Магистерская программа
«Финансы»

Программа экзамена при поступлении в магистратуру Национального исследовательского университета «Высшая школа экономики» Санкт-Петербург

HSE St. Petersburg School of Economics and Management (HSE SEM)

1. General information

1.1. The admission exam has the form of a written test with the duration of 90 minutes
1.2. This admission exam evaluates verbal, mathematical, logical and analytical skills and abilities that are necessary for applicants to complete successfully their master's studies in Master in Finance Programme.
1.3. The structure of the exam: the exam consists of the **Quantitative session** and **Integrated Reasoning**.
The section of the exam, **Quantitative**, is devoted to mathematics. This part includes at least 15 problems in arithmetic, geometry, algebra, combinatorics and statistics.
The Quantitative session estimates basic math and analysis skills, ability to solve quantitative problems. Each assignment has 5 choices, and the applicant should choose one correct answer.
Then comes the **Integrated Reasoning part**, where the student answers less than 10 questions in different formats in writing, such as analyzing graphs and tables, solving theoretical problems. This part of the exam is aimed at testing the development of entrepreneurial skills, strategic thinking, planning, and the ability to analyze information. The Integrated Reasoning section exam tests skills that business school faculty identify as important for success in the classroom, such as ability to analyze data presented in a case study.
Each assignment has 5 choices, and the applicant should choose one correct answer.
1.4. The Quantitative session contains 15 questions: 10 questions are worth 3 points for each correct answer, 5 questions are worth 5 points for each correct answer
The Integrated Reasoning section contains 10 questions: 5 questions are worth 4 points for each correct answer, 5 questions are worth 5 points for each correct answer.
Thus, the total number of points that an applicant can obtain, equals to 100.

2. Main topics

2.1. Quantitative section

1. 2.1.1. Quantitative section contains at least 15 assignments of 6 types:
   Data sufficiency (A statement is sufficient when it guarantees exactly one answer to that question).
2. Number properties
   a. Integers & Rules of Divisibility by Certain Integers
   b. Factors and Multiples
   c. Divisibility and Addition/Subtraction
   d. Primes &Prime Factorization

e. The Prime Box
f. Greatest Common Factor and Least Common Multiple
g. Remainders

3. Statistics
    a. Mean
    b. Median
    c. Mode
    d. Range
    e. Standard Deviation
4. Combinatorics
    a. Enumeration
    b. Combination
    c. Permutation
5. Probability
    a. Independent events
    b. Mutually exclusive events
    c. Combination of independent and mutually exclusive events
6. Integrated reasoning

Any assignments require to solve a problem and to choose one correct answer from five options.
Data sufficiency questions consist of assignment formulation and two statements marked (1) and (2). The applicant must decide if the given information is sufficient to answer the question. The applicant must choose between the following answers:

- if you can get the answer from (1) ALONE but not from (2) alone;
- if you can get the answer from (2) ALONE but not from (1) alone;
- if you can get the answer from BOTH(1) and (2) TOGETHER, but not from (1) alone or (2) alone;
- if EITHER statement (1) ALONE OR statement (2) ALONE suffices;
- if you CANNOT get the answer from statements (1) and (2) TOGETHER, but need even more data.

Or select a specific value from the 5 suggested.
2.1.2. Basic terms:

2.1.2.1. Natural numbers. Divisibility. Prime numbers and composite numbers. Greatest common divisor and lowest common multiple. Integer, rational and real numbers. Percent. Absolute value, power, root, arithmetical root, logarithm.

2.1.2.2. Numerical and algebraic expressions. Equalities and identities. Function, domain and codomain. Increase, decrease, periodicity, evenness, oddness of function. Max and min value of function. Function graph. Linear, quadratic, power, exponential and logarithmic function. equation, inequalities, combined equations. Solution of equation, inequality and combined equations. equivalence. Arithmetic and geometric series.

2.1.2.4. Logic. Necessary and sufficient condition.

2.1.3. Theoretical part

2.1.3.1. Arithmetic and algebra

Sets – basic terms. Set operation. A Venn diagram.

Number axis. Positive, negative numbers. Absolute value and its geometric sense.

Natural numbers (N). Prime and composite number. Divisor, multiple. Greatest common divisor and lowest common multiple.

Criterion for divisibility for 2, 3, 5, 9, 10. Division with a remainder Integer numbers (Z). rational quantities (Q), addition, subtraction, multiplication and division.

Proportions.

Decimal and ordinary fraction, its transformation one to the other. Round-up with prescribed accuracy.

Power with natural, integer and rational value. Arithmetical root. Operations with powers.

Percent calculation. Bank interest, compound interest.

Function. Function assignment (table, graph). Function increasing and decreasing.

Polynomial with one variable. Root of polynomial. Properties and graph of quadratic polynomial. Formula for quadratic polynomial roots. Vieta's theorem.

Numerical expression. Expression with variables. Algebraic manipulation, formulas for short multiplication.

Equation. The root of an equation. Equivalent equations.

Two combined linear equations with two variables and it properties. Inequalities. Properties of numerical inequalities. Solving inequality with a variable. Equivalent inequalities.

Arithmetic and geometric series.
The method of coordinates on a plane (foundations).

2.1.3.2. Combinatorial calculus, probability theory and statistics.

Permutations, arrangements, combinations. Arithmetic mean, median, mode. Standard deviation.

2.1.3.3. Geometry

Line, ray, segment, broken line; segment length. Angle, the measure of angle. Vertical and contiguous angles. Parallel lines, angles with parallel lines.

Triangle. Median, bisector, altitude. Criteria for equivalence of triangles. The interior angles of a triangle and it sum. Types of Triangles. Properties of isosceles and equilateral triangles.

Right-angled triangle. Pythagorean theorem, numerical right triangle. Quadrangle: parallelogram, rectangle, rhomb, square, trapezium. Circumference and circle. center of circle chord, diameter, radius. Tangent to circle.

Circuit.

Similarity. Criteria for similarity of triangles. Relations between linear elements and areas of similar triangles.

Formula for surface area and volume of prism. Formula for surface area and volume of pyramid. Formula for surface area and volume of cylinder. Formula for surface area and volume of cone. Formula for volume of sphere Necessary and sufficient condition.

2.2.Integrated Reasoning

Each multi-source reasoning question is based on a series of information contained in text, charts, or tables. For each practice question you should examine the relevant information and select the best answer of the choices given. This part includes: Multi-Source Reasoning, Graphics Interpretation, Integrated Reasoning Tips

The economic environment of business and finance

- The macroeconomic environment
- The market mechanism
- Financial market
- Demand
- Supply
- The equilibrium price
- Types of market structure
- The failure of perfect competition
- Risks for businesses and their investors
- Types of risk
- The objectives of risk management
- Types of performance measure
- Profitability , Activity, Productivity
- Measuring resource use: effectiveness, economy and efficiency
- Identifying key performance indicators

3. Recommended Literature

Main literature:

1. Graduate Management Admission Council (GMAC). The Official Guide for GMAT Review 2016. (2015). Hoboken, New Jersey: John Wiley & Sons, Inc.

2. GMAT Prep Plus 2020: 6 Practice Tests + Proven Strategies + Online + Mobile (Kaplan Test Prep) (2019). Kaplan Publishing, Inc.

3. Hasik J., Rudnick S., Hackney R. (2012). McGraw-Hill's GMAT 2013: 10 Practice Tests. McGraw-Hill.

HIGHER SCHOOL OF ECONOMICS
NATIONAL RESEARCH UNIVERSITY
SAINT PETERSBURG

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Appendix B. GMAT and GRE scales GMAT

GMAT (Graduate Management Admission Test)

HSE St. Petersburg grade	GMAT result
20 and below	Below 500
21	500-501
22	502-503
23	504-505
24	506-507
25	508-509
26	510-511
27	512-513
28	514-515
29	516-517
30	518-520
31	521-522
32	523-524
33	525-526
34	527-528
35	529-530
36	531-532
37	533-534
38	535-536
39	539-540
40	541-542
41	543-544
42	545-546
43	547-548
44	549-550
45	551-552
46	553-554
47	555-556
48	557-558
49	559-560
50	561 - 563
51	564 - 567
52	568 - 571
53	572 - 575
54	576 - 579
55	580 - 583
56	584 - 587
57	588 - 591
58	592 - 595
59	596 - 599
60	600 - 603
61	601 - 604
62	605–608
63	609 - 612
64	613 - 616

65	617– 620
66	621 - 624
67	625 - 628
68	629 - 630
69	631 - 634
70	635 - 638
71	639 - 641
72	642 - 644
73	645 - 647
74	648 - 650
75	651 - 653
76	654 - 656
77	657 - 659
78	670 - 672
79	673 - 675
80	676 - 678
81	679 - 681
82	682 - 684
83	685 - 687
84	688 - 690
85	691 - 693
86	694 - 696
87	697 - 699
88	700 - 701
89	702 - 703
90	704 - 705
91	706 - 707
92	708 - 709
93	710 - 711
94	712 - 713
95	714 - 715
96	716 - 717
97	718 - 719
98	720 - 722
99	723 - 724
100	725 and above

GMAT (Graduate Management Admission Test) – Quantitative part

HSE St. Petersburg grade	GMAT result
20 and below	Below 7
21	8
22	9
23	10
24	11
25	12
26	13
27	14

28	15
29	16
30	17
31	18
32	18
33	19
34	19
35	20
36	21
37	21
38	22
39	22
40	23
41	23
42	23
43	24
44	24
45	25
46	25
47	26
48	26
49	27
50	27
51	28
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54	29
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63	34
64	34
65	35
66	35
67	36
68	36
69	37
70	37
71	38
72	38
73	39
74	39
75	40
76	41
77	41

78	42
79	42
80	43
81	44
82	45
83	45
84	46
85	48
86	48
87	49
88	49
89	50
90	50
91	51
92	51
93	52
94	52
95	53
96	53
97	54
98	54
99	55
100	Above 55

GRE Subject Test in Mathematics

HSE St. Petersburg grade	GRE result
20 and below	Less than 400
21	400-403
22	404-407
23	408-410
24	411-415
25	416-420
26	421-425
27	426-430
28	431-435
29	436-440
30	441-445
31	446-450
32	451-455
33	456-460
34	465-470
35	471-475
36	476-480
37	481-485
38	486-490
39	491-495
40	496-500
41	501-505

42	506-510
43	511-515
44	516-520
45	521 - 530
46	531 - 540
47	541 - 550
48	551 - 560
49	561 - 570
50	571-580
51	581-585
52	586-590
53	591-595
54	596-600
55	601 - 605
56	606 - 610
57	611 - 615
58	616- 620
59	621- 625
60	626 - 630
61	631 - 635
62	636 - 640
63	641 - 645
64	646 - 650
65	651 - 655
66	656 - 660
67	661 - 665
68	666 - 670
69	671 - 675
70	676 - 680
71	681 - 685
72	685- 690
73	691 - 695
74	696–700
75	701 - 705
76	706 - 710
77	711 - 715
78	716 - 720
79	721 - 725
80	726- 730
81	731 - 735
82	736 - 740
83	741 - 745
84	746 - 750
85	751 - 755
86	756 - 760
87	761 - 765
88	766 - 770
89	771 - 775
90	776 - 780
91	781 - 785

92	786 - 790
93	791 - 795
94	796 - 800
95	801 - 810
96	811- 820
97	821 - 830
98	831 - 840
99	841 - 850
100	851 and above