1. The probability of the symptom A is 25% and the probability of the symptom B (which occurs independently on the symptom A) is 60%. What is the probability that both symptoms are observed in a patient?
a) less than 25% +
b) between 50% and 75% -
c) between 25% and 50% -
d) more than 75% -

2. A sphere has been enlarged, such that its surface area increased by a factor of 3. Its volume increased by a factor of
a) 5.2 +
b) 3 -
c) 9 -
d) 1.7 -

3. A curve is described by the equation $x^2 + y^2 + 2x + 4y + 1 = 0$. What is it?
a) a circle +
b) a parabola -
c) an ellipse -
d) a hyperbola -

4. The function $f(x) = x\cos(x)$ is:
a) odd +
b) neither even, nor odd, nor monotonic -
c) monotonic -
d) even -

5. What is the distance between points A=[-5,0,3] and B=[0,5,0]?
a) 7.7 +
b) 5.3 -
c) 12.6 -
d) 3.5 -

6. How many solutions of the equation $\left|3\pi|x| + 5\right| = 3$ are there in domain R?
a) none +
b) 2 -
c) 4 -
d) 1 -

7. Find the center C of a circle given by the equation $x^2 + y^2 - 8x + 6y + 9 = 0$.
a) C = [4; -3] +
b) C = [-3; 2] -
c) C = [2;-4] -
d) C = [1; 1] -

8. Choose the correct statement for the function $f(x) = (x-3)(x+2)$ on the interval [- 5, 2]
a) $f(x)$ has minimum value at x = 0.5 +
b) $f(x)$ has maximum value at x = 0 -

c) $f(x)$ has minimum value at x = –5 -

d) $f(x)$ has maximum value at x = 2 -

9. What is the domain of function $f(x) = \log_2\left(\frac{5}{|x-5|}\right)$?

a) all real numbers except 5 +
b) all positive real numbers except 5 -
c) all positive real numbers -
d) all real numbers -

10. What is the range of function (the set of all value of the function) $f(x) = 4\cos\left(\frac{\alpha}{4}\right)$

a) $\langle -4;4\rangle$ +

b) $\left\langle -\frac{1}{4};\frac{1}{4}\right\rangle$ -

c) $\langle -1;1\rangle$ -

d) $(-\infty;\infty)$ -

11. How many combinations of 5 different alphanumeric characters (repetition is not allowed) are there? Alphanumeric is a combination of alphabetic (26, case insensitive) and numeric characters.
a) 376,992 +
b) approx. 60.5 millions -
c) approx. 45.2 millions -
d) 658,008 -

12. What is the sum of the 1st and 6th term of an arithmetical sequence if the sum of first 6 terms of this arithmetical sequence is 30?
a) 10 +
b) 12 -
c) 6 -
d) 5 -

13. There are 6 black and 4 white balls in a bowl. What is the probability *P* that at least one of two randomly picked balls is white?
a) 50%≤P<100% +
b) 100%, at least one of picked balls must be white -
c) 0%<P<50% -
d) 0%, both balls must be black -

14. What is the 1st term of a geometric sequence if the 3rd term is 5 and 5th term is 25?
a) 1 +
b) –15 -
c) –5 -
d) $\sqrt{5}$ -

15. Simplify the expression: $\frac{a^{-3}b^{3}}{\sqrt{a^{-4}b^{6}}}\log_a a^4$

a) $\frac{4}{a}$ +

b) $\frac{b}{a}-4$ -

c) $a\,b^{-3}$ -

d) $a+4+b$ -

16. Choose the smallest integer constant *b* so that the quadratic equation $3x^2+bx+1=0$ has two real solutions:

a) 4 +

b) 1 -

c) 2 -

d) 3 -

17. What is the solution of the inequality $\frac{2|x-3|}{3}>4$

a) $(-\infty,-3)\cup(9,\infty)$ +

b) $(-\infty,-3)\cup(3,\infty)$ -

c) All real numbers except -3 a 3 -

d) $(-3,3)$ -

18. What is the length of leg (cathetus) of an isosceles right-angled triangle (i.e. both legs - catheti - are equal) whose area is 25?

a) $5\sqrt{2}$ +

b) $2\sqrt{5}$ -

c) 10 -

d) $\sqrt{10}$ -

19. Which of the following vectors is perpendicular to the vector ***u***=(2, *3*)

a) (-3,2) +

b) (2,0) -

c) (3,0) -

d) (3,2) -

20. If $\pi<\alpha<2\pi$ and $\sin(\alpha)=-0.37$ what is the value of $\sin(\alpha-\pi)$?

a) 0.37 +

b) $\cos\alpha$ -

c) $-\cos\alpha$ -

d) -0.37 -

21) The original statue is 1.5 m high. An enlarged copy of that statue is 3 m high. What is the ratio of the volume of the original statue to the volume of its enlarged copy?

a) 1:8 +
b) 1:4 -
c) 1:2 -
d) 2:3 -

22. Volume of a cone is given by the formula:
a) $\frac{1}{3}\pi\, h\, r^2$ +
b) $\pi\, h\, r^2$ -
c) $\pi\, h\, r$ -
d) $\frac{1}{2}\, h\, r^2$ -

23. Let C be a circle circumscribing a square S. Then the area ratio C/S of the circumscribed circle C and the square S is:
a) $\pi/2$ +
b) 3/2 -
c) $\sqrt{2}/2$ -
d) π -

24. What is the total surface area of a sphere if its volume is 10π ?
a) 15.3π +
b) 12 -
c) $2.5/\pi$ -
d) $10/\pi$ -

25. Let *i* is the imaginary unit defined as $i^2 = -1$.Simplify the expression of $-1+i^{11}$
a) $-1-i$ +
b) 0 -
c) -1 -
d) $-1+i$ -

26. What is the volume of the cylinder with a radius of 3 and a height of 7?
a) 63π +
b) 21 -
c) 441 -
d) 42π -

27. What is the sum of all even numbers from 20 to 100 ?
a) 2460 +
b) 4000 -
c) 2400 -
d) 4800 -

28. What is the solution of the inequality $\log_{10}(1-4x) \geq 0$?
a) $\langle -\infty; 0\rangle$ +
b) $\langle -1; 4\rangle$ -

c) $(-\infty;\infty)$ -

d) $\left(0;\frac{1}{4}\right\rangle$ -

29. Each interior angle in a regular hexagon is

a) 120° +

b) 60° -

c) 108° -

d) 136° -

30. What is the smallest period of the function $f(x)=2\sin(3x)$?

a) $\frac{2\pi}{3}$ +

b) $\frac{3\pi}{2}$ -

c) π -

d) $\frac{3}{2}$ -