SOLVED MATHEMATICAL EXERCISES

1. What is the value of the expression \( \left( \frac{1}{2} + \frac{1}{3} \right)^2 \)?
   A. \( \frac{1}{3} \)  
   B. \( \frac{5}{9} \)  
   C. \( \frac{4}{3} \)  
   D. \( \frac{1}{5} \)

2. The expression \( \left( \frac{1}{4} \right)^2 \cdot y^3 \) is equal to:
   A. \( \frac{1}{8} y^2 \)  
   B. \( \frac{1}{16} y^2 \)  
   C. \( \frac{1}{18} y^2 \)  
   D. \( \frac{1}{16} y^3 \)

3. What is the value of the expression \( \sqrt{x} \cdot (2 - \sqrt{x}) + x \), for \( x = 9 \)?
   A. 4  
   B. 6  
   C. 5  
   D. 3

4. What is the solution of the equation \( 2(x - 1) - 3 = x \)?
   A. 4  
   B. 2  
   C. 3  
   D. 5

5. Which interval is the solution of the inequality \( 3x - 6 > 2(x + 1) \)?
   A. (8, +\( \infty \))  
   B. (3, +\( \infty \))  
   C. [2, +\( \infty \))  
   D. [3, +\( \infty \))

6. At which point the linear function \( y = x + 3 \) intersects the Oy axis:
   A. P(0, 3)  
   B. P(3, 0)  
   C. P(0, 0)  
   D. P(1, 3)

7. Find the value of \( x \) such that the expression \( \frac{5 - 2x}{x - 2} \) it's not meaningful !
   A. 5  
   B. 3  
   C. 2  
   D. –2

8. Which pair of numbers is the solution of the system of linear equalities \( \begin{cases} x + 2y = 4 \\ 3x - y = 5 \end{cases} \)?
   A. (2, 4)  
   B. (2, 1)  
   C. (3, 5)  
   D. (3, 1)
9. If 8 workers finish the work for 12 days, for how many days the same work will be finished from 4 workers?
   A. 8 days  B. 6 days  C. 10 days  D. 24 days

10. If the rational expression \( \frac{2x^2 - 2y^2}{x - y} \) is simplified, then the result will be:
    A. \( x + 4y \)  B. \( 2(x - y) \)  C. \( 2(x + y) \)  D. \( 4(x + y) \)

11. What is the value of the function \( y = \log_3(x + 1) \) for \( x = 2 \)
    A. \( y = 2 \)  B. \( y = 3 \)  C. \( y = 0 \)  D. \( y = 1 \)

12. The sides of the right-angled triangle are; 6 cm, 8 cm and 10 cm (see the figure below).
    What is the value of the expression \( \sin \alpha + \cos \alpha ? \)

   A. \( 7/10 \)  B. \( 7/5 \)  C. \( 3/5 \)  D. \( 5/7 \)

13. What is the solution of the exponential equation \( 2^{x+3} - 7 \cdot 2^x = 16 ? \)
    A. \( x = 4 \)  B. \( x = 2 \)  C. \( x = 7 \)  D. \( x = 0 \)

14. Which number represents 60% of 50 ?
    A. 20  B. 30  C. 25  D. 24

15. The price of a device is 500 denars. What will be the new price if it is decreased for 40% ?
    A. 300  B. 520  C. 360  D. 610

16. In the box there put 4 red, 6 yellow and 8 white marbles. What is the probability to randomly pull out one white marble from the box?
    A. \( 3/12 \)  B. \( 4/12 \)  C. \( 4/9 \)  D. \( 3/8 \)

17. What is the value of the sum \( 1 + 2 + 3 + \cdots + 49 ? \)
    A. 1250  B. 1200  C. 1225  D. 950
18. What is the angle $\alpha$ (the interior angle at the point A) of the triangle ABC, if there is given the value of the interior angle at the point C and the value of the exterior angle at the point B (see the figure below)?

\[ \alpha \\
\ang{75} \\
\ang{125} \\
A \\
B \\
C \]

A. $60^\circ$  
B. $50^\circ$  
C. $45^\circ$  
D. $70^\circ$

19. Find the area of the shadowed part in the figure below!

\[ \begin{array}{c}
5 \\
2 \\
5 \\
8 \\
\end{array} \]

A. 30  
B. 22  
C. 38  
D. 32

20. What is the volume of the cylinder by the diameter $d = 6$ cm and the height $H = 10$ cm ?

A. $80\pi$ cm$^3$  
B. $70\pi$ cm$^3$  
C. $60\pi$ cm$^3$  
D. $90\pi$ cm$^3$

21. If the side of the cube is increased two times, then how many times will be increased its volume?

A. 4 times  
B. 6 times  
C. 8 times  
D. 2 times

22. If from 15 L (liters) milk there can be produced 5 kg cheese, how many liters of milk we need for producing of 8 kg cheese?

A. 30 L  
B. 20 L  
C. 25 L  
D. 24 L
23. Which of the following points belongs to the line $2x - 3y + 5 = 0$?
A. $M(4,1)$  
B. $M(-4,-1)$  
C. $M(-1,2)$  
D. $M(-4,5)$

24. Find the equation of a circle such that two points of its diameter have the coordinates $A(-2,3)$ and $B(6,3)$ respectively!
A. $(x-2)^2 + (y-3)^2 = 16$
B. $(x-2)^2 + (y-3)^2 = 4$
C. $(x+2)^2 + (y+3)^2 = 16$
D. $(x+2)^2 + (y+3)^2 = 4$

25. The point $(-3,2)$ belongs to the circle $(x+3)^2 + (y+1)^2 = r^2$. Which of the following results represents the radius of this circle?
A. $r = 3$  
B. $r = \sqrt{10}$  
C. $r = 9$  
D. $r = 10$