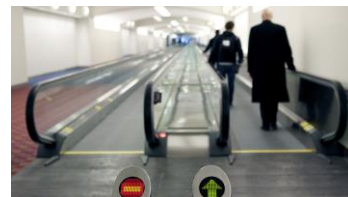**school nova**™

1. **Solve the word problems.**

a). A moving walkway's speed is 3 km/h. How long it will take for a suitcase on the walkway to move 200 m?

b). A man walks with the speed of 6 km/h. How long will it take him to walk 250 m (¼ km)?

c). How long it will take the man to walk the distance of 250 m if he is on the moving walkway?

d). How long it will take the man to walk the distance of 250 m if he is on the moving walkway and walking in the direction that is opposite to the direction of the walkway's movement?

2. Remove parenthesis:

$w \cdot (w + 3) =$ _____

$2x \cdot (4x + 2) =$ _____

$w \cdot (w - 3) =$ _____

$3x \cdot (1 - 5x) =$ _____

3. John read 90 pages of a book and this is a $\frac{3}{5}$ of the whole book. How many paged are there in the book?

4. Solve equations:
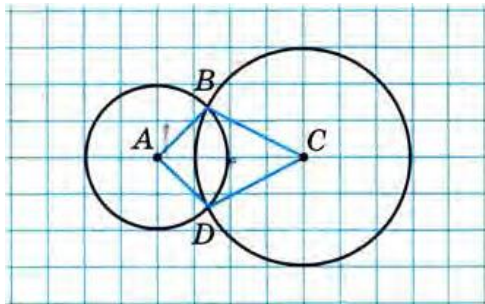
$$\frac{1}{1+\frac{2}{x}} = \frac{1}{3}$$

$$\frac{1}{1+\frac{2}{x}} = 3$$

5. Robert is 8 years old. His age is $\frac{2}{9}$ of the age of his father. His father's age is $\frac{3}{5}$ of that of his grandfather. How old is Robert's grandfather?

6. Solve:

$$\frac{\frac{3}{4}-\frac{1}{8}}{\frac{1}{4}+\frac{3}{16}} - \frac{3}{7} =$$

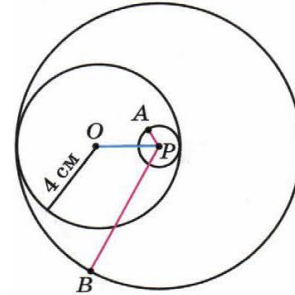**7.** Find the perimeter of the quadrilateral ABCD if the side of the square of the grid is 5 mm.

8. Two concentric circles are drawn with the centers in the point P. The third circle is tangent to the first two and has the center in the point O. Find the radii of the two circles if radius of the third circle and the distance between point O and P are known.

a. |OP|=5 cm
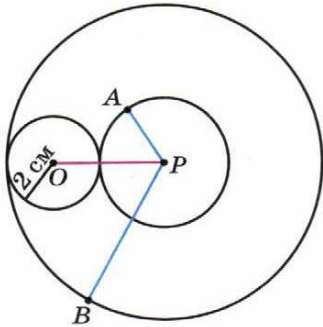
b. |PO|=3 cm.

9. Can you find the missing angular measures on the picture below without measuring angles? (hint: three angles of any triangles add up to a straight angle, vertical angles are equal)

1)

2)

3)
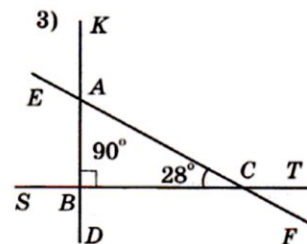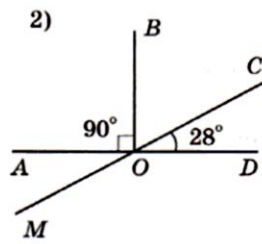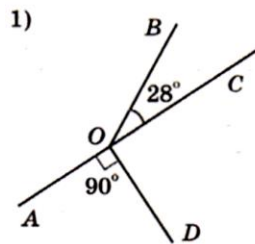
10. Arnav and Bora worked together on a project and received $150 for their completed work. Arnav worked 2 days and Bora worked 3 days, and they agree to divide the money between them in the ratio 2: 3. How much should each receive?

11. A fish tank is decorated by red and green marbles in the ratio 3 : 4. Find the total number of marbles in the fish tank if it contains 60 red marbles.

12. There are 6 kids and 6 chairs in the room. In how many ways can kids sit on these chairs?

13. There are 6 kids and 3 chairs in the room. In how many ways can kids sit on these chairs?

14. There are 26 letters in the alphabet. How many possible 3 letter words can be created? (Any letter combination is allowed including repeating letters. Even crazy words that do not exist such as - "jsz", "oqw", "ttt". You do not have to calculate the final answer, just write out the expression.)

15. There are 10 pairs of socks in a box, all are of different colors. How many socks do you need to take out without seeing their color to be sure that you have at least one pair of socks of the same color?

16. How many three digit numbers can be composed from digits 0, 1, 2, 3 if
   a. repetition of digit is allowed
   b. repetition of digit is not allowed?

17. There are 10 green and 5 red pencils in the box:
   a) Which is the smallest number of the pencils you have to take out of the box, to be sure that you have 2 green pencils?

   b) Which is the smallest number of the pencils you have to take out of the box, to be sure that you have 2 red pencils?

   c) Which is the smallest number of the pencils you have to take out of the box, to be sure that you have 2 pencils of different color?

   d) Which is the smallest number of the pencils you have to take out of the box, to be sure that you have 2 pencils of the same color?