STANDARD LEVEL - 2022

Closed questions

**Question 1S.** *(1 pkt)*

The number $(\sqrt{27}-\sqrt{12})^3$ is equal to:

**A.** $3\sqrt{3}$ **B.** $\sqrt{15}$ **C.** $\sqrt{18}$ **D.** $\sqrt{3}$

**Question 2S.***(1 pkt)*

A company's share price rose by 20% in the first week after entering the stock market. Unfortunately, two months after the outbreak of the pandemic their price decreased by the same percentage amount. The current share price is $x\%$ of the starting price, where $x$ is equal to:

**A.** $x = 90$ **B.** $x = 95;$ **C.** $x = 96$ **D.** $x = 98$

**Question 3S.***(1 pkt)*

The number $2\log_3\sqrt{12} - \left(\log_2\sqrt{3}\right)^{-1}$ is equal to:

**A.** $\log_3 2$ **B.** $1$ **C.** $\log_2 3$ **D.** $\sqrt{3}$

**Question 4S.***(1 pkt)*

The sum of all solutions of the equation $(2x-x^2)(x^2+3x)(x^2-2)=0$ is equal to:

**A.** $1$ **B.** $2$ **C.** $-2$ **D.** $-1$

**Question 5S.** *(1 pkt)*

The set of all solutions of the inequality $\frac{2-x}{3} - \frac{x-3}{4} \geqslant \frac{4-x}{6}$ is:

**A.** $(-\infty,-1]$ **B.** $(-\infty,1]$ **C.** $[3,\infty)$ **D.** $\left(-\infty,\frac{9}{5}\right]$

**Question 6S.***(2 pkt)*

Three consecutive terms of an increasing geometric sequence are $x-3,\ 6,\ x+2$. Hence $x$ is equal to:

**A.** $2$ **B.** $\sqrt{3}$ **C.** $3$ **D.** $7$

**Question 7S.** *(1 pkt)*

The diagonals of an parallelogram have lengths 8 and 12 and intersect at an angle 30°. The area of this parallelogram is equal to

**A.** $18$ **B.** $12\sqrt{3}$ **C.** $24$ **D.** $\sqrt{42}$

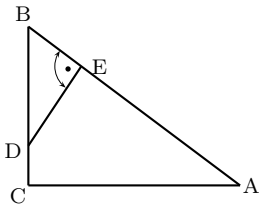
**Question 8S.***(1 pkt)*

Lines $k: y = -\frac{3}{2}x + 1$ and $l: mx + 2x - my - y - 2 = 0$ are perpendicular for:

**A.** $m = 2$ **B.** $m = -3$ **C.** $m = -4$ **D.** $m = 4$

**Question 9S.** *(2 pkt)*

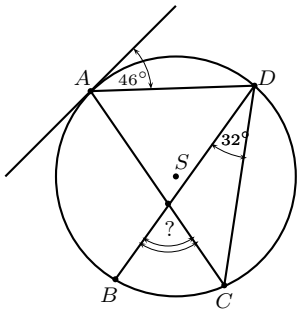
In a right-angled triangle $ABC$ we have: $|BC| = 6$, $|CA| = 8$.
The line $DE$ is perpendicular to the hypotenuse $AB$ and $|AE| = 3|EB|$ (see drawing). Then area of triangle $BDE$ is equal to:




**A.** 4 **B.** $\frac{25}{6}$ **C.** $\frac{5}{2}$ **D.** 2

**Question 10S.** *(2 pkt)*

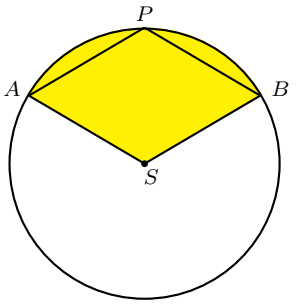
Points $A, B, C$ i $D$ lie on a circle with a center $S$. Tangent to the point $A$ and the line $AD$ form an angle of 46°. The angle $BDC$ is equal to 32° (see drawing). Under the above conditions lines $AC$ and $BD$ intersect at an angle of:




**A.** 64° **B.** 42° **C.** 78° **D.** 46°

**Question 11S.** *(1 pkt)*

Points $A, B, P$ lie on a circle with a center $S$ and radius equal to 1, whereby the quadrangle $ASBP$ is a rhombus (see drawing).
Then the market area is equal to:




**A.** $\frac{1}{3}$ **B.** $\frac{2}{5}$ **C.** $\frac{\pi}{3}$ **D.** $\frac{2\pi}{5}$

**Question 12S.** *(1 pkt)*

In a right-angled triangle $ABC$, the vertex of the right angle is at the point $C(1, 2)$. Point $S(3, 3)$. is at the center of hypotenuse and the triangle $SBC$ is equilateral. Then the area of triangle $ABC$ is equal to:

**A.** $\frac{5\sqrt{3}}{2}$ **B.** $\frac{5\sqrt{3}}{4}$ **C.** $2\sqrt{5}$ **D.** $\frac{3\sqrt{5}}{2}$

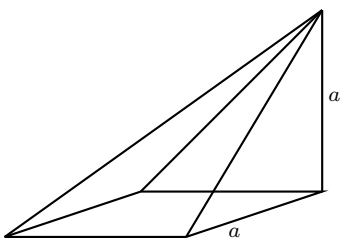
**Question 13S.** *(1 pkt)*

The number of all even four-digit numbers divisible by 5, with unique digits is equal to:

**A.** 504 **B.** 1008 **C.** 648 **D.** 816

**Question 14S.** *(2 pkt)*

The base of the pyramid is a square with a side length of $a$. One of the edges of this pyramid is perpendicular to the base and has length $a$ as well (see drawing). The total area of this pyramid is equal to:




**A.** $a^2(2 + \sqrt{2})$ **B.** $4a^2$ **C.** $a^2(1 + \sqrt{2})$ **D.** $a^2(3 - \sqrt{2})$