The CENTRE for EDUCATION in MATHEMATICS and COMPUTING

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Topic Generator - Problem Set
Problems

1. The average (mean) of the numbers 6, 8, 9, 11, and 16 is
(A) 8 (B) 9 (C) 10 (D) 11 (E) 7

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2. The value of $\frac{2}{5} + \frac{1}{3}$ is
(A) $\frac{3}{8}$ (B) $\frac{2}{15}$ (C) $\frac{11}{15}$ (D) $\frac{13}{15}$ (E) $\frac{3}{15}$

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3. If $A + B = 5$, then the value of $B - 3 + A$ is
(A) 2 (B) 8 (C) 7 (D) 15 (E) 13

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4. The smallest number in the set $\{3.2, 2.3, 3, 2.23, 3.22\}$ is
(A) 3.2 (B) 2.3 (C) 3 (D) 2.23 (E) 3.22

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5. The value of $\frac{2+3+4}{2\times 3\times 4}$ is
(A) 1 (B) $\frac{5}{6}$ (C) $\frac{7}{12}$ (D) 3 (E) $\frac{3}{8}$

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6. $3^2 + 4^2 + 12^2$ is equal to
(A) 13^2 (B) 19^2 (C) 17^2 (D) 15^2 (E) 11^2

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7. The value of $1 + 1 - 2 + 3 + 5 - 8 + 13 + 21 - 34$ is
(A) -32 (B) 1 (C) 88 (D) 0 (E) -34

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8. The time on a cell phone is 3:52. How many minutes will pass before the phone next shows a time using each of the digits 2, 3 and 5 exactly once?
(A) 27 (B) 59 (C) 77 (D) 91 (E) 171

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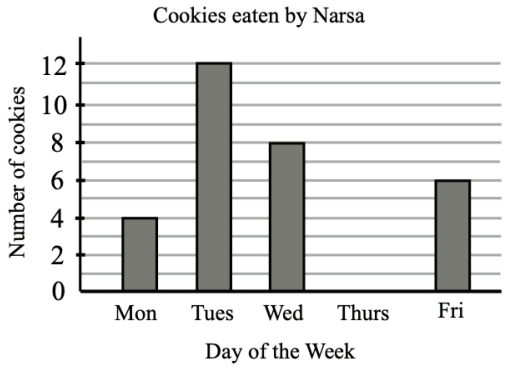
9. The value of $999 + 999$ is
(A) 2999 (B) 181 818 (C) 1998 (D) 999 999 (E) 198

10. Narsa buys a package of 45 cookies on Monday morning. The bar graph shows the number of cookies that Narsa eats each day from Monday to Friday.



How many cookies are left in the package after Friday?
(A) 45 (B) 25 (C) 20 (D) 15 (E) 12

11. Which of these values is the largest?
(A) $\dfrac{4}{2-\frac{1}{4}}$ (B) $\dfrac{4}{2+\frac{1}{4}}$ (C) $\dfrac{4}{2-\frac{1}{3}}$ (D) $\dfrac{4}{2+\frac{1}{3}}$ (E) $\dfrac{4}{2-\frac{1}{2}}$

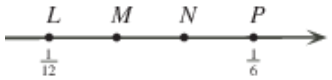
12. When the expression $2005^2 + 2005^0 + 2005^0 + 2005^5$ is evaluated, the final two digits are
(A) 52 (B) 25 (C) 20 (D) 50 (E) 5

13. If four *different* numbers are chosen from 5, 6, 7, 8, 9 to replace the □'s below, what is the smallest possible sum of the two 2-digit numbers?

$$\begin{array}{r} \square\ \square \\ +\ \square\ \square \\ \hline \end{array}$$

(A) 123 (B) 125 (C) 126 (D) 134 (E) 161

14. On the number line, points M and N divide LP into three equal parts. What is the value at M?



(A) $\frac{1}{7}$ (B) $\frac{1}{8}$ (C) $\frac{1}{9}$ (D) $\frac{1}{10}$ (E) $\frac{1}{11}$

15. Which of the following expressions is equal to 5?
(A) $(2 \times 3)^2$ (B) $3 + 2^2$ (C) $2^3 - 1$
(D) $3^2 - 2^2$ (E) $(3 + 2)^2$

16. Seven students shared the cost of a \$26.00 pizza. Each student paid either \$3.71 or \$3.72. How many students paid \$3.72?
(A) 1 (B) 3 (C) 5 (D) 4 (E) 2

17. There are n students in the math club at Scoins Secondary School. When Mrs. Fryer tries to put the n students in groups of 4, there is one group with fewer than 4 students, but all of the other groups are complete. When she tries to put the n students in groups of 3, there are 3 more complete groups than there were with groups of 4, and there is again exactly one group that is not complete. When she tries to put the n students in groups of 2, there are 5 more complete groups than there were with groups of 3, and there is again exactly one group that is not complete. The sum of the digits of the integer equal to $n^2 - n$ is
(A) 11 (B) 12 (C) 20 (D) 13 (E) 10

18. At a factory, 11 410 kg of rice is distributed equally into 3260 bags. A family uses 0.25 kg of rice each day. How many days would it take this family to use up one bag of rice?
(A) 9 (B) 12 (C) 13 (D) 14 (E) 15

19. Abdul is 9 years older than Susie, and Binh is 2 years older than Susie. How many years older is Abdul than Binh?
(A) 11 (B) 9 (C) 14 (D) 2 (E) 7

20. In the addition shown, each of P, Q and R is a digit.

$$\begin{array}{r} P\,Q\,R \\ +\quad Q\,R \\ \hline 1\,0\,1\,2 \end{array}$$

The value of $P + Q + R$ is
(A) 12 (B) 15 (C) 13 (D) 22 (E) 20

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21. How many different combinations of pennies, nickels, dimes and quarters use 48 coins to total \$1.00?
(A) 3 (B) 4 (C) 5 (D) 6 (E) 8

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22. The average of four different positive whole numbers is 4. If the difference between the largest and smallest of these numbers is as large as possible, what is the average of the other two numbers?
(A) $1\frac{1}{2}$ (B) $2\frac{1}{2}$ (C) 4 (D) 5 (E) 2

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23. Molly assigns every letter of the alphabet a *different* whole number value. She finds the value of a word by *multiplying* the values of its letters together. For example, if D has a value of 10, and I has a value of 8, then the word DID has a value of $10 \times 8 \times 10 = 800$. The table shows the value of some words. What is the value of the word MATH?

Word	Value
$TOTE$	18
$TEAM$	168
MOM	49
$HOME$	70
$MATH$	?

(A) 19 (B) 840 (C) 420 (D) 190 (E) 84

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24. There are n students in the math club at Scoins Secondary School. When Mrs. Fryer tries to put the n students in groups of 4, there is one group with fewer than 4 students, but all of the other groups are complete. When she tries to put the n students in groups of 3, there are 3 more complete groups than there were with groups of 4, and there is again exactly one group that is not complete. When she tries to put the n students in groups of 2, there are 5 more complete groups than there were with groups of 3, and there is again exactly one group that is not complete. The sum of the digits of the integer equal to $n^2 - n$ is
(A) 11 (B) 12 (C) 20 (D) 13 (E) 10

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25. The digits from 1 to 9 are written in order so that the digit n is written n times. This forms the block of digits $1223334444\cdots999999999$. The block is written 100 times. What is the 1953^{rd} digit written?
(A) 4 (B) 5 (C) 6 (D) 7 (E) 8

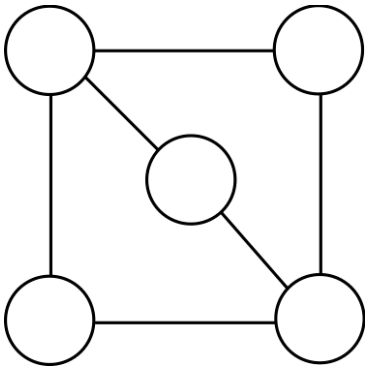
26. If n is a positive integer, the symbol $n!$ (read "n factorial") represents the product of the integers from 1 to n. For example, $4! = (1)(2)(3)(4)$ or $4! = 24$. If x and y are integers and $\frac{30!}{36^x 25^y}$ is equal to an integer, what is the maximum possible value of $x + y$?
(A) 10 (B) 47 (C) 17 (D) 26 (E) 13

27. Square $PQRS$ has sides of length 8. It is split into four rectangular regions by two line segments, one parallel to PQ and another parallel to QR. There are N ways in which these lines can be drawn so that the area of each of the four rectangular regions is a positive integer. What is the remainder when N^2 is divided by 100?
(A) 9 (B) 61 (C) 1 (D) 41 (E) 36

28. Three cubes have edge lengths 3 cm, 12 cm, and x cm. The average volume of the three cubes is $700cm^3$. The value of x, rounded to the nearest integer, is
(A) 6 (B) 10 (C) 8 (D) 9 (E) 7

29. A rectangular prism has integer edge lengths and has a volume of V. The six faces of the prism are painted and then the prism is cut into 1 by 1 by 1 cubes. Of these cubes, 50 cubes have no paint on them. What is the mean (average) of all possible values of V?
(A) 224 (B) 310 (C) 396 (D) 288 (E) 348

30. In the diagram, circles are *connected* if they are joined by a line segment.



Each circle is filled with one integer so that

- the positive difference between each pair of integers in connected circles is d, and
- the sum of the five integers in the circles is 54.

For how many different values of d between 1 and 20 inclusive can the circles be filled in this way?

(A) 4 (B) 12 (C) 8 (D) 20 (E) 16