SAMPLE STANDARD QUESTIONS
SSST MATHEMATICS ENTRANCE EXAM

Departments of Computer Science and Information Systems

1. Evaluate the set of all real coefficients α for which the equation $x^2 + 5x - \alpha = 0$ has two real and different solutions.

   a) $\alpha \geq -\dfrac{25}{4}$

   b) $\alpha > -\dfrac{25}{4}$

   c) $\alpha \leq -\dfrac{25}{4}$

   d) $\alpha < -\dfrac{25}{4}$

2. One integer n is selected randomly from the set $[1,50]$. What is the probability that the selected n will satisfy the following inequality:

$$29 \leq 7n + 3 \leq 99$$

   a) $\dfrac{1}{8}$

   b) $\dfrac{1}{9}$

   c) $\dfrac{1}{10}$

   d) $\dfrac{1}{11}$

3. Evaluate the integer solutions of $3^{|x^3 - 1|} + 7 = 2194$.

   a) $x = 2$
   b) $x = -2$
   c) $x = 2; x = -2$
   d) No integer solutions

4. A band wants to distribute its music on compact discs (CDs). The equipment to produce the CDs costs 250 KM, and a set of 10 blank CDs costs 5.90 KM. Which of the following represents the total cost, in KM, to produce n CDs, where n is a multiple of 10?

   a) $(250 + 0.59)n$
   b) $250 + 0.59n$
   c) $(250 + 5.90)n$
   d) $250 + 5.90n$
   e) $250n + 5.90$

5. A number n is increased by 8. If the cube root of that result equals –0.5, what is the value of n?

   a) – 15.625
   b) – 8.794
   c) – 8.125
   d) – 7.875
   e) 421.875

6. If a and b are real numbers, $i^2 = -1$ and $(a + b) + 5i = 9 + ai$, what is the value of b?

   a) 4

   b) 5

   c) 9

   d) $4 + 5i$

   e) $5 + 4i$

7. If $f(x) = x + 3$ and $g(x) = \frac{x^2 - 9}{x - 3}$, which of the following statements are true about the graphs of f and g in the xy-plane?

8.
   I.   The graphs are exactly the same.
   II.   The graphs are the same except when $x = 3$.
   III.   The graphs have an infinite number of points in common.

   a) I only
   b) II only
   c) III only
   d) I and III
   e) II and III

9. If line l is the perpendicular bisector of the line segment with the endpoints $(2,0)$ and $(0,-2)$, what is the slope of line l?

    a) 2
    b) 1
    c) 0
    d) -1
    e) -2

10. Twenty students have each sampled one or more of three kinds of candy bars that a school store sells. If 3 students have sampled all three kinds, and 5 have sampled exactly two kinds, how many of these students have sampled only one kind?

    a) 8
    b) 12
    c) 15
    d) 17
    e) 18

11. Find the equation of the line which is a tangent line to the circle with the equation $(x-3)^2 + (y-2)^2 = 1$ and is parallel to the line defined by the equation $y = x + 2$.

12. Find all natural numbers n for which $(n^{17} - n)$ is divisible by 10.

13. Find the sum of the binary numbers 1001010 and 1010111 without converting them to the decimal system.

14. Find the product of the binary numbers 1001010 and 1010111 without converting them to the decimal system.

15. The function $f(x) = 1 - x + \sqrt{\dfrac{x^3}{x+3}}$ is given. Find the domain of that function in R.

16. The function $f(x) = 1 - x + \sqrt{\dfrac{x^3}{x+3}}$ is given. Find all x in R for which $f(x) = 0$.

17. A number is formed in the following way. You throw a six-sided dice until you get a 6 or until you have thrown it three times at the most. A sequence of dice throws form either one, two or three-digit numbers. How many distinct numbers can be formed as a result of this experiment?