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ESSAY PROBLEMS

1. The area of a square $ABCD$ is 36 cm^2 . Let E be the midpoint of AB , and F be the midpoint of BC . What is the area of the trapezoid $AEFC$, in cm^2 ?

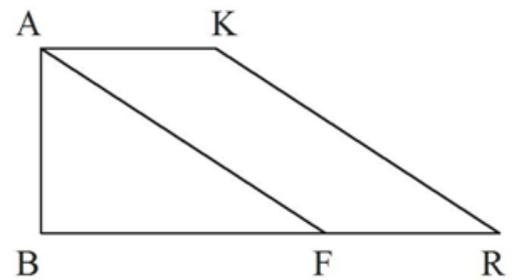
Answer :

2. Let $P = 1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10 \times 11 \times 12 \times 13 \times 14 \times 15$ and $Q = 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 + 13 + 14 + 15$.

What is the remainder when P is divided by Q ?

Answer :

3. In the figure, angle ABF is a right angle. The area of triangle ABF is equal to the area of parallelogram $FRKA$. The length of AB , BF and FA are 3 cm, 4 cm and 5 cm respectively. What is the length of FR , in cm?

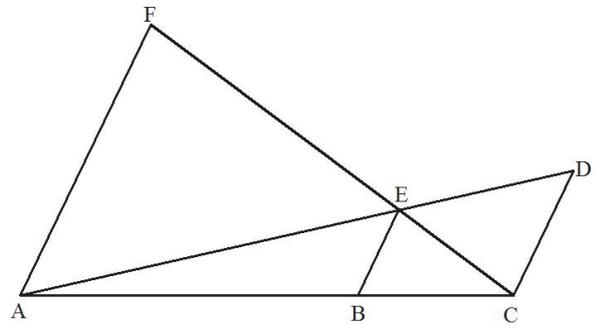


Answer :

4. Six bags of marbles contain 18, 19, 21, 23, 25 and 34 marbles, respectively. One bag contains red marbles only. The other five bags contain no red marbles. Jane takes three of the bags and George takes two of the others. Only the bag of red marbles remains. If Jane gets twice as many marbles as George, how many red marbles are there?

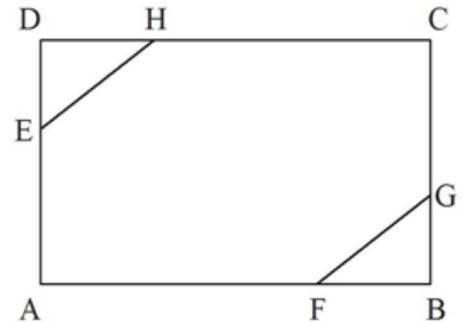
Answer :

5. In the figure, AF , BE and CD are parallel.
 $AB = 7$ cm, $BE = 3$ cm, and $CD = 4$ cm.
 Find the length of AF , in cm.



Answer :

6. In the figure, $ABCD$ is a rectangle, $ED = BG = \frac{1}{3}BC$
 and $BF = DH = \frac{1}{3}AB$. What is the ratio of the area of
 $AFGCHE$ to the area of $ABCD$?

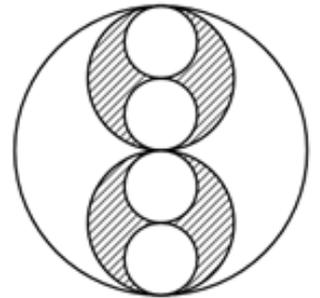


Answer :

7. One day Joko drove at the average speed of 50 km/hour from his house to his office. He arrived two minutes late. On the next day, he drove to his office at the average speed of 60 km/hour and arrived one minute early. What is the distance between Joko's house and his office, in km?

Answer :

8. In the figure, the diameter of the largest circle is 28 cm.
Two circles of diameter 14 cm are inscribed in it.
Two circles of diameter 7 cm are inscribed in each of the circles of diameter 14 cm.
What is area of the shaded region, in cm^2 ? [Use $\pi = \frac{22}{7}$.]



Answer :

9. The ratio of Amin's money to Budi's money was 5 : 4. They donated a part of their money for charity. Amin's donation was two times Budi's donation. After that, each of them had \$15. How much money was donated by Amin?

Answer :

10. A solid rectangular iron is put into a cylinder. The solid has a square base of side length 10 cm and height of 15 cm. The diameter and height of the cylinder are 14 cm and 16 cm, respectively. If water fills $\frac{3}{4}$ of the cylinder, how many cm^3 water will be spilled out? [Use $\pi = \frac{22}{7}$.]

Answer :

11. Siti had 60 green apples and 90 red apples for sale. The cost of every three green apples was \$10, and every five red apples was \$8. She mixed the apples and sold them all. If the selling price of every five mixed apples was \$15, how much profit did Siti get from selling all the apples?

Answer :

12. Ary and friends are having dinner together. They agree to share the bill among them. If they contribute \$16 each, then they still need \$4 more for paying the bill. But, if they contribute \$19 each, then the total collected money is enough to pay the bill, give tip that is 15% of the bill, and pay parking fee of \$2. How much is the bill?

Answer :

13. Peter has a three-digit code for a padlock. He has forgotten the code but he knows that all three digits are different. He also knows that if you divide the first digit by the second digit and then square the result, you get the third digit. Find all three-digit codes having this property.

Answer :