
- a) 11
- b) 22
- c) 33
- d) 40
- e) 44



11. Which one of the following statement is definitely true for the sum of the first 50 prime numbers?

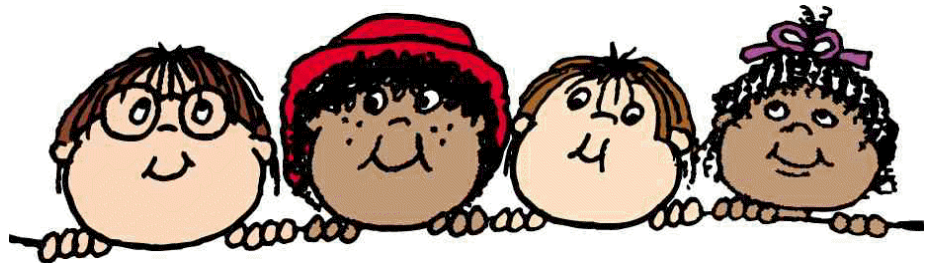
- a) Even
- b) Odd
- c) Can be even or odd it depends the 50th prime number
- d) If the 50th prime number is more than 100, even
- e) Can not be odd

Solve questions 12 and 13 according to the following table



12. How many children are in the group?

- a) 40
- b) 45
- c) 100
- d) 110
- e) 150



13. Which one of the following statements is not false?

- a) About half of the children in the group weigh between 30 and 35 kg.
- b) The heaviest child weighs 40 kg.
- c) About 40 children weigh between 25 and 35 kg.
- d) No child in the group weighs less than 20 kg.
- e) About 40 children weigh more than 30 kg.

14. Sihle has three pieces of rope that are 120 m, 132 m and 150 m long. He wants to make a set of ropes that are all in same length. If he wants the pieces to be as long as possible and does not want to waste any rope, how long should Sihle cut each piece?

- a) 1 m
- b) 2 m
- c) 3 m
- d) 4 m
- e) 5 m

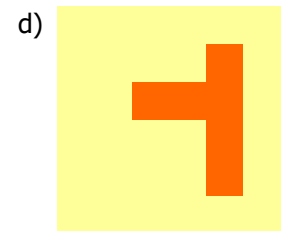
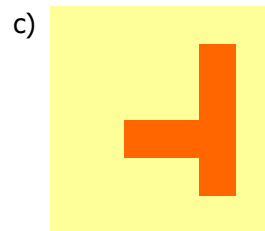
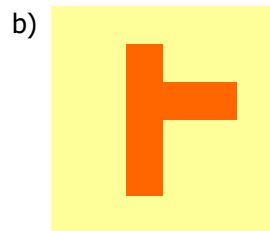
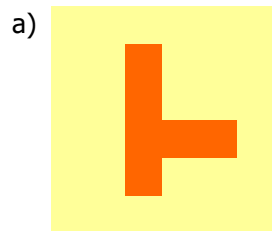
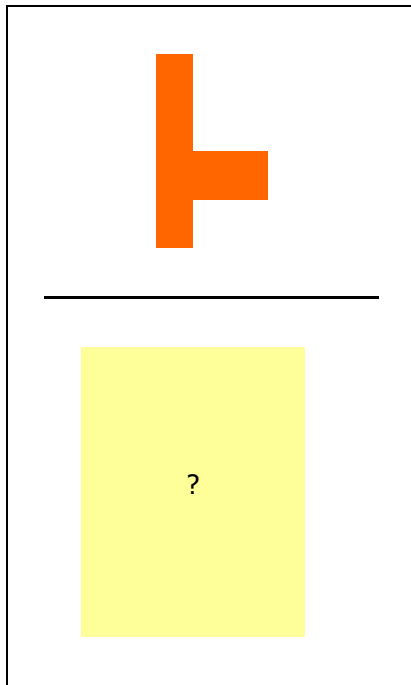


15. 1, 9, 9, 8, 7, 3, 7, 5, 2, 7, 1, 5, ... We created the above sequence by always adding the last four elements of the sequence and writing down the last digit of this sum as the next element of the sequence. The 20th value in this sequence is

- a) 0
- b) 2
- c) 5
- d) 7
- e) 9



16. Which of the following images is the reflection of the given shape according to the line?



e) None of the above

17. "How many bananas did you bring?" - asked Judy from her Mom. Her mom said: "A third of the bananas is 3 less than the half of them." How many bananas did she bring home?

- a) 24
- b) 6
- c) 12
- d) 36
- e) 18

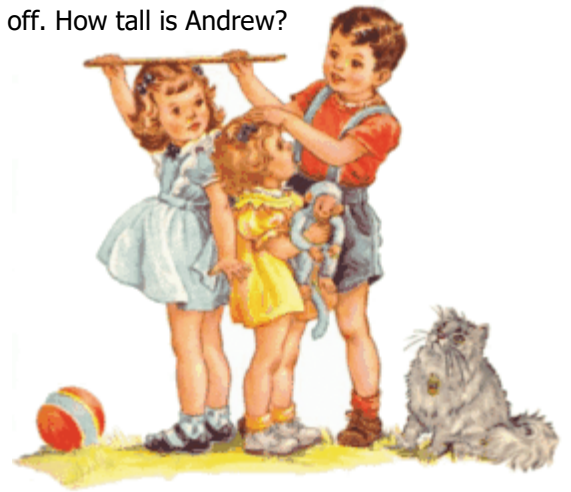


18. A father left R1600 to his three sons. In his will he said that his oldest son should get R200 more than the middle-son, and the middle-son should get R100 more than the youngest son. How much the middle son should get?

- a) R300
- b) R400
- c) R500
- d) R600
- e) R700

19. Four children took guesses on Andrew's height: 196cm, 163cm, 178cm, and 185cm. One of these children was 1cm off, the others were 6cm, 16cm and 17cm off. How tall is Andrew?

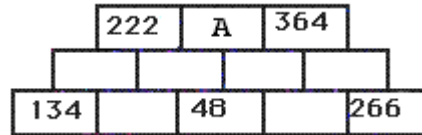
- a) 169cm
- b) 177cm
- c) 184cm
- d) 179cm
- e) 186cm



20. If six children can wrap 48 presents in 6 hours, then, working with the same effectiveness, how many presents can be wrapped by 3 children in 24 hours?

- a) 12
- b) 24
- c) 48
- d) 72
- e) 96

21. If the sum of the numbers in two neighboring fields is in the field right above them, the value of A is

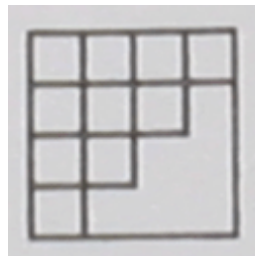


- a) 141
- b) 45
- c) 131
- d) 136
- e) 90

22. A baby bird from the day of her birth till the day she starts flying receives as many worms every day from her mommy as many days old she is that day. How many days old was the bird, which ate 210 worms till she started flying?

- a) 15 days
- b) 19 days
- c) 20 days
- d) 21 days
- e) 25 days

23. How many squares can you see on the following picture?



- a) 11
- b) 13
- c) 14
- d) 15
- e) 16

24. If 3 red dots are worth 6 green squares, and 3 green squares are worth 15 blue stars, then how many blue stars will 2 red dots be worth?

- a) 10
- b) 20
- c) 30
- d) 40
- e) 60

25. Let's write the numbers from 1 to 50 one after the other: $N=123\dots4950$. Delete 85 digits from this number so that you would get the highest possible number when you push the remaining digits close together. What is this number?

- a) 99 995
- b) 99 999
- c) 999 995
- d) 999 998
- e) 999 999

26. In an alien language, *getsu konniciva otoko* means "milky way is the most life", *watashi getsu daigaku* means "life of the stars" and *konniviva watashi kinyobi* means "college of the milky way". What is "the stars college" in this language?

- a) *Kinyobi watashi*
- b) *Konniviva otoko*
- c) *Daigaku kinyobi*
- d) *Getsu daigaku*
- e) *Watashi getsu*



27. Smarty decided that from now on he is going to tell the truth on Mondays, Wednesdays and Fridays, but will lie on all the other days. Once he said: "Tomorrow I am going to tell the truth." On what day did this happen?

- a) Thursday
- b) Friday
- c) Saturday
- d) Sunday
- e) Monday

28. In this addition same letters mean same digits, different letters mean different digits. What digit is D?

$$\begin{array}{r}
 A B C D \\
 A B C \\
 A B \\
 + \quad A \\
 \hline
 4 3 2 1
 \end{array}$$

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

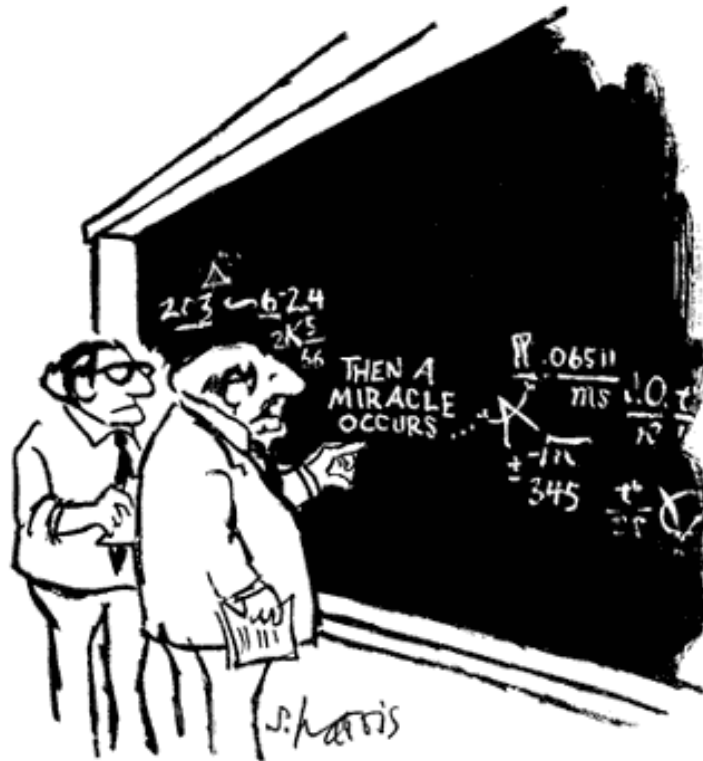
29. How many positive even numbers are there in which the sum of the digits is 8 and the product of the digits is 6?

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

30. Write the numbers from 1 to 9 in the fields of the 3x3 square so that the products of the numbers in each column and row are as indicated. What is the value of B

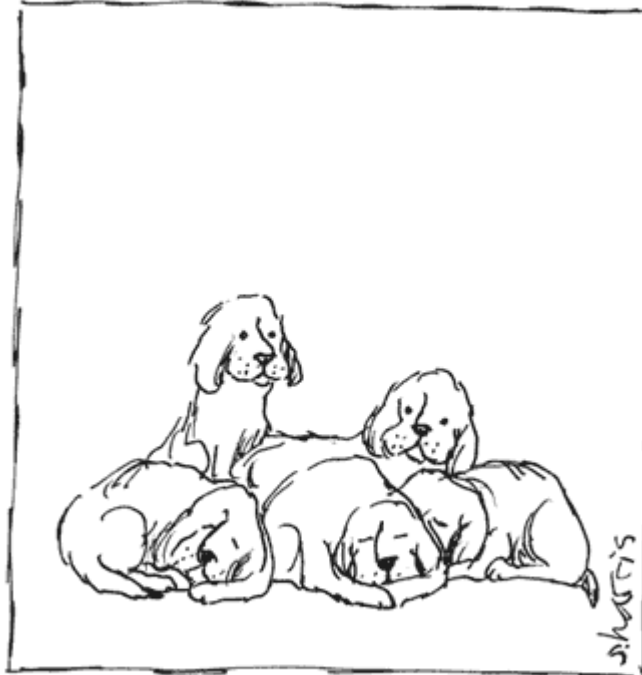
			20
			108
		B	168
42	80	108	

- a) 9
- b) 6
- c) 3
- d) 4
- e) 8



"I think you should be more explicit here in step two."

PROBABILITY



IF YOU HAVE 5 DOGS, 3 WILL BE ASLEEP