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Transformation du plan exercices cor

Plan Transformations - Math courses and exercises Thing has PDF Links PDF 1 PDF 2 PDF 3 PDF 4 PDF 5 PDF 6 PDF 7 PDF 8 PDF 9 17 3! The plan is returned to the $(O', 'vec's) tag. To the $M (x-y)$, $M '(x';,y')$, such as: $$$left-lbrace-begin-array-lcl'x' 'alpha x'beta y 'y' 'gamma x' 'delta y 'end'array'right.$$$ 1) Is this correspondence an application of $-mathcal-P-$ to $-mathcal-P-$? What is the state of the $-mathcal-P-$transformation? Then specify the mutual transformation. 2) The previous verified condition is assumed for the application $f $ {1}, which corresponds to the actual $alpha_{1},beta_{1}, gamma_{1} and delta_{1} and for applications $f $ {2}, Responding to the actual $alpha_{2}, beta_{2}, gamma_{2}-text and delta_{2}.$ Show that the $$f-{2}-circ f_{1}$$ is a transformation of $-mathcal-P-$ Exercise 2 W $-mathcal-P$ plan reported to $(O; vec, 'vec'j), point $M (x-y)$ is matched to $M point (x'; y')$. Is this correspondence an application from $-mathcal-P-text to mathcal? Private $$3-P-$ private with some points? a) $-left-lbrace-begin-array-lcl x' x-{2} -y-{2} 'y' 'y' 'x'{2}-{2}'end-array-right.$b) $$ left-lbra begin array-lcl x' 'sqrt' 'y' 'sqrt' 'sqrt' 'end-array'-right.$c) $-left-lbrace'begin array-lcl x' 'dfrac'x'{2} '1 {2} 'y' 'y' 'dfrac'y'{2} 'y'{2}'end-array-right.$ d) $$ 'left'lbrace'begin-array-lcl' x' 'sqrt' x'{2} 'y'{2} ' ' ' ' ' ' ' ' x-y'end-array-right.$ Exercise 3 Affinity Be two simple $-mathcal-D-text and Delta and the real $$k is different from zero. In each $M, a parallel plan is drawn to $-Delta$ that cuts the $-mathcal-D-text in H$ and builds a point of $$M such as $-overrightarrow-HM'.' s overrightarrow'. 1) Show that this has defined a $$f plan transformation. 2) Specify immutable points $f USD and general immutable rights $f.$ 3) Specify a $$f image. Point A and its image $A text by $f.$U live the previous result to simply build a M' image of any $M point specified. 4) Specify $f-$5) By selecting the appropriate $$(O',i') gives the analytical word $f.$ Exercise 4 In plan, referred to in $(O', 'vec'i, 'vec'j)$, right $'mathcal'D'text and mathcal' 'D'' equations are considered: $'mathcal'D': 3x-2y-6 qquad 'mathcal'D': x-4y-4-$0 Is $M point (x-y)$ plan. $-mathcal-D-$ parallel run by M cuts $x'x-text to H$; Parallel to $-mathcal-D'$ for $M-dollar cuts $y y-text in K$. Or $M'(x'; y')$ point that projects in $H text on x'x'text in K'text to y'y'y.$1) Show that M' is a $$M image in the $f-text application mathcal'p'text in 'mathcal'$$$$f$ transformation $-mathcal-P-$? 2) Give analytical expression $f.$ 3) Are there any immutable points for $f dollars? 4) Answer previous questions from $-mathcal-D: x-y-0-text and mathcal: $0 Translations of Exercise 5 or $$ABC triangle. Build a picture of this triangle by vector translation: a) $-overrightarrow-AB quad$b) $-overrightarrow quad$c) $$-overrightarrow quad$d) any type of bike.- $2) Vector translation $f $-vec$Determine $f overrightarrow-AB-circ t_-overrightarrow-BC-circ t_-overrightarrow-AC-$3) Or $A', B'text and $$ $A images, B-text and C$ by translating $f overrightarrow, AB't_'overrightarrow-AC-$ What is the nature of quadrilaterals $ABA'C'; 4) Can a quad $ABA'C$ be a diamond? Square? Exercise 6 Parallelogram is considered $ABCD.$ Building an image of this parallelogram by vector translation: a) $-overrightarrow qquad$b) $-overrightarrow qquad$c) $$$$50 qquad$d) $-vec-V-text-any-$ Exercise 7 1) There are two circles of $-mathcal-C-text and mathcal$$ $O-text centers and O'$ and the same radius. To show that one of these two circles is an image of the other in the translation that will be specified. 2) It is now assumed that $-mathcal-C-text and mathcal$ are secret in $A-text and $$t for vector translation of $-overrightarrow-OO' or $$M point $$ mathcal-C-text and $M image by $t.$ Demonstrate, that $A is ortowicie triangle MBM'Exercise 8 Parallelogram is considered $$ABCD, with peaks $A-text and B$ is fixed. What is the total number of D points when C describes a simple or circle? Exercise 9 I mean two straight downs $-mathcal-D-text and mathcal$ and vector $$$$ Build segment $[MM'] as $$M$ belongs to $-mathcal-D-; The $-overrightarrow-MM' exercise of $10-mathcal-C- circle is given and two points are $A-text and B.$ Build, using a two-point translation of $P text and Q-text with mathcal$ such as $$ABPQ or parallelogram. Exercise 11 $A, B-text and C$ are 3 points misaligned; t is a translation that converts $A text to B.$ D is an image of $B text by $$$(BC)$ led by the $-mathcal-D$cuts $(AC) text on E.$ Demonstrating that C is a $[AE]$ Exercise 12 ABC is a triangle. and N$ are points specified by $'overrightarrow', overrightarrow, 'CA'ca'text and 'overrightarrow', 'overrightarrow', 'MB'$ 1) Build $M-text and 'N.$ 2 $B' N$ turns $A text into 'E.$ Show that $'parallel ''text' and ''parallel' (AB)$Co can be inferred for $C, E-text and 'N$' points? Exercise 13 Build right by going through $$P and competing in $D-text and D.$ Exercise 14 I'm a triangle of $$ABC $H orthomocenter and two points $D text and E$ such as $$BCDE or parallelogram. Perpendicular conducted from $D-text to AB and E-text to AC) cut into $K.$1) Show that $$K is $$H converted into a $'overrightarrow translation of BE$2) Inducing condition for $A,,, K to be aligned. Exercise 15 Parallelogram is considered a $ABCD.$1) show that there is a translation that turns the right (AB) into the right (DC) and the right (AD) to the right of $(S2)$ 2) or $$K plan point. Straight $-Delta$ via $K-text-cut -(AB) text and DC-text in M'text and N$ respectively, AD'text and (BC)' text in Text and Q$ respectively. Show that there are two $-Delta$ rights, such as the $[MN] -text and PQ] segments that have the same length. Exercise 16 We consider the triangle of $$ABC and $$D straight passes through $A.$ We mark at $$D two points $P-text and $30 as $$A or the middle $[PQ].$ Or $P image image of $$P$$P through vector translation $-overrightarrow-AB-text and $3$$Q. image by vector translation $-overrightarrow-AC.$ Show that the $[BC] text and [PQ] segments have the same medium. Exercise 17 Plan features $(O;,', 'vec'd')$ Give analytical expression of vector translation $'vec'$ and Cartesian equation converted to right $-mathcal-D-$ and $-mathcal-D-$ wheels in each of the following cases: 1) $-vec-V(4,-1)-quad 'mathcal'D': 5x-y-4-0-quad -mathcal-C:: x-{2}-y-{2}-9-0.$ 2) $-vec-V(-3-,-5)-quad -mathcal-D-:- x-4y-1-0-quad 'mathcal'c:: In {2} {2} plan with $(O',', vec'd)$, points $A (0) (B(1 ,-2) (-1.2) $t ($3), $B, Text C and D'text by 't.$1') Save analytical formulas of $$t and reeassemper the coordinates of the $B; C'text and $2) I'm $G barycentre of weighted points $(B;,2) and D'3). $G.$3) Or $G picture $G-text by $$$.$Determine G' contact information and see if the $G point is barycentre weighted points 2) and $4) I$$K isobycentre points $B $K $K; $K, is the isoboary center of $B, C'text, and D'.$ Exercise $19-mathcal-D-text and mathcalD'$ are two parallel rights; $A-text and B$ are two fixed points outside the plan bar specified by $-mathcal-D-text and mathcalD'$ and on both sides of that band. Specify the $M point text to 'mathcal'D'$ and point $M 'text' to 'mathcal', such as right $(MM') is perpendicular to $-mathcal-D-text and math-mathcal-D'$ and that the amount of $AM-MM'M'B$ is minimal. Exercises $20-mathcal-D-text and mathcal are two parallel charges; $A-text and $B are two fixed points on both sides of the band between $D-text and mathcal$. set, cut $-mathcal-D-text and mathcald'text respectively in M-text and M'$ Determine $(Delta)$, so that the length of the broken $AMM B$ line is minimal. Homotheties Exercise 21 Be a Triangle $ABC.$ Build a picture of this triangle by homothety center O and ratio of $ $k in the following cases: $a) O-A-text and k-1. qquad b) -O-A-text and k-2$$c) O-text is in the middle of '[BC] 'text' and 'k'2.$ $d)- O-text and 'k-text' are arbitrary. $ Exercise 22 Show that the image of a square by homothetie is a square. Exercise 23 i.e. $A-text and $$B two plan points, $A'text and B'$ their images by homothety $$h center $$O and a ratio of $$k; show that the h middle image $I text from [AB] is the middle $I'text of '[A'B'].$ The inferred that the center of gravity image of the $$G triangle $ABC dollars for $$h is the center of gravity of the triangle of $A B'C'$ homothetic triangle $ABC.$ Exercise 24 or O, B three points given. Show that there is one $O $$O homothe center $h you that converts $A text to $3 in the following cases; (to be determined): $a) overrightarrowOB--dfrac{3}{2}-overrightarrow-OA-qquad b) overrightarrow- AB-5-overrightarrow',OB{0}$ Exercise 25 or $A-text and B two points. Show that there is one homothety $$h$$k by rotating the text $A in A$6 in the following cases (it will be specified as a measure): $a)) K--dfrac{1}{2}-qquad c) - K-1 $ Exercise 26 Be $A, B'; It is assumed that $A text and $3 are different, $A'text and B'$ are different, the rights $(AB) text and A'B$' are parallel, and $'overrightarrow', AB'eq overrightarrow, show that there is one homothety of $$h by turning $A into text A and Text and Text B and determine its report). Exercise 27 I mean two triangles $ABC-text and A'B'C'$ with parallel sides $(AB) and $(A'B')$$ and B'c')$16 and A'B')$. (1) It is assumed that $AB A'B'$Show that one of these triangles is an image of the other in translation or in central symmetry to be determined. (Both cases will be distinguished from two cases, AB-overrightarrow-A'B'-text and overrightarrow-AB-overrightarrow-A'B')$ 2) It is assumed that $ABeq A'B'$Show one of these triangles is the image of the other in homothety, which will be specified Exercise 28 Or parallelogram $ABCD.$ Build an image of this parallelogram by homothety center $O $ and a ratio of $k $ in the following cases $a) -O-A-text and k-1-1-qquad b) O'A-text and k'2$ $c)- O-text is in the middle of the text [BC] and 'k'2-qquad d') 'O'text' and 'k'text' are arbitrary. Exercise 29 Show that the relationship of the two central symmetry is a translation. Exercise 30 or $$ABC triangle. We pay attention to $A'text and 'B'$ in the middle of the sides of $[BC] -text and [AC]], H orthomocenter, $$G center of gravity and $$O center of the circle bounded to triangle $ABC.$ We think homothety $$h center $$G that transforms $A'text into A.$ What is his relationship? What is the image of the right (AH)? right (BH)? Deduce that H, O are aligned (the law containing these points is called Euler's law). Exercise 31 Plan is reported to the point $(O;,', 'vec',"' is considered a $I point (-2,3)$, a right $D $2x-y-3-0.$Analy defining $I and a ratio of $-dfrac{2}{3}$, then give the image equation $D'text by 'h.$ Exercise 32 Two simple $D'text' and D'd secantes at $$O and $$A point outside these laws. The purpose of the exercise is to build $M text on D'text and N'text on D'$ checking vector relationships: $-overrightarrow-AN-2-overrightarrow-AM.$1) Show that $$N is a $$M image by transformation that will be explained. 2) Deduce that the N is also on the $-Delta$ law to be determined. 3) Complete design. Exercise 33 Triangle is considered a $ABC with 3 sharp angles. M is $[AB].$$P-text and N is two points $[BC].$$Q$ is that $MNPQ$ is a square. Build a $$IJKL square with a homothetie with all the tops on the sides of the triangle $ABC.$ Exercise 34 I'm $$C circle and $A-text and B$ two points outside the circle, I is in the middle of $[AB].$1) At any time $M the C$ text is tied to a point of $N $$ABM.$ center of gravity Show that $$N is a $$M image by a well-chosen homothety. Determine and build all $$N points when the $$M described 2) At any time, $M C$ text is associated with the P point such that $AMBP$ is parallelogram. Showing that the $$P is a picture $M dollars through a transformation that will be explained. Specifying and constructing all points $P $$ when $$M.$opisuje $C.$ $35.$ABCD is a trapezoid in which the rights $(AB) and CD) $ are parallel, while $(AD) and (BC)nie are. Be $M-text and N$ media with $[AB]-text and [CD]$, $I intersection of $(AC) and $$J intersection of $(AD) and 'BC.$1) Is $h$$I homothety center considered to be transforming $A-text into B3.$? 2) Deduce that I, N are aligned. 3) Show as well as J, N are aligned. Exercise 36 Consists of two homotelia separate centers, i.e. $h-{1} homothety center $O-$${1} and $k-{1}-text and $h_{2} center gay $O-{2} and $k-{2}.$ $f h_{2} h_{1}.1) Or $M any point of the plan, $M-{1}-h_{1}-text and h_{2}(M_{1}).$ So : $$$$$$O_{1}M'-k_{1}-overrightarrow-O_{1}M-text and 'overrightarrow'O_{2}M'k_{2}-overrightarrow-O_{2}M_{1}$Inferring that : $-overrightarrow-O_{1} K_{1}k_{2}-overrightarrow-O_{1}M(1-k_{2}) -overrightarrow-O_{1}O_{2}-quad ($1)2) It is assumed that $k-{1}k_{2}-$1.$ Demonstrate that equality (1) is in order to deduct O_{1}O_{2} k_{2} the nature of the application $f.$3) It is assumed that $k-{1}k_{2}eq $1.a) to demonstrate that one point of $$O is unchanged at $$f if and only then : $$$$$$O_{1}O-k_{1}k_{2}-overrightarrow O_{1}O-O_{1}O-k_{2}-overrightarrow-O_{1}O_{2}-quad (2).$Infer the existence and uniqueness of such a point O, defined by: $$$$O_{1}O-dfrac-1-k_{2}-1 1-k_{1}k_{2}-overrightarrow-O_{1}O_{2}-$b) Subdue from (1) and (2) that $$b $f is homothety $O-$O-report center $k {1}k_{2}.$ Exercise 37 Two Circle Homothety Centre A) Two circles $-mathcal-C-(O)-text and 'mathcal'c' (O'; R') given , it is proposed to specify homoteties that convert $-mathcal-C-text into mathcal-C1) or $h such homothets, if any, and $$k of its ratio. Show that you have: $$k-dfrac-R'-R'- or 'k--dfrac'-R'$2) a) Demonstrate that if there is a homothety proportion of $-dfrac-R'-R'r-r transforming $-mathcal-C-text into mathematics, its $$I center is such that $R-overrightarrow-IO'-R'overrightarrow-IO-vec{0}.-quad($1)$ demonstrate that if $Req R'$, equality (1) defines one point I and only one. b) Check the homothety center $I and report $-Dfrac-R'r-R-R then answer the question. 3) (a) Demonstrate that in the case of homotheties $-Dfrac-R'r-R-R-R-making transforming $-mathcal-C-text into jego $J $ centrum jest taki, 'e $R overrightarrow-JO'-R'overrightarrow-JO-vec{0}.-quad($2)$ Zademonstruj, 'e r'wno '(2) definiuje jeden punkt $J $ i tylko jeden. b) Sprawd, czy centrum homothety $J i zg-iso $-Dfrac-R'r-R-R nast-pnie odpowiada na pytanie. Thus, given two separate $-mathcal-C-text and 'mathcal'$' circles of $O-text and O'$ and separate $R-text and R'$ shelves, there are two homotheties turning $-mathcal-C-text into 'mathcal'.$The first is center homothety the point I such as $-overrightarrow'IO'--dfrac-R'-R'-overrightarrow-JO-$ Note that if $O-text and O'$ are separate, then $I's text and 'J$' are aligned with $O'text and 'O'$('O'$' (right of the centers of the two circles) and we have: $'dfrac'overline'IO'-overline-IO'-overline'-overline'JO') 'Overline'JO'Dfrac-R'$$I-text and J$ are called Homothety Centers of the Circles $-mathcal-C-text and mathcal-C$4) Study the case where $O O'$, a nast-pnie ten, w kt-rym $R R'text i 'Oeq O'$Conclude z przelice. B) Naley oddzielne $-mathcal-C-text i mathcal'$two kr-gi oddzielnych $O-text i O'$ centr-w i oddzielne $R-text i R'$ szprychy. $I-text i J $ ich centra homotetyczne. 1) Two parallel and similar half-right $Ox and O'x'$, cut in the respective years $-mathcal-C-text in 'A'text' and 'mathcal'c'text in 'A'.$Demonstrate that the right (AA') goes through $I.$ 2) Two half-rights $Ox'text and 'O'x'$ parallel and opposite meaning, cut in the respective years $-mathcal-C-text in 'A'text' and 'mathcal'c'text in 'A".$ Demonstrate that the right (AA') goes through $J.$ 3) Deduct from the previous two questions a construction of the homothety centers $I text and J.$ B) i.e. $-mathcal-D-$ a tangential straight to $-mathcal-C-text in A$and tangent to $-mathcal-C-text in 'A'.$1) Demonstrate that the right $'mathcal'D'$ passes per $I-text or J.$2) Infer that the possible tangents common to $-mathcal-C-text and mathcalc' are the tangents at $-mathcal-C$going through $I-text and J$, je-li istnieje. 3) Build $I-text i J$ oraz wsp-lne styczne w $-mathcal-C-text i mathcalC'$ w nast-puj-cych przypadkach: a) $-mathcal-C-text i mathcalC'$ se zewn-trzne: $OO's R-R'$; b) $-mathcal-C-text i mathcalC$ s-styczne zewn-trznie: $OO'R-R'$; c) $-mathcal-C-text i mathcal'c s-tajne: $$ R-R'It;OO'It;R-R'$; d) $-mathcal-C-text i mathcal'c s-wewn-trznie styczne: $OO R-R'$; e) jeden z dw-ch znajduje sio poza drugim: $OO 'It; R-R. 38 Poniszy rysunek uzyskany z simple two to two cuts are called full quadrilateral peaks $A, B It is proposed to show that $[AF], [BD] -text and [EC]$ segments have their respective origins I, J; 1) Build $R-text and S$points such as $FBRD-text and ESCF$ quadrilaterals are parallelogram. 2) The homothety center is considered $h {1} $A $A, which turns $B text into C$ and $h-{2} $$A $h homothety, which turns the text $D into E.$) to show that the image right $(B)) text by $h_{2} h_{1} is right (ES) b) Specify the right image $(DR)' by 'h_{1}'circ h_{2}.$) What about the transformations $h-{1} h_{2}-text and h_{2}-circ h_{1}$? It $h h_{1} h_{2}.$ Determine $h(R).$ Inferre that the $A, R-text, and S$ points are aligned. 3) Homothety is considered to be $h $$F center and $$${1}{2}.$ report specify images of $A, S.S., S-text by $$$I. Exercise 39 1) $$C $C $O center circle is considered, and two $$C tangeous secantes in the $$I.$ show that $O is on the corner of a bisecttor formed by two tangents. 2) There are two $D-text and D$ at $$I, $A $one point outside of two straights. Build a tangeous circle in $D-text and $$: Choose your center with question 1 in mind and build contact points in that circle using $D-text and D'$3) Build with two tangeous circles with $D and D$ passing through $A.$ Justify construction. Reflections Exercise 40 That is $$ABCD $$ABCD parallelogram and $$s axis reflection $(BD).$ Are marked by $A-text and $C of the corresponding $A and C-text text images by $1.$ 1) Specify the image for $$s right $(AC), followed by segment $[AC].$2) Show, that the $I text [AC]$ is immutable by $s.$3) In conclusion from previous questions that $AA CC'$ is a rectangle. Exercise 41 is a $$ABC $$A-$ rectangle triangle, $$K in the middle of $[BC], $$H orthogonal $A text projected to $[BC], $I-text, and J$orthogonal predicted $H-text on AB) text, and AC$ respectively. The purpose of the exercise is to show that the $(AK) and IJ)$ rights are perpendicular. The reflection of the $$(AB)$ axis is $s referred to as $$1 and $C (C);, H's ($1) a) Build the points $H text and C'$ show that $B, H'text, and C'$ are aligned. b) Build as simply as possible point $K ($2) a) What is the nature of $AKK'C'$? b) Show that the $(IJ) text and AH)$ are parallel. 3) Show that $(AH') and BC)$ are perpendicular. (4) Inferring from earlier questions that the rights of and 42ABC is a triangle. We notice $$H of his orthocenter and $$O center of his circle limited $-mathcal-C.$$[AD]$ is the diameter of $-mathcal-C.$ Right (AH) crosses the $-mathcal-C-text- in A'text and Text A' $O. $[BC] -text and Delta$ is parallel to (BC) passes $O.$ We note the $s-{1}$-{1} reflection of the $-Delta$ axis and the $s-{2}$axis reflection of $(S1)$ show that the $$BHCD$ quadrangle is parallelogram. 2) Show, using homothety, Identify transformation $s-{2}-circ s_{1}.$ Enter image $A text by S_{2} s_{1} and then specify $s-{2} s_{1}.$4) What is the $H-text image by $s_{2}? Next, make an unusual property orthopaedic center of the triangle and a limited circle. 5) Application: Build a $$ABC triangle knowing its center bounded around $$$$$O$, its orthocenter $$H and a $D text point on the side of [BC]. $Rotations. It consists of isometry exercises 43 In the oriented plane, the triangle of $ABC $ is considered to be $(overrightarrow-AB {3}) and AB<AC$; The circle of this triangle is determined by $$O zeta$, and its center is 1) Figure 2) Or $E M-in) is referred to as $zeta$. P 'setminus', 'overrightarrow', 'overrightarrow') -dfrac-pi-{3}[2-ft] a) Check if $A in; E$ then determine and build E b {3}) Determine and build the point I such as $IB-IC-text and overrightarrow-IB, overrightarrowIC) $3) Or $$P per point of the $[AC]$ segment as $CP AB$a) Show that there is a single $R rotation such as $R(A) $C.c, what is its angle b) Determine the center of the rotation R4) Give the nature of the triangle IAP and infer that : $AC-AI-AB$5) I'm $$M a variable point of the set $F-text and $G the center of gravity of the triangle $MBC.$ Determine and build the set described by the point G when $$M describes $$E Exercise $44 or $(O', 'vec'; $$ orthonormed plan tag or $f application that at any time $M (x-, y)$ of the plan joins the point $M (x'; y') of the plan, $M (x-y)$ of the plan, $M (x'; y') of the plan, $M (x-y)$ of the plan, $M (x'; y') of the plan, $M (x-y)$ of the plan,