Name:
Group A
Result:

1. [7 *points*]

Solve for x:

a) $\log_{\sqrt{3}}(x-1) = -2$

b) $9^{x+1} = \left(\dfrac{1}{\sqrt{3}}\right)^{x-1}$

c) $\log_3(x-2) - \log_3(x+3) = 2$

d) $2^{2x+1} - 7 \cdot 2^x + 3 = 0$

e) $\log x + \log(x-3) = 1$

2. [3 *points*]

If $\log_2 5 = P$ and $\log_2 3 = Q$, write in terms of P and Q:

a) $\log_2 15 =$

b) $\log_2 0.6 =$

c) $\log_2 0.24 =$

3. [2 *points*]

Tomasz invests 5000PLN into an account that pays 6.2% per annum compounded annually. Maria also invests 5000PLN, but into an account that pays 6% per annum compounded monthly. Calculate the value of their investments after 5 years.

4. [2 *points*]

Population of a certain town in t years after 2021 is given by the formula:

$$P(t) = 12300(1.02)^t$$

a) Write down the population of the town in 2021.
b) Find the percentage increase in population of the town between 2021 and 2030.

5.   [3 *points*]

The population of elk in a certain forest is estimated to be around 200. It is claimed that the population increases by 7% each year.

a) Estimate the population in 5 years.

b) How long it would take for the population to reach 500 animals?

6.   [3 *points*]

Radium-226 has a half life of 1600 years (so after 1600 years half of the original substance remains). Calculate how long it would take for 1 g of Radium-226 to decay by 30%.