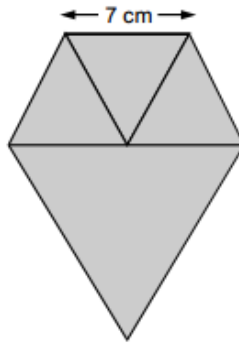# SAMPLE
SSST MATHEMATICS ENTRANCE EXAM

Departments of Computer Science and Information Systems

Duration: 1,5 hours
Use of calculators: Allowed

Good luck!

Question 1.

Tatjana has three small equilateral triangles and one large equilateral triangle. The length of the sides of the small triangles is 7 centimeters. Tatjana makes this shape:

Calculate the perimeter of the shape.

Question 2.

Simplify the following complex number expression

$$\left(\frac{-1+i}{1+i}\right)^2 \left(\frac{3-i}{3+i}\right)$$

and obtain its imaginary part:

a) $\frac{3}{10}$

b) $\frac{3}{5}$

c) $\frac{-3}{5}$

d) $\frac{-3}{10}$

Question 3.

Find the set of all real solutions for the following inequality:

$$\frac{x+2}{x-4} \le 0$$

a) $[-2,4]$
b) $(-\infty, 2] \cup (4, \infty)$
c) $[-2,4)$
d) $(-\infty, 2] \cup [4, \infty)$

Question 4.

Find all the solutions of the following equation:

$$\cos x + \cos 3x = 2$$

Question 5.

Ado has $100\,KM$ at the start of February. On the first of February he gets $2\,KM$ more. Every following day he gets $1.5\,KM$ more than the day before and every fourth day (starting from the fourth of February) he gets a bonus of $1\,KM$. How much money does Ado have at the beginning of March?

Question 6.

Solve the following equation:

$$5^{2(x+\log_5 2)} - 2 = 5^{x+\log_5 2}$$

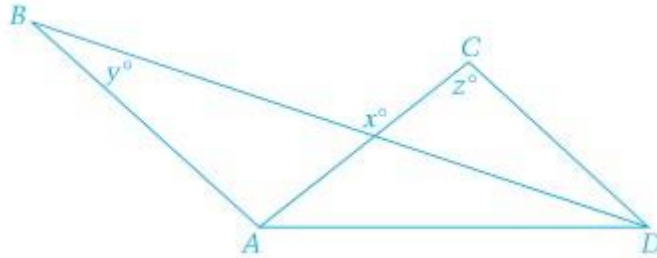**Question 7.**

Simplify the following equation:

$$\frac{x^3 - 1}{a^3 + a} \cdot \frac{a}{x^2 + x + 1} : \frac{x^2 - 2x + 1}{2a^2 + 2}$$

Question 8.

a) If two dice are rolled, find the probability that the sum is equal to 4.

b) A bag contains 6 marbles: 2 red marbles, 1 yellow marble, and 3 blue marbles. If you take one marble out and put it back, and then take another marble out, what is the probability that you will get 1 blue marble followed by 1 yellow marble?
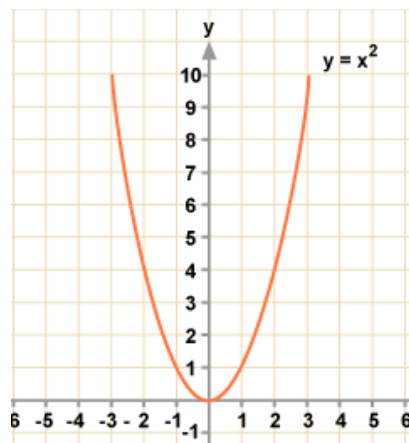
Question 9.

In the following figure, $\overline{AB}$ and $\overline{CD}$ are parallel. Evaluate the angle x in terms of angles y and z?

Question 10.

Graph $f(x) = x^2$ is shown in the following figure:

Sketch the graph of function $g(x) = -3f(2x) + 1$.