DEMO version of Maths admission test

The Maths examination consists of two parts: A and B.

Part A includes 7 tasks, which require choosing a correct answer from several variants. Each correct answer is worth 10 point. The candidate can get total of 70 points for this part.

Part B includes 3 tasks which require to fill in the answer. The candidate can get total of 30 points for this part.

The maximum number of points for parts A and B – 100.

The minimum number of points needed to pass the exam successfully – 39.

The candidate has 60 minutes to complete all the tasks.

Part A.

1.	**Solve the equation:** $\cos x = \dfrac{1}{2}$	a) $x = (-1)^k \cdot \dfrac{\pi}{3} + \pi k, \ k \in Z$ b) $x = \pm\dfrac{\pi}{3} + \pi k, \ k \in Z$ c) $x = \pm\dfrac{\pi}{3} + 2\pi k, \ k \in Z$ d) $x = \pm\dfrac{\pi}{6}$
2.	**Find the derivative of function:** $y = 4x^4 + \cos x - 2e^x + 5$	a) $y' = 16x^3 - \cos x - 2e^x$ b) $y' = 16x^3 - \sin x - 2e^x$ c) $y' = 4x^3 - \sin x - 2$ d) $y' = 4x^3 - \cos x - xe^x + 5x$
3.	**Solve:** $\left(\dfrac{1}{6}\right)^{-2x+6} < 36$	a) $(-\infty; 4]$ b) $[4; +\infty)$ c) $(-\infty; 4)$ d) $(4; +\infty)$
4.	A deck consists of 36 cards. Randomly we draw one card. What is the probability that this card is a "king"?	a) 2/9 b) 1/6 c) 1/4 d) 1/9
5.	**Solve:** $2\cos x = \sqrt{3}$	a) $\pm\dfrac{\pi}{3} + \pi n, n \in Z$ b) $\pm\dfrac{\pi}{3} + 2\pi n, n \in Z$

		c) $(-1)^n \dfrac{\pi}{6} + \pi n, n \in Z$ d) $\pm \dfrac{\pi}{6} + 2\pi n, n \in Z$
6.	**Find the maximum value of the function** $\sqrt{2}(\cos x - \sin x)$	a) $\dfrac{1}{4}$ b) 2 c) $\dfrac{\sqrt{2}}{2}$ d) 1
7.	**Solve the equation**: $\log_2(x-1) = 3$	a) 9 b) 3 c) 0 d) 4

Part B.

Write the correct answer:

8. Find the area of the rectangular trapezoid, the bases of which are 16 and 22, the large side makes an angle of $45°$ with the base.

9. Solve the inequality: $\dfrac{\log_2(x+5)}{2^{x+2} - 4^x - 3} \le \log_2(x+5)$

10. Find all the values of the parameter "a", for each of which the equation $\sqrt{3^{2x} - 5a} = 3^x - a$ has a single root.