Mathematica Centrum

Together, let's shape the mathematicians of the future

FIBONACCI PREPARATORY TEST 2016
DETAILED SOLUTIONS

1. The base of a pyramid has 6 sides. In all, this pyramid has (6 + 1) 7 vertices.

2. The expression 400 < 398 is false.

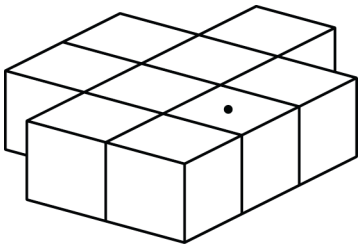
3. The difference between (7 x 12) 84 and (72 ÷ 8) 9 is (84 - 9) 75.

4. A period of 8 weeks is equal to (8 x 7) 56 days. A period of (56 + 8) 64 days represents more than 63 days.

5. The ten's digit of (428 - 348) 80 is 8.

6. There are about (6 x 30) 180 days or a little less than (180 ÷ 7) 26 weeks in a period of 6 months. You will go to the gym approximately (26 x 5) 130 times over a period of 6 months.

7. Nine blocks have been glued together, as shown in the diagram. There is only 1 block (the one with a dot) that has exactly 3 faces that have glue on them.



8. Mathew is X years old and Mathilda Y years old. The sum of their ages is presently X + Y. Three years ago, the sum of their ages was X + Y - 6.

9. From 1 to 100 there are 100 natural numbers. If we take away all 1-digit natural numbers (1 to 9) and the only 3-digit natural number (100), there is a total of (100 - 10) 90 2-digit natural numbers.

X	9	13	7
3	**27**	39	21
4	36	**52**	**28**
10	90	130	70

10. The expression that yields a sum that is even is 12 + 14 + 55 + 33.

11. Mathilda rolls a dice 30 times. She should expect to get a 5 (30 ÷ 6) 5 times.

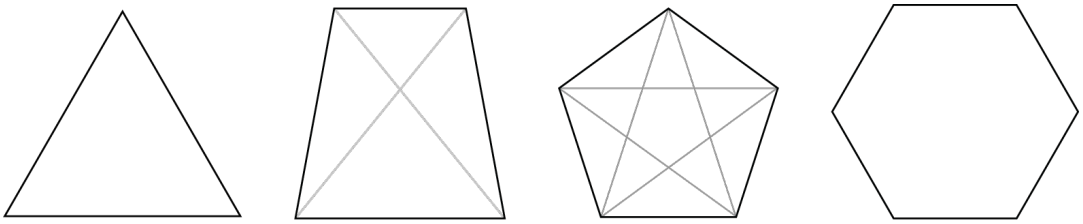
12. The number represented by a ?, that has a value closest to 30 is, 28.

13. 3 hundreds (300) + 50 ones + 16 tens (160) is equal to (300 + 50 + 160) 510.

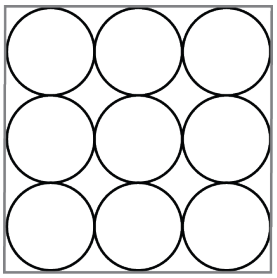
14. 2 m (200 cm) + 1 dm (10 cm) + 5 cm is equal to (200 + 10 + 5) 215 cm.

15. There are 3 different ways (10 x $2, 4 x $5, and (2 x $5 + 5 x $2)) to make change for a $20 bill if you were using $5 bills and $2 coins.

16. Zero diagonals can be drawn in a triangle. Two diagonals can be drawn in a quadrilateral, and 5 can be drawn in a pentagon. If you analyse closely these three numbers, you can see that they form a logical sequence. Indeed, 0 + **2** = 2, 2 + **3** = 5. The number of diagonals that can be drawn in a hexagon is (5 + **4**) 9.

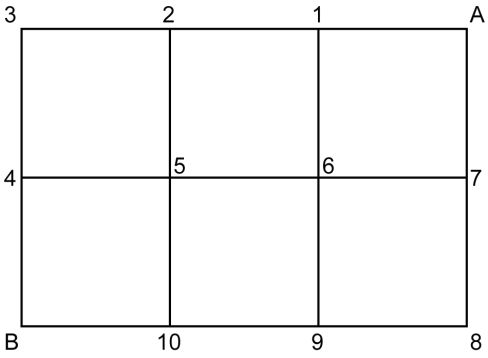


17. From N x N = 1 + 2 + 3 + 4 + 3 + 2 + 1, we deduct that N x N = 16 = 4 x 4 and that N = 4. The value of 10 x N is equal to (10 x 4) 40.



18. Andrea can stack 4 balls on the 9 balls that form the base. On these 4 balls, she can stack one other ball. She will need (4 + 1) 5 more balls to form this ''pyramid''.

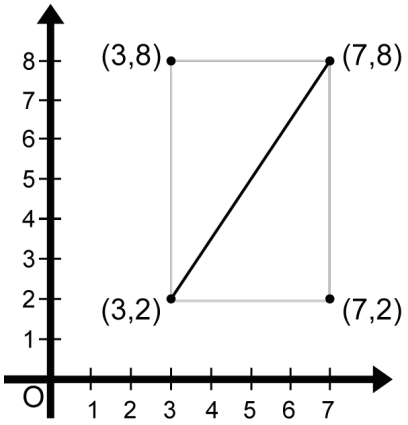
19. There are 10 different 500 m routes (A-1-2-3-4-B, A-1-2-5-4-B, A-1-2-5-10-B, A-1-6-5-4-B, A-1-6-5-10-B, A-1-6-9-10-B, A-7-6-5-4-B, A-7-6-5-10-B, A-7-6-9-10-B, and A-7-8-9-10-B) to get from point A to point B.



20. Melissa has bought 5¢ and 10¢ stamps for a total of 55¢. If she were to buy the same number of 5¢ stamps, but twice the number of 10¢ stamps, it would cost her $1.05. From these two premises, we can infer that the amount paid for the 10¢ stamps is (105¢ - 55¢) 50¢. The number of 10¢ stamps she has bought is (50¢ ÷10¢) 5 and that of 5¢ is ((55¢ - 50¢) ÷ 5¢) 1.

21. The divisors of 10 are {1, **2**, 5, 10}, those of 12 are {1, **2**, 3, 4, 6, 12}, and those of 36 are {1, **2**, 3, 4, 6, 9, 12, 18, 36}. The GCD of 10, 12, and 36 is 2.

22. Diagonal AB of a rectangle is represented in the diagram. The coordinates of one of the other two vertices of the rectangle are (7 , 2).



23. In the sequence: 1, 8, 15, 22, 29, … 113, each term is 7 more than the preceding term. We can say that 1 + 7 x ? = 113. The value of the ? is given by (113 - 1) ÷ 7. This value is 16. In this sequence, there are (16 + 1) 17 terms.

24. When he stops, after having covered 70% of the distance, Mathew has covered (70% x 30) 21 km. From the time he left his house to the time he got back, Mathew has travelled a distance of (21 x 2) 42 km.

25. We can calculate the number of pages that Mathilda read by finding the numerator in the equation: 6/5 = ?/75. Mathilda has read (6 x 15) 90 pages.

26. The next number in the sequence: 1, 3, 4, 7, 11, … is (7 + 11) 18.