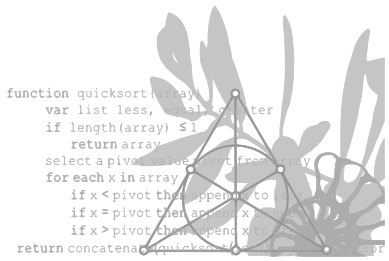


Univerza na Primorskem
UP FAMNIT
Študijsko leto 2018/2019

Algebra I

1. KOLOKVIJ

– 7. DECEMBER 2018 –

Čas pisanja: 90 *minut. Maksimalno število točk:* 50. *Dovoljena je uporaba pisala, kalkulatorja in enega ročno napisanega lista formata A4 z definicijami in formulami (brez rešenih primerov). Pišite razločno in utemeljite vsak odgovor. Srečno!*

1. V trapezu $ABCD$ sta stranici AB in CD vzporedni. V kakšnem razmerju se sekata diagonali, če je $|AB| = 3|CD|$? *(10 točk)*

2. Dan imamo paralelogram $ABCD$ z oglišči $A(-1, 3, x + 5), B(x, 2, 4)$ in $C(3, x, 1)$.

   (a) Določite koordinate oglišča D tako, da bo $|\overrightarrow{BD}| = 3$. *(8 točk)*

   (b) Izračunajte ploščino paralelograma (če ste za x dobili več možnih rešitev upoštevajte najmanjšo). *(5 točk)*

3. Dano imamo ravnino Π: $x + y + z = 2$ in premico $\ell = (1, 1, 0) + \lambda(1, -1, 2)$.

   (a) Določite koordinate točke, v kateri premica ℓ prebada ravnino Π. *(3 točke)*

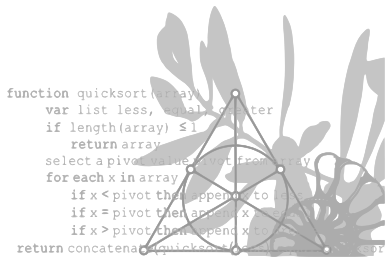
   (b) Določite kot med ravnino Π in premico ℓ. *(3 točke)*

   (c) Zapišite vektorsko obliko enačbe premice p skozi točko $P(0, 1, 2)$, ki je vzporedna ravnini Π in pravokotna na premico ℓ. *(8 točk)*

4. Naj bosta $\ell : \frac{x}{6} = \frac{y-3}{-2} = -z - 5$ in $p = (1, 7, -4) + \lambda(1, -3, 3)$ premici v prostoru.

   (a) Izračunajte razdaljo med premicama ℓ in p. *(5 točk)*

   (b) Zapišite splošno obliko enačbe ravnine Σ, ki vsebuje premico ℓ in je vzporedna s premico p. *(8 točk)*



University of Primorska
UP FAMNIT
Academic year 2018/2019

Algebra I

Midterm 1

– December 7, 2018 –

Time: 90 *minutes. Maximum number of points:* 50*. You are allowed to use a pen, a calculator and one* A4 *hand-written piece of paper with definitions and formulas (and with no solved exercises). Write clearly, and justify all your answers. Good luck!*

1. In the trapezoid $ABCD$ the line segments AB and CD are parallel. Determine the ratio in which the diagonals intersect if $|AB| = 3|CD|$. *(10 points)*

2. Consider a parallelogram $ABCD$ defined by points $A(-1, 3, x + 5), B(x, 2, 4)$ and $C(3, x, 1)$.
   (a) Find the coordinates of D such that $|\overrightarrow{BD}| = 3$. *(8 points)*
   (b) Determine the area of the parallelogram (if you got more than one solution for x, use the smallest one). *(5 points)*

3. We are given the plane Π: $x + y + z = 2$ and the line $\ell = (1, 1, 0) + \lambda(1, -1, 2)$.
   (a) Determine the point of intersection of Π and ℓ.. *(3 points)*
   (b) Determine the angle between Π and ℓ. *(3 points)*
   (c) Find the vector equation for the line p through the point $P(0, 1, 2)$ that is paralell to Π and orthogonal to ℓ. *(8 points)*

4. Let $\ell : \frac{x}{6} = \frac{y-3}{-2} = -z - 5$ and $p = (1, 7, -4) + \lambda(1, -3, 3)$ be two lines in space.
   (a) Determine the distance between ℓ and p. *(5 points)*
   (b) Find the general form equation of the plane Σ that contains ℓ and is parallel to p. *(8 points)*