

**13<sup>TH</sup> ANNUAL NATIONAL MATHEMATICS COMPETITION**  
**12<sup>TH</sup> OF MARCH, 2016**  
**ALGEBRA**

1. Evaluate  $5+10+15+20$

- A. 45
- B. 50
- C. 55
- D. 60
- E. 65

2. Evaluate  $3 \times 6 - 10 \div 2$

- A. 4
- B. 8
- C. 9
- D. 12
- E. 13

3. What percentage of an hour is 36 minutes?

- A. 30%
- B. 40%
- C. 50%
- D. 60%
- E. 70%

4. Simplify  $\left(1 + \frac{1}{2}\right) \times \left(1 + \frac{1}{3}\right) \times \left(1 + \frac{1}{4}\right) \times \left(1 + \frac{1}{5}\right)$

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

5. Change 0.375 to a fraction.

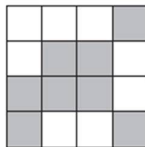
- A.  $\frac{1}{11}$
- B.  $\frac{3}{8}$
- C.  $\frac{5}{8}$
- D.  $\frac{2}{7}$
- E.  $\frac{4}{9}$

6. Evaluate  $3^4 - 2^6$

- A. 17
- B. 19
- C. 21
- D. 22
- E. 24

7. Which decimal fraction is represented by the shaded squares?

- A. 0.5
- B. 0.4
- C. 0.3
- D. 0.2
- E. 0.1



8. A farmer counts the number of goats on his farm. Each goat has four legs. The total number of goats' legs is 51 more than the number of goats. How many goats does the farmer have?

- A. 16
- B. 17
- C. 18
- D. 19
- E. 20



9. Which of the following fraction is the greatest?

- A.  $\frac{11}{12}$
- B.  $\frac{13}{14}$
- C.  $\frac{15}{16}$
- D.  $\frac{17}{18}$
- E.  $\frac{19}{20}$

10. Find the square of  $5^2$

- A. 5
- B. 125
- C. 250
- D. 475
- E. 625

11. Let us call a number as "interesting number" if it is product of two prime numbers. Which of the following is **not** an interesting number?

- A. 6
- B. 10
- C. 12
- D. 14
- E. 15

12. The sum of first  $n$  odd numbers can be computed as

$$1+3+5+\dots+(2n-1) = n^2$$

Ex:  $1+3+5+\dots+9 = 5^2 = 25$

$$1+3+5+\dots+19 = 10^2 = 100$$

Evaluate,  $1+3+5+\dots+29$

- A. 169
- B. 196
- C. 225
- D. 256
- E. 289

13. Find  $\sqrt{4}$

- A. 1
- B. 2
- C. 4
- D. 8
- E. 16

14. Find  $x$  if  $3:2x=12:40$

- A. 1
- B. 2
- C. 4
- D. 5
- E. 8

15. The sum of two of the following numbers is 0.

$-7, -4, -3, -1, 3, 5$

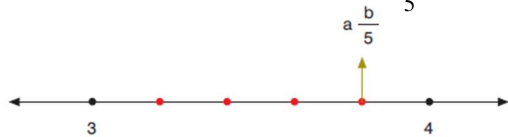
What is the product of these two numbers?

- A. -9
- B. -6
- C. -5
- D. 2
- E. 12

16. Evaluate  $(7a-5) \times (3a-8)$  when  $a=1$

- A. -10
- B. -8
- C. -6
- D. -5
- E. -2

17. On the following number line, the interval between 3 and 4 is divided into equal parts and the number  $a\frac{b}{5}$  is shown.



What is  $a+b$  ?

- A. 5
- B. 6
- C. 7
- D. 8
- E. 9

18. The figure below shows the answer key for a test with James's answers.

ANSWER KEY

1 - A
2 - A
3 - B
4 - C
5 - D
6 - B
7 - A
8 - D
9 - D
10 - A

Name: James  
Surname: Watt

1	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
2	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
5	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
6	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
10	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What percentage of the questions did James answer correctly?

- A. 40%
- B. 45%
- C. 50%
- D. 55%
- E. 60%

19. What is %20 of 15?

- A. 2
- B. 3
- C. 4
- D. 5
- E. 6

20.  $\frac{\frac{1}{2} + \frac{1}{3} + \frac{1}{6}}{\frac{1}{2} - \frac{1}{3}} = ?$

- A. 1/5
- B. 5
- C. 1/6
- D. 6
- E. 5/6

21. Which of the following is **not** divisible by 6?

- A. 246
- B. 336
- C. 432
- D. 456
- E. 578

22. Which of the following is equal to  $\frac{2}{7}$  ?

- A. 16/60
- B. 8/32
- C. 6/28
- D. 12/40
- E. 10/35

23. Which of the following is not a prime number?

- A. 2
- B. 3
- C. 5
- D. 7
- E. 10

24. A father's current age is equal to six times the age difference between his two children. In two years' time the father will be 56 years old. Find the age difference between the two children?

- A. 5
- B. 6
- C. 8
- D. 9
- E. 10

25. Evaluate  $51.4 + 2.41$

- A. 53.81
- B. 62.6
- C. 75.5
- D. 87.214
- E. 100

26. Find  $x$  if  $5x + 4 = 19$

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

27. Find the L.C.M of 12, 16 and 20.

- A. 180
- B. 210
- C. 220
- D. 240
- E. 300

28. Change 4500 cm to m.

- A. 0.45 m
- B. 4.5 m
- C. 45 m
- D. 45000 m
- E. 450000 m

29. Find the average of the following

3, 5, 5, 7, 7, 9

- A. 5
- B. 6
- C. 7
- D. 8
- E. 9

30. 133 tonnes of sand was transported by three lorries which have capacities of 5 tonnes, 6 tonnes and 8 tonnes respectively. If each lorry made the same number of trips, how many trips did each lorry make?

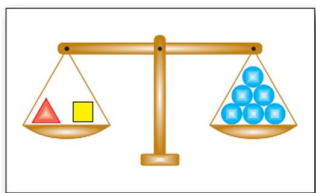
- A. 7
- B. 8
- C. 10
- D. 11
- E. 13

31. Which of the following is greater than 77,777

- A. 77,121
- B. 76,543
- C. 77,689
- D. 70,999
- E. 77,781

32. How many hours are there in 2 week 6 days?  
 A. 500  
 B. 480  
 C. 460  
 D. 440  
 E. 420
33. Find the value  $100 - 99 + 98 - 97 + 96 - 95 + \dots + 4 - 3 + 2 - 1$   
 A. 50  
 B. 40  
 C. 35  
 D. 30  
 E. 20
34. 10 more than twice a number is 20. What is the number?  
 A. 5  
 B. 10  
 C. 0  
 D. 20  
 E. 15

35. In the figure below, the scale is balanced. A triangular object and a square object are in the left pan and six circular objects are in the right pan.



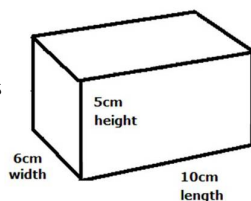
The mass of a triangular object is four times the mass of a circular object, and a square object weighs 3 g more than a circular object. If  $x$  is the mass of a circular object, which equation models the balance scale correctly?

- A.  $3x + (x + 6) = 4x$   
 B.  $4x - (x - 3) = 6x$   
 C.  $4x + (x + 3) = 6x$   
 D.  $6x - (x + 4) = 3x$   
 E.  $6x - (x - 4) = 3x$

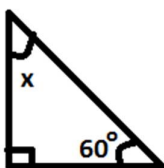
### GEOMETRY

36. A parallelogram has  
 A. 1 side  
 B. 2 sides  
 C. 3 sides  
 D. 4 sides  
 E. 5 sides

37. The volume of the cuboid given is  
 A.  $110 \text{ cm}^3$   
 B.  $240 \text{ cm}^3$   
 C.  $300 \text{ cm}^3$   
 D.  $320 \text{ cm}^3$



38. Find  $x$  in the given right angled triangle.  
 A.  $20^\circ$   
 B.  $30^\circ$   
 C.  $40^\circ$   
 D.  $50^\circ$   
 E.  $60^\circ$



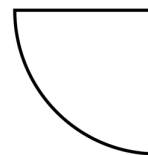
39. The pencil on the figure is combined of  
 A. a cuboid and a cone  
 B. a cylinder and a cone  
 C. a cylinder and a cube  
 D. a sphere and a cylinder  
 E. a sphere and a cuboid



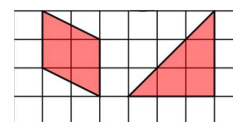
40. A rectangle has a perimeter of 64 m. Find the length of the rectangle if its breadth is 12 m.  
 A. 76 m  
 B. 52 m  
 C. 20 m  
 D. 16 m  
 E. 12 m

41. Find the area of a square whose perimeter is 4 cm.  
 A.  $1 \text{ cm}^2$   
 B.  $2 \text{ cm}^2$   
 C.  $4 \text{ cm}^2$   
 D.  $8 \text{ cm}^2$   
 E.  $16 \text{ cm}^2$

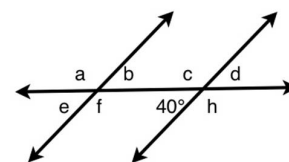
42. Find the perimeter of the quarter circle of the radius 7 cm. (Take  $\pi$  as  $22/7$ )  
 A. 48 cm  
 B. 36 cm  
 C. 32 cm  
 D. 25 cm  
 E. 20 cm



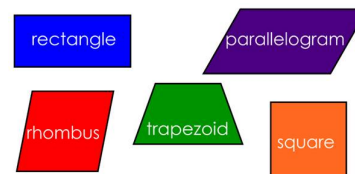
43. Find the total area of the two shapes if each unit square represents  $4 \text{ cm}^2$ .  
 A.  $34 \text{ cm}^2$   
 B.  $30 \text{ cm}^2$   
 C.  $28 \text{ cm}^2$   
 D.  $24 \text{ cm}^2$   
 E.  $20 \text{ cm}^2$



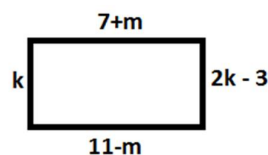
44. Which one is **not** equal to  $40^\circ$ ?  
 A. e  
 B. b  
 C. a  
 D. d  
 E. They are all equal to  $40^\circ$



45. How many of the shapes given have four right angles?  
 A. 1  
 B. 2  
 C. 3  
 D. 4  
 E. 5

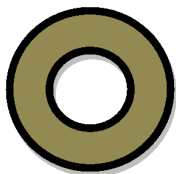


46. In the figure, a rectangle was given. Find the area of the rectangle.  
 A. 24  
 B. 27  
 C. 30  
 D. 40  
 E. 48



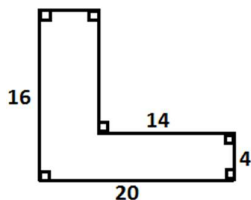
47. In the figure, two circles have radii of 3 cm and 4cm. Find the perimeter of the shaded region. (Take  $\pi$  as  $22/7$ ).

- A. 32 cm
- B. 44 cm
- C. 48 cm
- D. 56 cm
- E. 60 cm



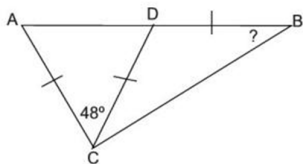
48. Find the area of the figure.

- A. 140
- B. 148
- C. 152
- D. 168
- E. 180



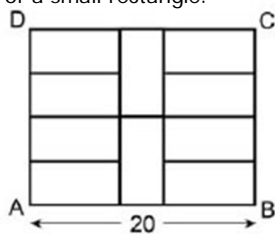
49. Find the angle B in the figure.

- A.  $66^\circ$
- B.  $55^\circ$
- C.  $48^\circ$
- D.  $40^\circ$
- E.  $33^\circ$



50. In the figure, ABCD rectangle was divided into 10 equal small rectangles. Find the perimeter of a small rectangle.

- A. 16
- B. 20
- C. 24
- D. 30
- E. 36



### APTITUDE

51. What is the next number in the series: 5, 7, 9, 11, 13, ?

- A. 12
- B. 13
- C. 14
- D. 15
- E. 16

52. What is the next number in the series: 24, 19, 14, 9, ?

- A. 4
- B. 6
- C. 7
- D. 8
- E. 10

53. What is the next number: 8, 6, 12, 10, 20, 18, ?

- A. 24
- B. 36
- C. 47
- D. 58
- E. 60

54. What is the next number: 1, 2, 4, 7, 28, 33, 198, ?

- A. 264
- B. 248
- C. 220
- D. 212
- E. 205

55. Consider the pattern: 2, 4, 7, 13, 16, ... . The pattern has the following rule: Each term in the pattern is obtained by:

- Take the square of the previous term
- Then, add the digits of the result.

For example:  $7^2 = 49$ ;  $4+9=13$ . Then, 7 is followed by 13.

Find the 20<sup>th</sup> term in the pattern.

- A. 11
- B. 13
- C. 15
- D. 17
- E. 19

56.  $1 \rightarrow 2, 2 \rightarrow 5, 3 \rightarrow 5, 4 \rightarrow 4, 5 \rightarrow 5, 6 \rightarrow 6, 7 \rightarrow 4, 8 \rightarrow ?$

- A. 4
- B. 5
- C. 6
- D. 7
- E. 8

57. In a row at a bus stop, A is 7<sup>th</sup> from the left and B is 9<sup>th</sup> from the right. They both interchange their positions. A becomes 11<sup>th</sup> from the left. How many people are there in the row?

- A. 18
- B. 19
- C. 20
- D. 21
- E. 22

58. Find the odd one out.

5, 10, 15, 18, 20, 25

- A. 5
- B. 10
- C. 15
- D. 18
- E. 20

59. Find the odd one out.

1, 4, 9, 12, 16, 25, 36

- A. 36
- B. 25
- C. 16
- D. 12
- E. 9

60. Find the odd one out.

135, 317, 975, 731, 573, 264

- A. 317
- B. 975
- C. 731
- D. 573
- E. 264

61. Find out the wrong number in the series:

1, 1, 2, 6, 24, 96, 720

- A. 18
- B. 16
- C. 12
- D. 10
- E. 6

4	8	20
9	3	15
6	6	?

62. In an exhibition, seven cars of different companies - Cadillac, Ambassador, Fiat, Maruti, Mercedes, Bedford and Fargo are standing facing to east in the following order : Cadillac is next to right of Fargo. Fargo is fourth to the right of Fiat. Maruti car is between Ambassador and Bedford. Fiat which is third to the left of Ambassador, is at one end. Which one of the following is the correct position of Mercedes?
- Next to the left of Cadillac
  - Next to the left of Bedford
  - Between Bedford and Fargo
  - Fourth to the right of Maruti.
  - On the leftmost position

63. Which of the following is least like the others?
- cube
  - sphere
  - pyramid
  - circle
  - cone

64. Five girls are sitting on a bench to be photographed. Seema is to the left of Rani and to the right of Bindu. Mary is to the right of Rani. Reeta is between Rani and Mary. Who is sitting immediate right to Reeta ?
- Bindu
  - Mary
  - Rani
  - Reeta
  - Seema

65. At which number did the car park in the figure?
- 87
  - 90
  - 92
  - 95
  - 99

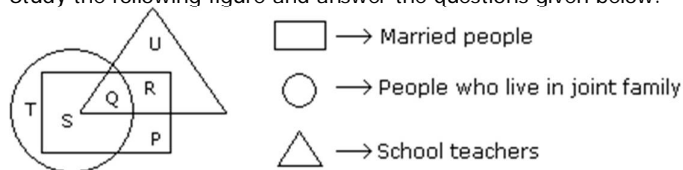


66. Susan can type 10 pages in 5 minutes. Mary can type 5 pages in 10 minutes. Working together, how many pages can they type in 30 minutes?
- 15
  - 20
  - 25
  - 65
  - 75
67. Each child in a family has at least 4 brothers and 3 sisters. What is the smallest number of children the family might have?
- 7
  - 8
  - 9
  - 10
  - 11

68. Find the missing number.
- 2
  - 3
  - 4
  - 6
  - 9

2	3
4	6
6	9
9	?

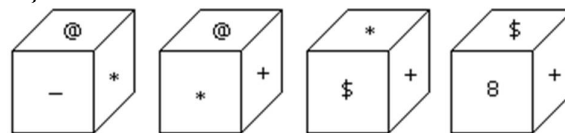
Study the following figure and answer the questions given below.



Answer the questions 69 and 70 according to the given figure above.

69. By which letter, the people who live in joint family but are neither married nor teachers are represented?
- P
  - Q
  - R
  - S
  - T
70. What does R represent?
- People who live in joint family but are neither married nor teachers
  - Married school teachers who do not live in a joint family
  - School teachers who are not married
  - People who are married but who are not living in joint family and who are not teachers
  - Married school teachers

71. Which symbol will be on the face opposite to the face with symbol \* ?



- @
- \$
- 8
- +
- 

72. John walks towards the east then towards North and turning  $45^\circ$  right walks for a while and lastly turns towards left. In which direction is he walking now?
- North
  - East
  - South-East
  - North-East
  - North-West

Answer the questions 73, 74 and 75 according to the given information below.

1	x	3	5	2
4		1	2	5
2	5	4		1
3	y	5		z
	1		4	

In the above figure, numbers from 1 to 5 are written in squares. Each row and each column should have each number only once.

73. Find x.

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

74. Find y.

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

75. Find z.

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

**END OF THE EXAM**

**WORKING AREA**

(You can use this space for rough work)

**WORKING AREA**  
(You can use this space for rough work)

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**WORKING AREA**

(You can use this space for rough work)

**WORKING AREA**

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**WORKING AREA**

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**WORKING AREA**

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