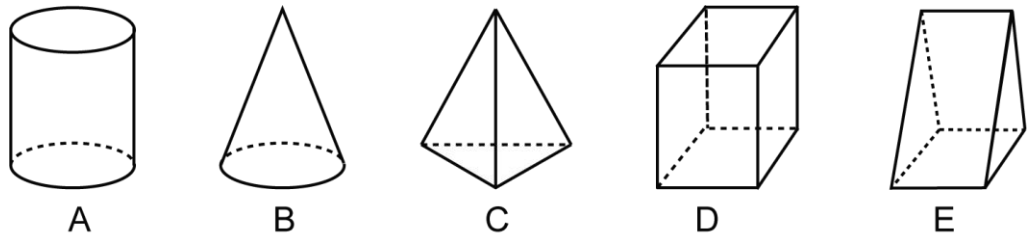
# Mathematica Centrum

Together, let's shape the mathematicians of the future

**FIBONACCI PREPARATORY TEST 2018**
**DETAILED SOLUTIONS**

**1.** The solid which has 12 edges is the rectangular prism D.

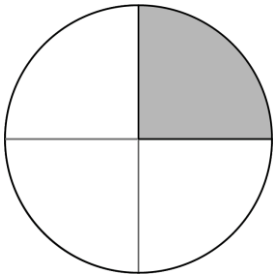



**2.** You can buy (24 ÷ 5 = 4R4) four $5 cereal boxes with $24.

**3.** The value of X in the equation: 2 + 9 + X + 3 - 2 = 13 is 1.

**4.** The quotient of 210 ÷ 70 is 3.

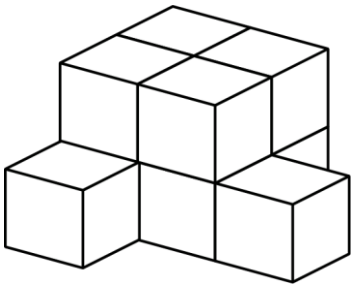
**5.** The fraction of the pie that has been eaten is 1/4.



**6.** Forty dimes = $4 = 16 quarters. The value of the ? in the equation: 20 quarters = ? quarters + 16 quarters is 4.

**7.** The tens digit in the product of 9 x 15 is (9 x 15 = 10 x 15 - 1 x 15 = 135) 3

**8.** There are (2 x 4 + 2) 10 blocks in the pile.

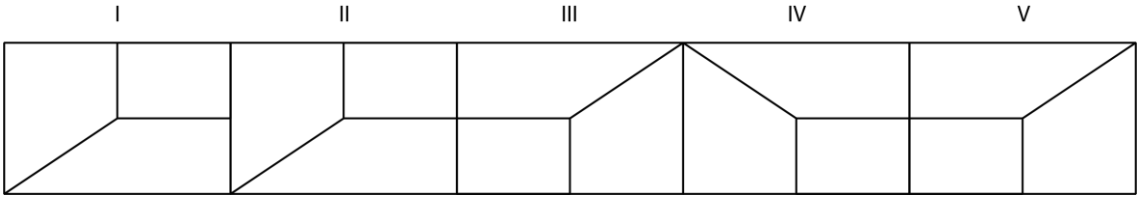


**9.** The next term in the sequence 2, 3, 5, 8, 13, 21, … is (13 + 21) 34.

**10.** Mathew has ((30 - 6) ÷ 2) 12 books. Mathilda has (30 - 12) 18 books.

**11.** 10 mm = 1 cm

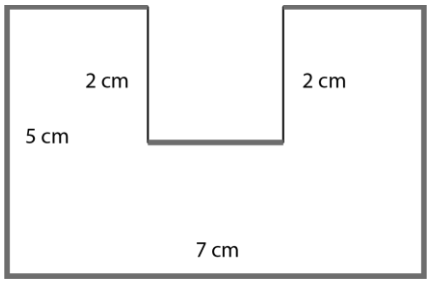
**12.** Mathilda used a reflection (symmetry) to transform figure IV into figure V.




**13.** The number of sides (6) plus the number of angles (6) in an hexagon is equal to (6 + 6) 12.

**14.** A heart beats 10 times every 10 seconds. It beats once every second. In 2 minutes (120 seconds) it will beat 120 times.

**15.** Mathilda watched 120 minutes of a 3 hour movie. She watched 120 minutes (2 hours) of a 3 hour movie. She watched (2 hours out of 3 hours) 2/3 of the total movie.




**16.** The perimeter of the original 7 cm x 5 cm rectangular carton represented in bold colour is (2 x (7 + 5)) 24 cm. The perimeter of the carved carton shown here in the the diagram is (24 cm + 2 x 2 cm) 28 cm.

**17.** The sum of two consecutive odd numbers is 16. The product of these two consecutive odd numbers (7 and 9) is (7 x 9) 63.

**18.** Let ‘s suppose it is 3 o’clock (fig.1). When the minute hand of the clock goes around once (60 minutes), the hour hand moves a distance of 1 hour, from 3 to 4 (fig. 2) or 1/12 of the clock’s circle. If the minute hand goes around 60 times, the hour hand will go around (60 ÷ 12) 5 times.

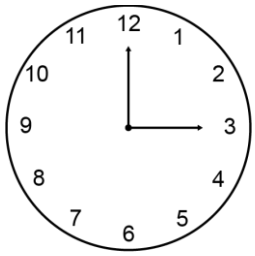



fig. 1

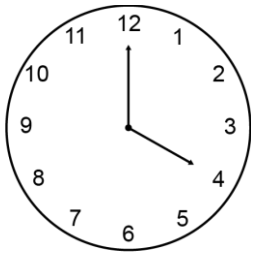
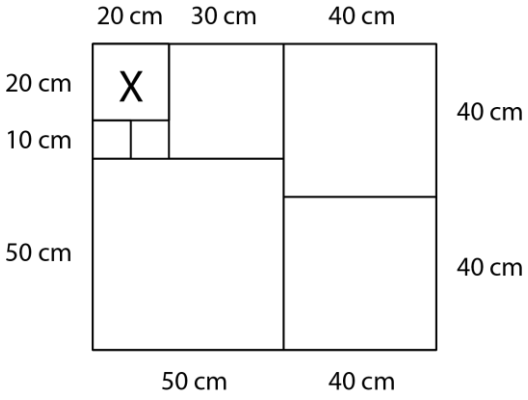



fig. 2

**19.** A bag contains 4 red balls, 3 green balls, and 2 blue balls. There are 9 balls in the bag. There are only 2 blue balls out 9 balls in the bag. If you randomly choose one of these balls, the probability that the ball chosen is blue is 2/9.

**20.** Melissa has used square tiles to completely cover a 80 cm x 90 cm rectangular surface. Starting from the two squares on the right (80 = 2 x 40), we can deduce the length of the sides of all the squares. The length of the side of tile X is 20 cm.



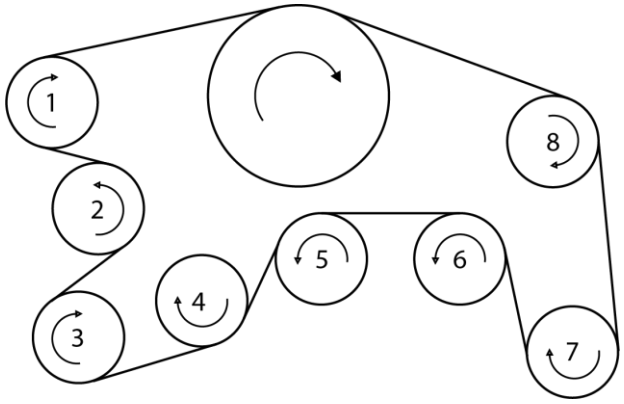

**21.** The factors of 3 are (1, **3**). The factors of 6 are (1, 2, **3**, 6). The factors of 12 are (1, 2, **3**, 4, 6, 12). The greatest common factor of 3, 6, and 12 is 3.

**22.** $1^2 = 1 \times 1 = 1$, $2^2 = 2 \times 2 = 4$, $3^2 = 3 \times 3 = 9$. The value of $4^2 + 5^2$ is $4 \times 4 + 5 \times 5 = 41$.

**23.** A pile of 100 identical sheets of paper is 4 cm high. The thickness of one sheet of the same paper is (4 cm ÷ 100) 0.04 cm.

**24.** I have $100. If I increase this amount by 50%, I will have ($100 + $50) $150. If I increase this new amount by another 50%, I will have ($150 + $75) $225.

**25.** When the big wheel turns in a clockwise direction, wheels 1 - 3 - 4 - 7 - 8 also turn in a clockwise direction.




**26.** If N is a natural number and N + 3 is an odd number, we must conclude that N is an even number. The only expression that can represent an odd number is 3 x N + 3. If N is any even number (3 x **2** + 3 = 9, 3 x **4** + 3 = 15, … ) 3 x N + 3 is always odd.

**27.** If the average of M, N, and P is 9, their sum is (9 x 3) 27. If M = 13, we can write that 13 + N + P = 27. From this equation, we find that the greatest possible value of P is 11 (P cannot be equal to 13).

**28.** The total amount paid ($30) being even, Mathusalem has bought an even number of $3 containers. He could not have bought 12 containers (12 x $3 = $36), he must have bought 8.