Name:
Result:

1. *(4 points)*

Tomasz invests 150 000 PLN into savings account that pays 8% p.a. compounded quarterly.

(a) Find the value of the investment after 5 years. [2]

The average inflation rate over these 5 years has been equal to 6.5% per year.

(b) Estimate the real value of Tomasz's investment after 5 years. [2]

2. *(5 points)*

Explorers Wanda and Tomasz are located at $(3, 4, 1)$ and $(-1, 2, 3)$ respectively. The units are kilometres, $Z = 0$ represents the sea level and all coordinates are given to the nearest kilometre.

(a) Use the above measurements to find the angle of elevation from Wanda to Tomasz. Give your answer to 4 significant figures. [2]

(b) Find the maximum percentage error of your answer to part (a). [3]

3. *(6 points)*

The base of a square-based pyramid has coordinates $A(3, 0, 1), B(-1, 1, 1), C(0, 5, 1)$ and D. The apex E lies directly above the centre of the base. 1 unit represents 10 metres.

(a) Find the coordinates of D. [2]

The angles that the edges AE, BE, CE and DE make with the base plane are all equal to $70°$.

(b) Find the height of the pyramid. [2]

(c) Find the volume of the pyramid. Express your answer in the standard form. [2]

4. *(8 points)*

Maria wants to buy a new Tesla model 3 which costs 220 000 PLN. She saved 80 000 PLN and wants to loan the remaining funds. The terms of the loan are as follows. The interest rate is 11.5% p.a. compounded monthly and the loan is to be repaid in equal monthly instalments in 10 years.

(a) How much does Maria need to borrow? [1]

(b) Calculate the monthly repayments. [2]

(c) Calculate the total interest that Maria will pay. [2]

After 5 years Maria is allowed to repay the loan in one final payments.

(d) Calculate how much she would save, if she would do so. [3]

5. *(7 points)*

Consider a triangle ABC, with $A(1, -3, 2)$, $B(k, 0, 1)$ and C

(a) The distance from point A and B is $\sqrt{14}$. Find the value of k, given that $k > 0$. [2]

(b) The midpoint between A and C is $(-1, 1, 0)$. Find the coordinates of C. [2]

(c) Calculate the angle BAC. [3]