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> with(GroupTheory):
Petersen Graph
> a:=[[1,2,3,4,10],[5,9,8,7,6]];
      a := [[1, 2, 3, 4, 10], [5, 9, 8, 7, 6]] (1)
> b:=[[1,6,4],[2,9,5],[3,10,8]];
      b := [[1, 6, 4], [2, 9, 5], [3, 10, 8]] (2)
> A:=PermutationGroup(a,b);
      A := <(1, 2, 3, 4, 10)(5, 9, 8, 7, 6), (1, 6, 4)(2, 9, 5)(3, 10, 8)> (3)
> GroupOrder(A);
      60 (4)
> a2:=[[1,4],[2,3],[5,8],[6,7]];
      a2 := [[1, 4], [2, 3], [5, 8], [6, 7]] (5)
> b2:=[[1,10],[2,9],[3,6],[4,8]];
      b2 := [[1, 10], [2, 9], [3, 6], [4, 8]] (6)
> A:=PermutationGroup(a,a2,b,b2);
A := <(1, 2, 3, 4, 10)(5, 9, 8, 7, 6), (1, 4)(2, 3)(5, 8)(6, 7), (1, 6, 4)(2, 9, 5)(3, 10, 8), (1, 10)(2, 9)(3, 6)(4, 8)> (7)
> GroupOrder(A);
      60 (8)
> a3:=[[3,7],[4,9],[5,6]];
      a3 := [[3, 7], [4, 9], [5, 6]] (9)
> A:=PermutationGroup(a,a2,b,a3);
A := <(1, 2, 3, 4, 10)(5, 9, 8, 7, 6), (1, 4)(2, 3)(5, 8)(6, 7), (1, 6, 4)(2, 9, 5)(3, 10, 8), (3, 7)(4, 9)(5, 6)> (10)
> GroupOrder(A);
      120 (11)
> Elements(A);
{(), (1, 3, 7)(4, 5, 8, 6, 9, 10), (1, 4, 9)(2, 3, 6, 8, 5, 7), (1, 5, 6)(2, 7, 9, 10, 4, 3), (1, 6, 5)(2, 3, 4, 10, 9, 7), (1, 7, 3)(4, 10, 9, 6, 8, 5), (1, 9, 4)(2, 7, 5, 8, 6, 3), (2, 10, 8)(3, 4, 5, 7, 9, 6), (2, 8, 10)(3, 6, 9, 7, 5, 4), (1, 10, 4, 3, 2)(5, 6, 7, 8, 9), (1, 10, 4, 5, 8)(2, 9, 3, 7, 6), (1, 10, 9, 6, 8)(2, 4, 7, 3, 5), (1, 10, 9, 7, 2)(3, 8, 4, 6, 5), (1, 2, 3, 4, 10)(5, 9, 8, 7, 6), (1, 2, 3, 6, 8)(4, 9, 5, 10, 7), (1, 2, 7, 5, 8)(3, 9, 4, 6, 10), (1, 2, 7, 9, 10)(3, 5, 6, 4, 8), (1, 3, 10, 2, 4)(5, 8, 6, 9, 7), (1, 3, 8, 2, 6)(4, 5, 7, 9, 10), (1, 4, 2, 10, 3)(5, 7, 9, 6, 8), (1, 4, 8, 10, 5)(2, 3, 6, 9, 7), (1, 5, 10, 8, 4)(2, 7, 9, 6, 3), (1, 5, 2, 8, 7)(3, 6, 9, 10, 4), (1, 6, 10, 8, 9)(2, 3, 4, 5, 7), (1, 6, 2, 8, 3)(4, 10, 9, 7, 5), (1, 7, 10, 2, 9)(3, 6, 8, 5, 4), (1, 7, 8, 2, 5)(3, 4, 10, 9, 6), (1, 8, 5, 4, 10)(2, 6, 7, 3, 9), (1, 8, 5, 7, 2)(3, 10, 6, 4, 9), (1, 8, 6, 3, 2)(4, 7, 10, 5, 9), (1, 8, 6, 9, 10)(2, 5, 3, 7, 4), (1, 9, 2, 10, 7)(3, 4, 5, 8, 6), (1, 9, 8, 10, 6)(2, 7, 5, 4, 3), (1, 10, 4, 3, 6, 8)(2, 9, 5), (1, 10, 4, 5, 7, 2)(3, 8, 9), (1, 10, 9, 6, 3, 2)(4, 7, 8), (1, 10, 9, 7, 5, 8)(2, 4, 6), (1, 2, 3, 4, 5, 8)(6, 10, 7), (1, 2, 3, 6, 9, 10)(4, 8, 7), (1, 2, 7, 5, 4, 10)(3, 9, 8), (1, 2, 7, 9, 6, 8)(3, 5, 10), (1, 8, 5, 4, 3, 2)(6, 7, 10), (1, 8, 5, 7, 9, 10)(2, 6, 4), (1, 8, 6, 3, 4, 10)(2, 5, 9), (1, 8, 6, 9, 7, 2)(3, 10, 5), (1, 10)(2, 4, 8, 9)(3, 5, 6, 7), (1, 10)(2, 9, 8, 4)(3, 7, 6, 5), (1, 2)(3, 10, 7, 8)(4, 9, 5, 6), (1, 2)(3, 8, 7, 10)(4, 6, 5, 9), (1, 3)(4, 8)(6, 10), (1, 4)(2, 5)(3, 8), (1, 5)(2, 4)(7,

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10), (1, 6)(2, 9)(3, 10), (1, 7)(5, 10)(8, 9), (1, 8)(2, 5, 10, 6)(3, 7, 4, 9), (1, 8)(2, 6, 10, 5)(3, 9, 4, 7), (1, 9)(2, 6)(7, 8), (2, 10)(3, 9)(4, 7), (2, 8)(3, 5)(6, 7), (3, 7)(4, 9)(5, 6), (4, 6)(5, 9)(8, 10), (1, 3, 5)(2, 4, 8)(6, 7, 10), (1, 3, 7)(4, 9, 8)(5, 10, 6), (1, 3, 9)(2, 6, 10)(4, 7, 8), (1, 4, 6)(2, 5, 9)(3, 8, 10), (1, 4, 7)(2, 10, 5)(3, 9, 8), (1, 4, 9)(2, 5, 6)(3, 7, 8), (1, 5, 3)(2, 8, 4)(6, 10, 7), (1, 5, 6)(2, 4, 9)(3, 10, 7), (1, 5, 9)(2, 4, 6)(7, 10, 8), (1, 6, 4)(2, 9, 5)(3, 10, 8), (1, 6, 5)(2, 9, 4)(3, 7, 10), (1, 6, 7)(2, 8, 9)(3, 5, 10), (1, 7, 3)(4, 8, 9)(5, 6, 10), (1, 7, 4)(2, 5, 10)(3, 8, 9), (1, 7, 6)(2, 9, 8)(3, 10, 5), (1, 9, 3)(2, 10, 6)(4, 8, 7), (1, 9, 4)(2, 6, 5)(3, 8, 7), (1, 9, 5)(2, 6, 4)(7, 8, 10), (2, 10, 8)(3, 9, 5)(4, 6, 7), (2, 8, 10)(3, 5, 9)(4, 7, 6), (1, 3, 10, 6)(2, 4, 9, 8)(5, 7), (1, 3, 5, 9)(2, 4, 7, 10)(6, 8), (1, 3, 8, 4)(2, 6, 5, 10)(7, 9), (1, 3, 9, 5)(2, 6, 7, 8)(4, 10), (1, 4, 2, 5)(3, 7, 8, 10)(6, 9), (1, 4, 6, 7)(2, 10, 3, 9)(5, 8), (1, 4, 7, 6)(2, 3)(5, 9, 8, 10), (1, 4, 8, 3)(2, 10, 5, 6)(7, 9), (1, 5, 10, 7)(2, 8, 4, 9)(3, 6), (1, 5, 2, 4)(3, 10, 8, 7)(6, 9), (1, 5, 3, 9)(2, 7)(4, 6, 10, 8), (1, 5, 9, 3)(2, 8, 7, 6)(4, 10), (1, 6, 10, 3)(2, 8, 9, 4)(5, 7), (1, 6, 2, 9)(3, 7, 10, 8)(4, 5), (1, 6, 4, 7)(2, 8, 3, 5)(9, 10), (1, 6, 7, 4)(2, 3)(5, 10, 8, 9), (1, 7, 10, 5)(2, 9, 4, 8)(3, 6), (1, 7, 4, 6)(2, 5, 3, 8)(9, 10), (1, 7, 6, 4)(2, 9, 3, 10)(5, 8), (1, 7, 8, 9)(2, 5, 6, 10)(3, 4), (1, 9, 2, 6)(3, 8, 10, 7)(4, 5), (1, 9, 3, 5)(2, 7)(4, 8, 10, 6), (1, 9, 5, 3)(2, 10, 7, 4)(6, 8), (1, 9, 8, 7)(2, 10, 6, 5)(3, 4), (1, 10)(2, 4)(5, 7)(8, 9), (1, 10)(2, 9)(3, 6)(4, 8), (1, 2)(3, 10)(6, 9)(7, 8), (1, 2)(3, 8)(4, 5)(7, 10), (1, 3)(4, 10)(5, 9)(6, 8), (1, 4)(2, 3)(5, 8)(6, 7), (1, 5)(2, 7)(3, 9)(4, 10), (1, 6)(2, 3)(4, 7)(9, 10), (1, 7)(4, 6)(5, 8)(9, 10), (1, 8)(2, 5)(3, 4)(6, 10), (1, 8)(2, 6)(5, 10)(7, 9), (1, 9)(2, 7)(3, 5)(6, 8), (2, 10)(3, 4)(5, 6)(7, 9), (2, 8)(3, 6)(4, 9)(5, 7), (3, 7)(4, 5)(6, 9)(8, 10)}

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```
> r:=[[1,2,3,4],[5,8,7,6]];
      r := [[1, 2, 3, 4], [5, 8, 7, 6]] (13)
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> s:=[[1,4],[2,3],[5,8],[6,7]];
      s := [[1, 4], [2, 3], [5, 8], [6, 7]] (14)
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> B:=PermutationGroup(r,s);
      B := <(1, 2, 3, 4)(5, 8, 7, 6), (1, 4)(2, 3)(5, 8)(6, 7)> (15)
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> GroupOrder(B);
      8 (16)
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> Elements(B);
{(), (1, 3)(6, 8), (2, 4)(5, 7), (1, 2, 3, 4)(5, 8, 7, 6), (1, 4, 3, 2)(5, 6, 7, 8), (1, 2)(3, 4)(5, 6)(7, 8), (1, 3)(2, 4)(5, 7)(6, 8), (1, 4)(2, 3)(5, 8)(6, 7)} (17)
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> t:=[[2,8,4],[3,7,5]];
      t := [[2, 8, 4], [3, 7, 5]] (18)
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> B:=PermutationGroup(r,s,t);
      B := <(1, 2, 3, 4)(5, 8, 7, 6), (1, 4)(2, 3)(5, 8)(6, 7), (2, 8, 4)(3, 7, 5)> (19)
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> GroupOrder(B);
      48 (20)
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> Elements(B);
{(), (1, 3)(6, 8), (1, 5)(2, 6), (1, 6)(2, 3, 4, 5, 8, 7), (1, 6)(2, 7, 8, 5, 4, 3), (1, 7)(4, 6), (1, 8)(2, 5)(3, 4)(6, 10), (1, 8)(2, 6)(5, 10)(7, 9), (1, 9)(2, 7)(3, 5)(6, 8), (2, 10)(3, 4)(5, 6)(7, 9), (2, 8)(3, 6)(4, 9)(5, 7), (3, 7)(4, 5)(6, 9)(8, 10)}
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(2, 4)(5, 7), (2, 8)(3, 5), (3, 7)(4, 8), (1, 3, 5)(2, 6, 8), (1, 3, 7)(4, 6, 8), (1, 5, 3)(2, 8, 6), (1, 5, 7)(2, 4, 6), (1, 7, 3)(4, 8, 6), (1, 7, 5)(2, 6, 4), (2, 4, 8)(3, 5, 7), (2, 8, 4)(3, 7, 5), (1, 2, 3, 4)(5, 8, 7, 6), (1, 2, 7, 8)(3, 6, 5, 4), (1, 3, 5, 7)(2, 4, 6, 8), (1, 3, 7, 5)(2, 6, 8, 4), (1, 4, 3, 2)(5, 6, 7, 8), (1, 4, 5, 8)(2, 3, 6, 7), (1, 5, 3, 7)(2, 8, 4, 6), (1, 5, 7, 3)(2, 4, 8, 6), (1, 7, 3, 5)(2, 6, 4, 8), (1, 7, 5, 3)(2, 8, 6, 4), (1, 8, 5, 4)(2, 7, 6, 3), (1, 8, 7, 2)(3, 4, 5, 6), (1, 2, 3, 6, 5, 8)(4, 7), (1, 2, 7, 6, 5, 4)(3, 8), (1, 4, 3, 6, 7, 8)(2, 5), (1, 4, 5, 6, 7, 2)(3, 8), (1, 8, 5, 6, 3, 2)(4, 7), (1, 8, 7, 6, 3, 4)(2, 5), (1, 2)(3, 4)(5, 6)(7, 8), (1, 2)(3, 8)(4, 7)(5, 6), (1, 3)(2, 4)(5, 7)(6, 8), (1, 4)(2, 3)(5, 8)(6, 7), (1, 4)(2, 5)(3, 8)(6, 7), (1, 5)(2, 6)(3, 7)(4, 8), (1, 6)(2, 3)(4, 7)(5, 8), (1, 6)(2, 5)(3, 4)(7, 8), (1, 6)(2, 5)(3, 8)(4, 7), (1, 6)(2, 7)(3, 8)(4, 5), (1, 7)(2, 8)(3, 5)(4, 6), (1, 8)(2, 5)(3, 6)(4, 7), (1, 8)(2, 7)(3, 6)(4, 5)}