Solutions for the Mathematics problems for BA pre-session exam (Miklos Bona)

1.1: x^26

1.2: x=2

1.3: 1/81

1.4: 2

1.5: a) True, b) True, c) False, d) False

1.6: x ≥ e^e

2.1: -40

2.2: y=4

2.3: x1=0, x2=6

2.4: t=37.167 years

2.5: -5

3.1: 2.6785

3.2: 10

3.3: 12

3.4: (3x^6-5x^4-6x)/(x^4-2x^2+1)

3.5: 72x^7

3.6: f(x) = 1/x is not a continuous function at x=0, as 1/x cannot be interpreted at x=0 (division by zero)

3.7: local minimum is at p1(1, -8) and local maximum is at p2(-1, 8)

3.8: -1

3.9: x>3y (x, y ∀ R)

3.10: 5x^4\*y^7+2x\*y^-3

3.11: x=y

3.12: x=9/4, y=9/2

4.1: B\*A=

|  |  |
| --- | --- |
| 9 | 11 |
| 55 | 76 |

4.2: A\*B=

|  |  |  |
| --- | --- | --- |
| 46 | 23 | 6 |
| 2 | 1 | 2 |
| 12 | 6 | 4 |

4.3: A^T=

|  |  |  |
| --- | --- | --- |
| e | 2 | 4 |
| 93 | 6.1 | pi |
| 4.7 | 4.22 | 0 |

4.4: detA=4

5.1: Ω={(1,1), (1,2), …, (6,6)}, #Ω=36

5.2: 24.64%

5.3: E=20/6

The breakdown for each solution is uploaded as separate scanned pages.