American University - Central Asia

Entrance Examination on Mathematics

1. Arithmetic calculation.
2. Algebraic expressions and identical transformations.
3. Systems of algebraic equations.
4. First order equation with absolute value of variable.
5. Inequalities with absolute values variable.
6. Investigation of quadratic trinomial and quadratic inequalities.
7. Inequalities with rational fractions.
8. Arithmetic and geometric progressions.
9. Investigation of functions and graph constructions.
10. Simple interest and compound interest analysis.
11. Elementary set theory
12. Combinatorial analysis.
13. Tasks with requirement to generate equations.
14. Plane geometry.

№	Tasks	Circle correct answer
1.	If a fleet of ***m*** buses uses ***g*** gallons of gasoline every two days, how many gallons of gasoline will be used by 4 buses every 5 days?	a) $\frac{10g}{m}$; b) $\frac{10m}{g}$; c) 10gm; d) $\frac{20g}{m}$; e) $\frac{5g}{4m}$.
2.	Calculate: $\left(\frac{3}{5}+0{,}25-\frac{1}{8}\right)\cdot 3{,}2+\frac{9}{2}:10.$	a) 2.77; b) 0.5; c) 2.5; d) 3.5; e) 2.37.
3.	Simplify the expression: $\left(\frac{x^{1,5}-1}{x^{0,5}-1}+x^{0,5}\right):\frac{x-1}{x^{0,5}-1}.$	a) $x^{0.5}$-1; b) $x^{0.5}$+1; c) x+1; d) x-1; e) 1.
4.	Solve system of the equations and find sum of solutions $\begin{cases}3x+y+2z=7\\x+y-z=-2\\3x+y+z=0\end{cases}$	a) 12; b) 25; c) 31; d) 45; e) 37.

5.	Solve the equation $\left\|x^2-2x-3\right\|+3=7x$ and find the sum of all its solutions.	a) 10; b) 4; c) 9; d) -5; e) -6.
6.	The sum of third and seventh terms of growing arithmetic series is 24, and their product is 128. Then the difference of this progression is equal to:	a)1 b) 2; c) 3; d) 4; e) 5.
7.	In investing different job opportunities, you find that firm A will start you at \$10 000 per year and guarantee you a raise of \$500 each year, while firm B will start you at \$10 000 per year and guarantee you a raise by 5% each year. Find total amount of payments over a 15-year period for each firms A and B.	a)\$350420,\$420500; b)\$450000, \$520352; c)\$202500, \$215786; d)\$202500, \$260250; e)\$520460, \$580360.
8.	If you paid \$160 for a camera after receiving a discount of 20%, what was the price of the camera before discount?	a)\$250 ; b) \$200; c) \$192; d) \$145; e) \$128.
9.	Solve the following inequality $\left\|5x-3\right\|\succ 6x-2$	a) $(-\infty;0.6)$; b) $(-3;\frac{5}{11})$; c) $(-\infty;\frac{5}{11})$; d) $(-\infty;0.2)$; e) $(0.2;\frac{5}{11})$
10.	Solve: $\frac{1}{x^2-9}-\frac{1}{(x-3)^2}\geq 0.$	a) $(-\infty,-3]$; b) $(-\infty,-3)$; c) $(-3,3)\cup(3,\infty)$; d) $(3,\infty)$; e) $(-3,3)$
11.	Find the least and the greatest values of the following function f(x)=$\frac{x^3}{3}-\frac{3x^2}{2}+2x;\ x\in[0;3]$.	a) $\frac{5}{6};\ \frac{2}{3}$; b) 0; 1.5 ; c) 0; $\frac{2}{3}$; d) 0;1;

		e) 0; $\frac{5}{6}$.
12.	How many milliliters of distilled water must be added to 60 milliliters of 70% acid solution to obtain a 60% solution?	a) 20; b) 40; c) 10; d) 15; e) 18.
13.	A school musical production brought in $ 12600 on the sale of 3500 tickets. If the tickets sold for $2 and $4, how many of each type were sold?	a) 700 and 2800; b) 500 and 3000; c) 600 and 2900; d) 2000 and 1500; e) 1200 and 2300.
14.	There are 3 students: Aijan, Nargiza and Sergei. How many ways can 3students be seated in 3 seats on the bench if Aijan and Nargiza are good friends and want to be together and have seats side by side.	a) 4; b) 6; c) 8; d)5; e)1.
15.	In the group of 36 students, 33 can swim, 21 can play chess but 4 can do neither. How many students can play chess and can swim?	a) 22; b) 20; c) 15; d) 25; e) 10.
16.	4 cards are randomly selected from the deck of 36 cards. How many hands are there with 2spades and 2 queens?	a) 12; b) 660; c) 6084; d) 60; e)36.
17.	The population in the town is increasing by 2% every year. Find amount of citizens in 5 years if today there are 6000 citizens.	a) 24 000; b) 12000; c) 6624; d) 7200; e) 6715.
18.	A car which costs $24000 will be amortized during 25 years. Interest rate is 14%. If you decided to give this car for the rent what annual payment you should have in order to compensate the costs of the car?	a) $4225; b) $5200; c) $2521; d) $3492; e) $6250.
19.	Find the equation of the line which passes through the given point (1;4) and parallel to the given line $y=\frac{3}{5}x+1$.	a) $y=\frac{3}{5}x+\frac{12}{5}$; b) $y=\frac{5}{3}x+\frac{7}{3}$;

		c) $y=\frac{3}{5}x+\frac{17}{5}$; d) $y=-\frac{3}{5}x+\frac{23}{5}$; e) $y=4x+\frac{3}{5}$

Answers:
1) a; 2) a; 3) a; 4) a; 5) d; 6) b; 7)c; 8) b; 9) c; 10)b; 11) b; 12) c;13) a; 14) a; 15) a; 16) b; 17) c; 18) d; 19) c.