

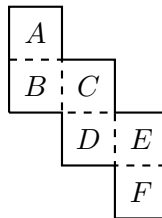
## NMC SAMPLE PROBLEMS: GRADE 6

1. What is the sum of the greatest common divisor and the least common multiple of 18 and 24?  
(a) 432                      (b) 78                      (c) 66                      (d) 42                      (e) None of these
  
2. Which number is the smallest in the set  $\left\{\frac{4}{3}, 1.3, \frac{9}{7}, \frac{7}{5}, \frac{5}{4}\right\}$ ?  
(a)  $\frac{4}{3}$                       (b) 1.3                      (c)  $\frac{9}{7}$                       (d)  $\frac{7}{5}$                       (e)  $\frac{5}{4}$
  
3. In a pet store,  $\frac{1}{2}$  of the animals are fish,  $\frac{1}{10}$  of them are dogs,  $\frac{1}{5}$  of them are birds, and the remaining six are cats. How many animals are in the store?  
(a) 10                      (b) 20                      (c) 30                      (d) 40                      (e) None of these
  
4. A prime number is a counting number greater than 1 that is divisible by only 1 and itself. What is the median of the prime numbers between 2 and 25 (inclusive)?  
(a) 7                      (b) 9                      (c) 11                      (d) 13                      (e) None of these
  
5. A person 120 centimeters tall casts a shadow of 32 centimeters at the same time that a flag pole casts a shadow of 120 centimeters. How tall is the flag pole in centimeters?  
(a) 32                      (b) 48                      (c) 240                      (d) 450                      (e) None of these
  
6. If  $\frac{5}{13} = \frac{n}{39} = \frac{n+m}{156} = \frac{p-m}{104}$ , what is the value of  $p$ ?  
(a) 85                      (b) 45                      (c) 39                      (d) 15                      (e) None of these
  
7. Simplify the following expression,  $(-2)^4 + \sqrt{16} - |-5|$ .  
(a) 15                      (b) 0                      (c) 5                      (d) -5                      (e) None of these
  
8. The ratio of length to width of a rectangle is 5:3. If the width of the rectangle is 15 inches, what is the area in square inches of the rectangle?  
(a) 125                      (b) 135                      (c) 225                      (d) 375                      (e) None of these

9. A survey of 2000 children showed that 1400 watched “The Lion King”, 850 watched “Finding Nemo”, and 390 watched both movies. What percent of the children did not watch either?
- (a) 7%                      (b) 11.25%                      (c) 14%                      (d) 22.5%                      (e) None of these
10. Cindy was asked by her teacher to subtract 3 from a certain number and then divide the result by 9. Instead, she subtracted 9 and then divided the result by 3, giving an answer of 43. What would her answer have been if she had worked the problem correctly?
- (a) 11                      (b) 13                      (c) 15                      (d) 17                      (e) None of these
11. Mary ran a three-mile race at an average speed of 6 mile per hour for the first mile, 5 mile per hour for the second mile, and 4 mile per hour for the third mile. How many minutes did it take for her to complete the race?
- (a) 12                      (b) 37                      (c) 45                      (d) 60                      (e) None of these
12. The sum of Amy’s age and her younger sister’s age is 30 and their product is 221. How many years older is Amy than her sister?
- (a) 2                      (b) 4                      (c) 5                      (d) 6                      (e) None of these
13. There are 20 animals available for adoption at PetSmart, 12 dogs and 8 cats. Wilson wishes to adopt two animals. How many ways can he choose 1 dog and 1 cat?
- (a) 20                      (b) 24                      (c) 80                      (d) 96                      (e) None of these
14. The angles of a triangle are in the ratio 1:3:5. What is the largest angle in the triangle?
- (a)  $95^\circ$                       (b)  $100^\circ$                       (c)  $105^\circ$                       (d)  $110^\circ$                       (e) None of these
15. If  $8a - 6b = 24$ , what is the value of  $\frac{a}{3} - \frac{b}{4}$ ?
- (a) 1                      (b) 12                      (c) 2                      (d) 24                      (e) None of these
16. An artist wants to paint a picture on a canvas where the length of the canvas is 6 more inches than twice the width. If the total perimeter of the canvas is 108 inches, what is the length of the canvas (in inches)?
- (a) 16                      (b) 30                      (c) 38                      (d) 54                      (e) None of these
17. Suppose  $a < 0$  and  $a + b > 0$ . Which of the following statements is always true?
- (a)  $2a + b < 0$                       (b)  $2b > 0$                       (c)  $2a + 1 > 0$                       (d)  $2a + b > 0$                       (e)  $a - b > 0$

18. Seventy students took a Mathematics exam. 10% of them scored at least 90 points, and 20% scored at least 80 but less than 90 points. How many students have scored less than 80 points?
- (a) 21                      (b) 24                      (c) 40                      (d) 45                      (e) 49
19. The average of Sue's three tests is 85. Each test is worth 100 points. What score does she have to make on her 4th test to get an average of 87?
- (a) 87                      (b) 93                      (c) 90                      (d) 95                      (e) None of these
20. A bag contains candies. One-fourth of the candies are blue, one-eighth are green, one-fourth are yellow, and the rest are red. What portion of the candies is red?
- (a)  $\frac{3}{8}$                       (b)  $\frac{1}{4}$                       (c)  $\frac{1}{3}$                       (d)  $\frac{1}{5}$                       (e) None of these
21. There are 6 people in a room and each person shakes every other person's hand exactly one time. How many handshakes will there be?
- (a) 10                      (b) 60                      (c) 30                      (d) 15                      (e) None of these
22. If  $\frac{a}{b} = 12$  and  $\frac{b}{c} = 20$ , then what is the value of  $\frac{a}{b+c}$ ?
- (a) 32                      (b)  $\frac{32}{3}$                       (c)  $\frac{80}{7}$                       (d)  $\frac{1}{35}$                       (e) None of these
23. What is the next number in the following pattern?
- 5 , 10 , 16 , 23 , 31 , ?
- (a) 36                      (b) 37                      (c) 38                      (d) 39                      (e) 40
24. Which of the following is the same as
- $$\frac{\frac{1}{a \times b}}{\frac{1}{a} + \frac{1}{b}} ?$$
- (a)  $\frac{1}{a+b}$                       (b)  $a + b$                       (c)  $\frac{a+b}{a \times b}$                       (d)  $\frac{a \times b}{a+b}$                       (e) None of these
25. 51 is what percent of 60?
- (a) 80%                      (b) 85%                      (c) 90%                      (d) 95%                      (e) None of these
26. A straight line passes through the three points (3, -4), (5, 1) and (1, y). What is the value of y?
- (a) 6                      (b) -1                      (c) -5                      (d) -9                      (e) None of these

27. John divided his souvenir hat pins into two piles. The two piles had an equal number of pins. He gave his brother one-half of one-third of one pile. John had 66 pins left. How many pins did John give to his brother?
- (a) 3                      (b) 6                      (c) 11                      (d) 22                      (e) None of these
28. There are 30 students on a school bus. Ten students wear hats. Ten students wear eye glasses. Only five students wear both eye glasses and hats. How many students wear neither hats nor eye glasses?
- (a) 10                      (b) 15                      (c) 20                      (d) 25                      (e) 30
29. Sam can finish a job alone in 6 hours. Jane can finish the job alone in 3 hours. If they do the job together, in how many hours can they finish the job?
- (a) 0.5                      (b) 1                      (c) 1.5                      (d) 2                      (e) 2.5
30. There are 2 ways to travel directly between  $A$  and  $B$ . There are 3 ways to travel directly between  $B$  and  $C$ . There are 2 ways to travel directly between  $C$  and  $D$ . There are 3 ways to travel directly between  $A$  and  $C$ . Visiting a place more than once is not allowed. In how many ways can one travel from  $A$  to  $D$ ?
- (a) 10                      (b) 12                      (c) 14                      (d) 16                      (e) 18
31. Define an operation  $\#$  as follows:  $a\#b = a \cdot b + a + b$  for all integers  $a$  and  $b$ . Find the value of  $x$  satisfying the equation  $(x\#8) - 5 = 48$ .
- (a) 11                      (b) 9                      (c) 7                      (d) 5                      (e) 3
32. When the diagram shown below is folded to form a cube, what letter is opposite of the face marked F?



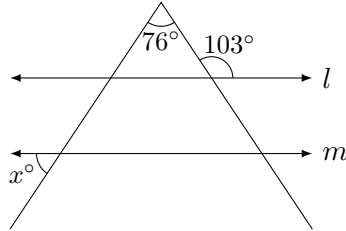
- (a) A                      (b) B                      (c) C                      (d) D                      (e) E
33. Slacks and shirts are on sale. The \$25 slacks can be purchased at a 20% discount and the \$18 shirts can be purchased at a 25% discount. What is the total cost, in dollars, of three pairs of slacks and 4 shirts at the sale price including 5% sales tax on the sale price?
- (a) 119.70                      (b) 114                      (c) 108.30                      (d) 112.70                      (e) None of these

34. Solve for  $n$

$$4 = \frac{n}{1 + \frac{1}{1 + \frac{1}{2}}}$$

- (a)  $\frac{32}{3}$       (b) 8      (c)  $\frac{16}{3}$       (d)  $\frac{28}{3}$       (e) None of these

35. In the figure below, line  $l$  is parallel to line  $m$ . What is the degree of the angle  $x$ ? (*Note: Figure not drawn to scale!*)



- (a)  $76^\circ$       (b)  $77^\circ$       (c)  $27^\circ$       (d)  $24^\circ$       (e) None of these
36. What is the volume of a rectangular box whose length, width and height are 24 inches, 1.5 feet and 18 inches, respectively?
- (a)  $2.25 \text{ ft}^3$       (b)  $3.25 \text{ ft}^3$       (c)  $4.25 \text{ ft}^3$       (d)  $4.5 \text{ ft}^3$       (e)  $4.75 \text{ ft}^3$
37. Calculate using order of operations:  $33 - (2 - 4)^3 + 6 \times 2 + (7 - 12)^2 - 3$
- (a) 9      (b) 25      (c) 59      (d) 75      (e) None of these
38. Jordan had scored 90 points before the last game of the basketball season. He scored 18 points in the last game, making his season average 12 points per game. How many games did Jordan play during the season?
- (a) 9      (b) 12      (c) 18      (d) 20      (e) None of these
39. What is the value of  $n$  if  $2^{15} \times 4^{30} \times 8^{45} = 2^n$ ?
- (a) 90      (b) 100      (c) 180      (d) 210      (e) None of these
40. How much greater, in square inches, is the area of a circle of radius 10 inches than the area of a circle of diameter 10 inches?
- (a)  $25\pi$       (b)  $50\pi$       (c)  $75\pi$       (d)  $100\pi$       (e) None of these

41. Quadrilateral  $ABCD$  is a trapezoid with  $\overline{AB}$  parallel to  $\overline{CD}$ . We know  $\overline{AB} = 30$  and  $\overline{CD} = 15$ . What is the ratio of the area of triangle  $ACB$  to the area of the trapezoid  $ABCD$ ?
- (a) 1 : 2                      (b) 1 : 3                      (c) 2 : 3                      (d) 3 : 4                      (e) None of these
42. For the set of numbers  $a, b, c, d, e$ , the following four inequalities are true:  $d < b$ ,  $c < a$ ,  $a < d$ , and  $e < a$ . Which number in the set is the median?
- (a)  $a$                       (b)  $b$                       (c)  $c$                       (d)  $d$                       (e)  $e$
43. Of the five apples in a bag, three are green apples and two are red apples. If two are chosen randomly from the bag, what is the probability that both are green apples?
- (a) 0.09                      (b) 0.2                      (c) 0.3                      (d) 0.5                      (e) None of these
44. The sum of two numbers  $x$  and  $y$  is 104, and the value of the fraction  $\frac{x}{y}$  is 0.3. What is the value of  $y - x$ ?
- (a) 30                      (b) 56                      (c) 80                      (d) 86                      (e) None of these
45. When a water tank is 40% full, it contains 25 gallons less than when it is 10% empty. How many gallons of water does the tank hold when it is full?
- (a) 25                      (b) 50                      (c) 75                      (d) 100                      (e) None of these
46. The ratio of teachers to students in a particular school is 1 to 33. The ratio of female students to the total number of students is 5 to 11. If there are 375 female students, how many teachers are there?
- (a) 25                      (b) 30                      (c) 33                      (d) 41                      (e) None of these
47. A juice company sells its product in either a 15-ounce size or a 10-ounce size. It charges \$3.30 for the 15-ounce size. How much should it charge for the 10-ounce size if the company wants the price per ounce to be 10% more than the price per ounce of the 15-ounce size?
- (a) \$2                      (b) \$2.20                      (c) \$2.35                      (d) \$2.42                      (e) None of these
48. What is the 199th digit of the decimal representation of  $\frac{4}{37}$ ?
- (a) 0                      (b) 1                      (c) 2                      (d) 3                      (e) 4
49. Is the expression  $1 \cdot 2 + 3 \cdot 4 + \cdots + 2016 \cdot 2017$  even or odd?
- (a) Even                      (b) Odd

50. Sookie has 14 coins totaling \$2.10 in her pocket. What are these coins if there is only 1 nickel in her pocket?
51. Minjung was shopping for shoes and found a pair that was on sale for 40% off. As she went to pay for it, the store manager announced an instant sale that took an additional 20% off all items. What percent would be the total discount?
52. 38 students were asked about their use of the gymnasium at their school:
- 20 students use the weight room
  - 15 students use the pool
  - 12 students use the climbing wall
  - 5 students use the pool and the weight room
  - 7 students use the pool and the climbing wall
  - 5 students use the climbing wall and the weight room, but don't use the pool
  - 4 students use the climbing wall, the weight room, and the pool
- How many students don't use any of these facilities?
53. A square and an equilateral triangle have equal perimeters. The area of the triangle is  $2\sqrt{3}$  square inches. What is the number of inches in the length of the diagonal of the square?
54. What is the sum of all possible 3 digit numbers that can be made from the numbers 1, 3 and 5? (No digit is repeated in each number.)
55. Simplify  $48\frac{1}{13} \div 25 + 38\frac{18}{39} \div 250 \times 7$
56. Determine the 60th number in the following pattern of numbers:  
1, 2, 2, 3, 3, 3, 4, 4, 4, 4, 4, 5, 5, 5, 5, 5, 6, 6, 6, 6, 6, 6,  $\dots$

▷ KEYS ◁

[1] (b)	[15] (a)	[29] (d)	[43] (c)
[2] (e)	[16] (c)	[30] (e)	[44] (b)
[3] (c)	[17] (b)	[31] (d)	[45] (b)
[4] (c)	[18] (e)	[32] (c)	[46] (a)
[5] (d)	[19] (b)	[33] (a)	[47] (d)
[6] (a)	[20] (a)	[34] (d)	[48] (b)
[7] (a)	[21] (d)	[35] (c)	[49] (a)
[8] (d)	[22] (c)	[36] (d)	[50] 5 quarters, 8 dimes, and 1 nickel
[9] (a)	[23] (e)	[37] (d)	[51] 52 %
[10] (c)	[24] (a)	[38] (a)	[52] 8
[11] (b)	[25] (b)	[39] (d)	[53] 3
[12] (b)	[26] (d)	[40] (c)	[54] 1998
[13] (d)	[27] (b)	[41] (c)	[55] 3
[14] (b)	[28] (b)	[42] (a)	[56] 11