Practice First Exam AA

MATH V1010: Groups and Symmetry, September 25, 2003

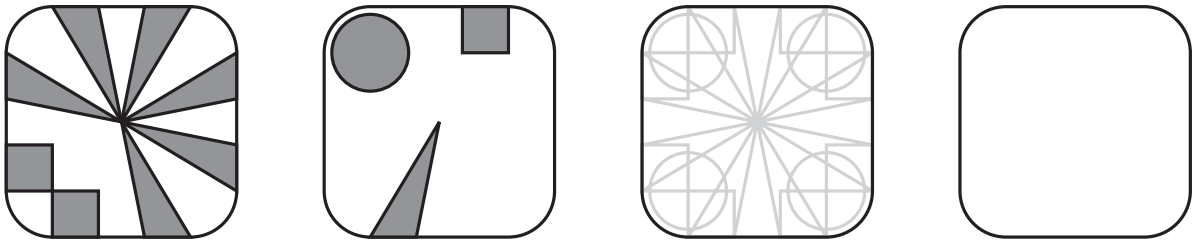
Name: _____ **School:** _____

[1]	[2]	[3]	[4]	TOTAL

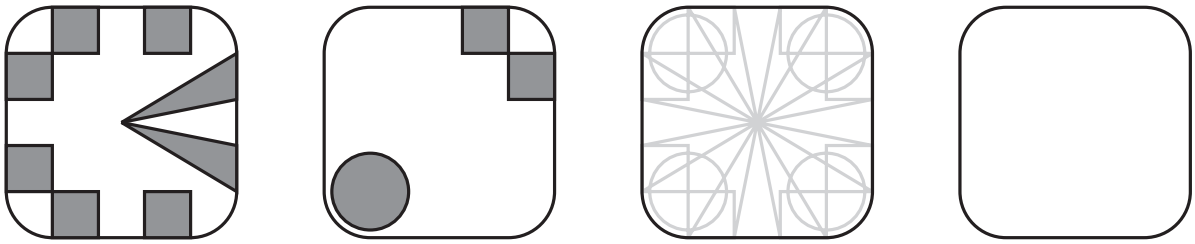
You may use scratch paper, but only this sheet will be graded; please present all answers on this sheet.

For problems [1] and [2], which symmetries of the square preserve the pattern on the left? Modify the second pattern so that it has the same subgroup of symmetries. In the blank square on the right, design your own pattern with the same subgroup of symmetries.

[1]



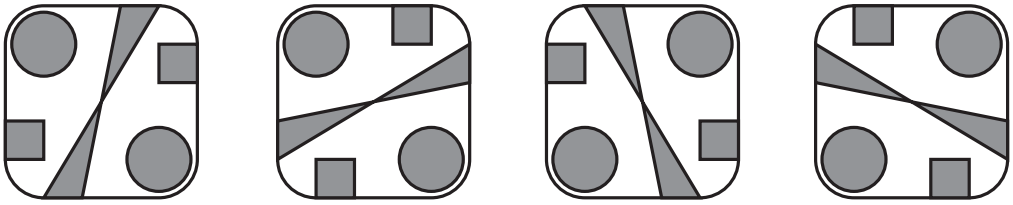
[2]



[3] What is the cycle structure of a perfect shuffle of the deck of 16 cards shown? (Use the names of the cards shown. Do not use numbers 1, 2, ...) How many perfect shuffles does it take for the deck to return to its starting position?

C D E F G H I J K L M N P Q R S

[**4**] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.



Practice First Exam AB

MATH V1010: Groups and Symmetry, September 25, 2003

Name: _____ **School:** _____

[1]	[2]	[3]	[4]	TOTAL

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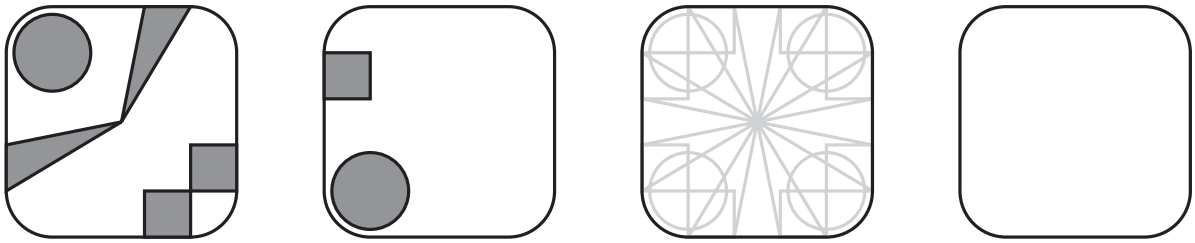
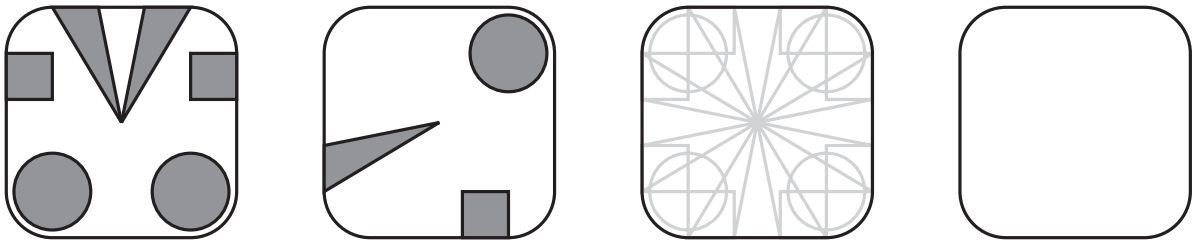


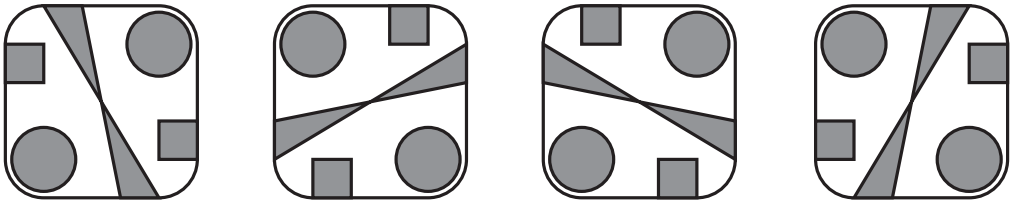
[2]



[3] What is the cycle structure of a perfect shuffle of the deck of 16 cards shown? (Use the names of the cards shown. Do not use numbers 1, 2, ...) How many perfect shuffles does it take for the deck to return to its starting position?

E F G H I J K L M N P Q R S T U

[4] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.



Practice First Exam AC

MATH V1010: Groups and Symmetry, September 25, 2003

Name: _____ **School:** _____

[1]	[2]	[3]	[4]	TOTAL

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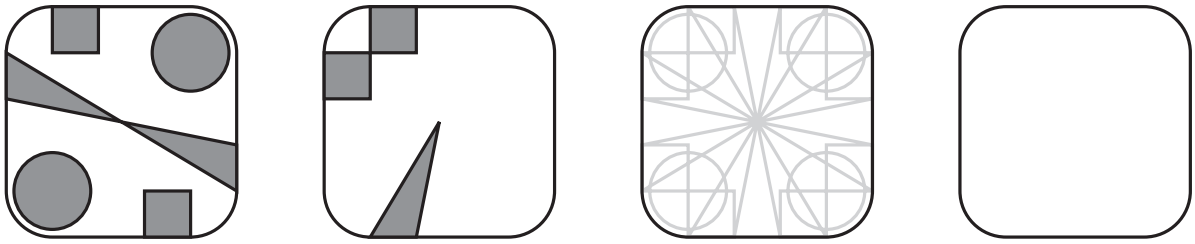
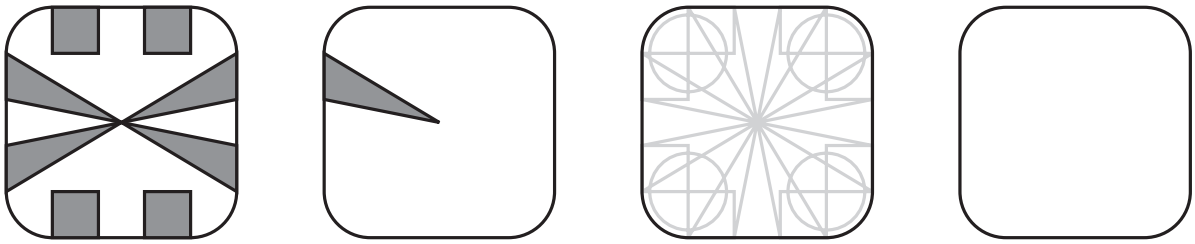


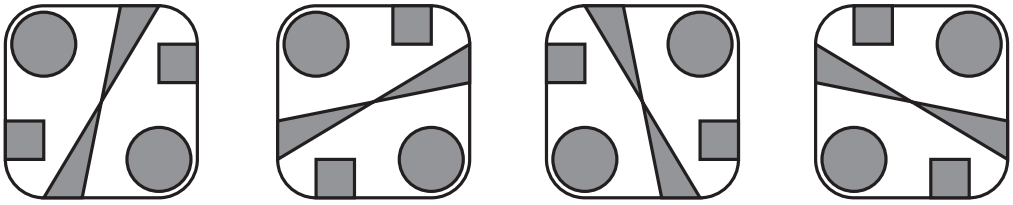
[2]



[3] What is the cycle structure of a perfect shuffle of the deck of 16 cards shown? (Use the names of the cards shown. Do not use numbers 1, 2, ...) How many perfect shuffles does it take for the deck to return to its starting position?

B C D E F G H I J K L M N P Q R

[**4**] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.



Practice First Exam AD

MATH V1010: Groups and Symmetry, September 25, 2003

Name: _____ **School:** _____

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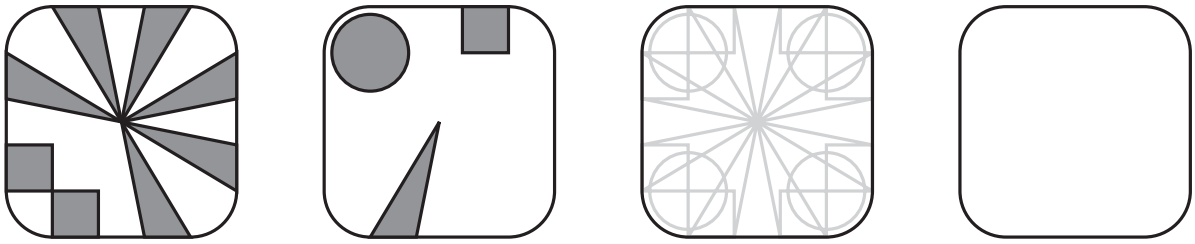
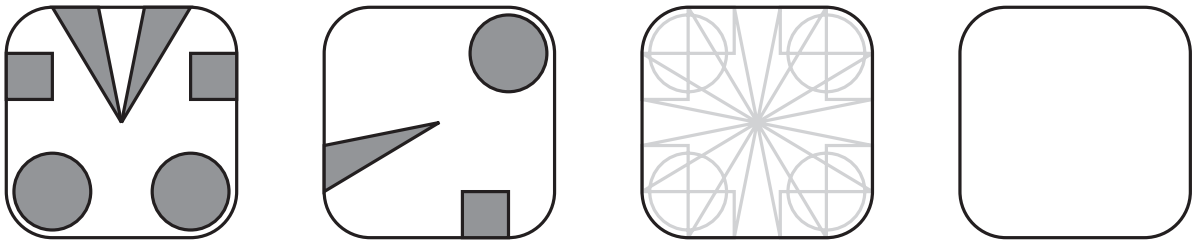


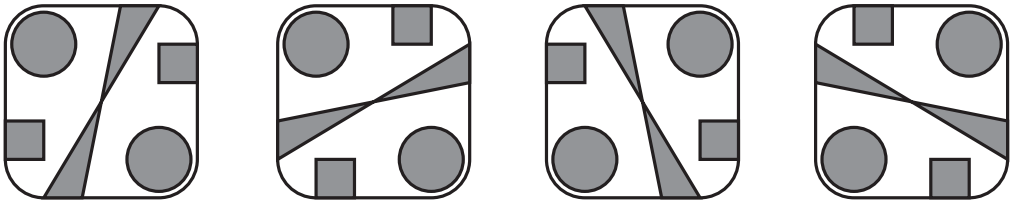
[2]



[3] What is the cycle structure of a perfect shuffle of the deck of 16 cards shown? (Use the names of the cards shown. Do not use numbers 1, 2, ...) How many perfect shuffles does it take for the deck to return to its starting position?

D E F G H I J K L M N P Q R S T

[**4**] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.



Practice First Exam AE

MATH V1010: Groups and Symmetry, September 25, 2003

Name: _____ **School:** _____

[1]	[2]	[3]	[4]	TOTAL

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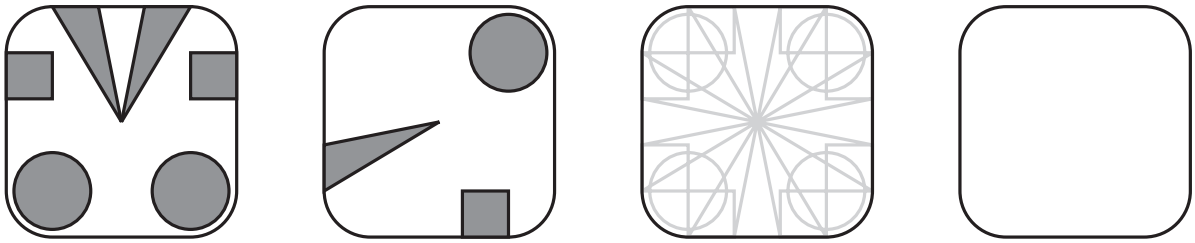
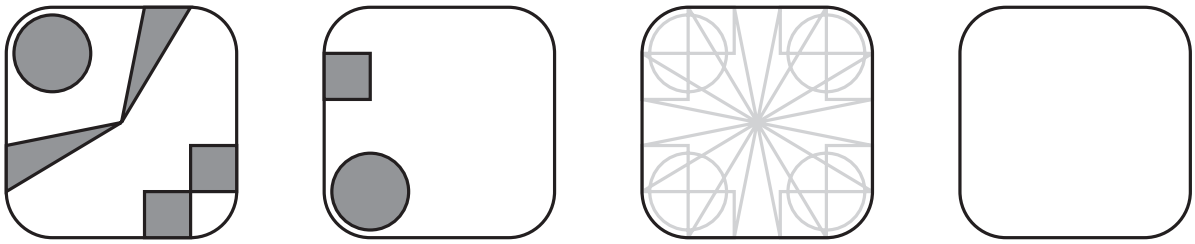


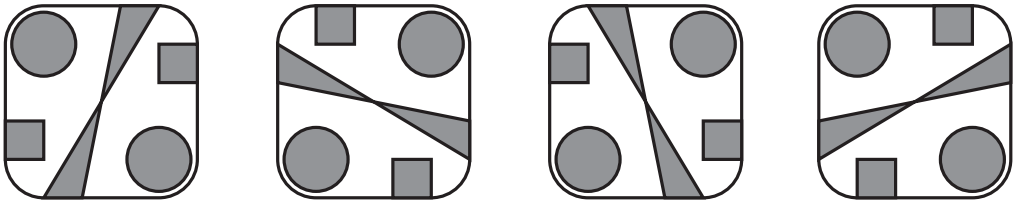
[2]

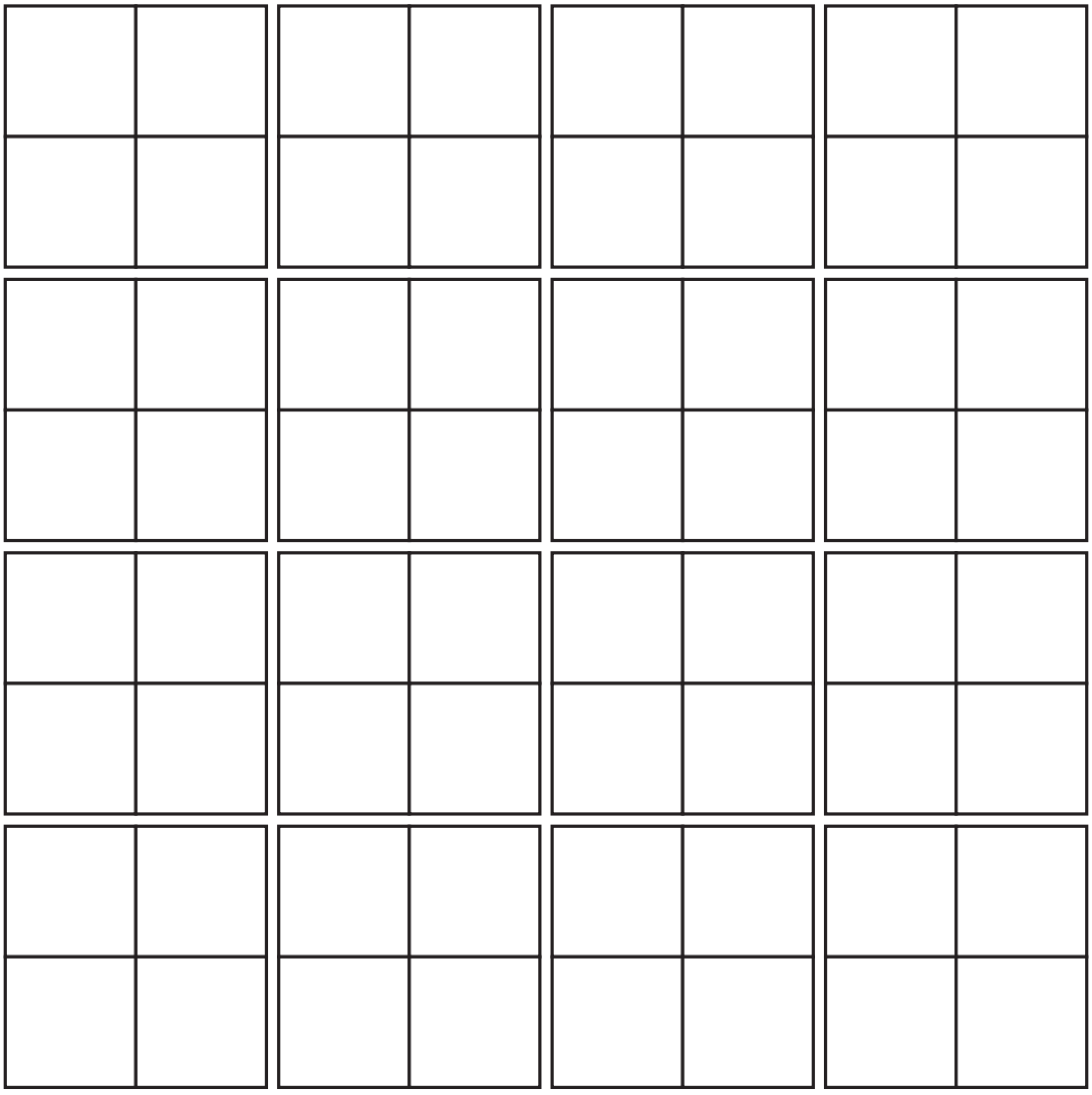


[3] What is the cycle structure of a perfect shuffle of the deck of 16 cards shown? (Use the names of the cards shown. Do not use numbers 1, 2, ...) How many perfect shuffles does it take for the deck to return to its starting position?

G H I J K L M N P Q R S T U V W

[**4**] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.





Practice First Exam AF

MATH V1010: Groups and Symmetry, September 25, 2003

Name: _____ **School:** _____

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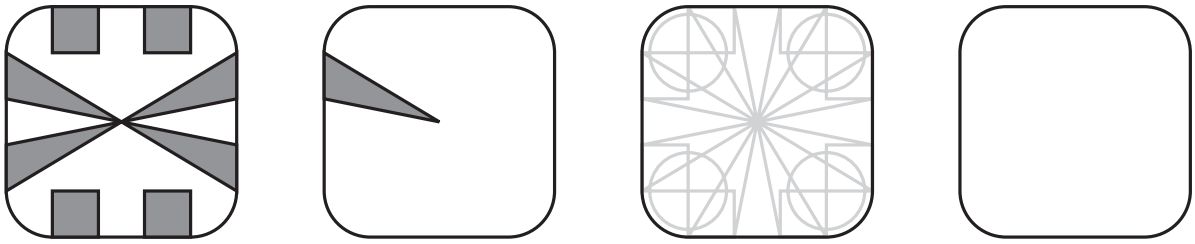
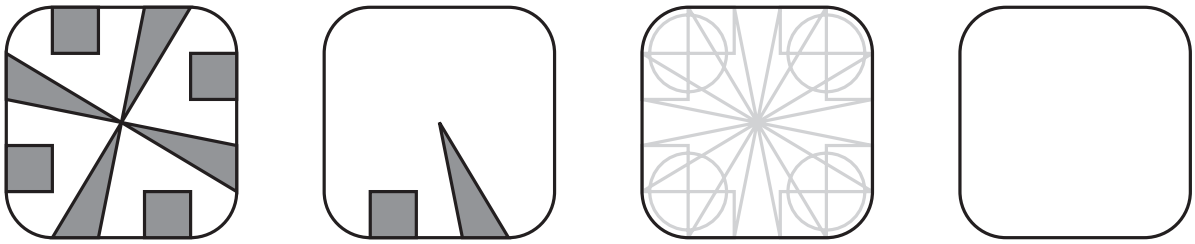


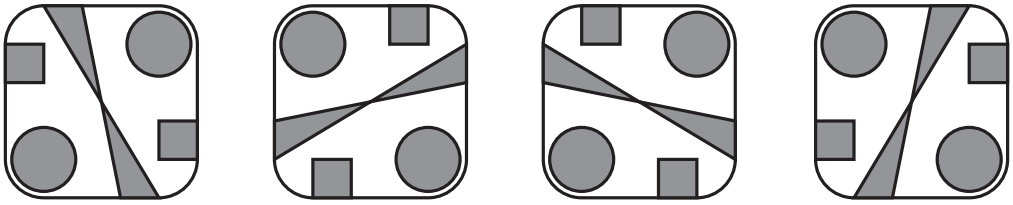
[2]



[3] What is the cycle structure of a perfect shuffle of the deck of 16 cards shown? (Use the names of the cards shown. Do not use numbers 1, 2, ...) How many perfect shuffles does it take for the deck to return to its starting position?

D E F G H I J K L M N P Q R S T

[4] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.



Practice First Exam AG

MATH V1010: Groups and Symmetry, September 25, 2003

Name: _____ **School:** _____

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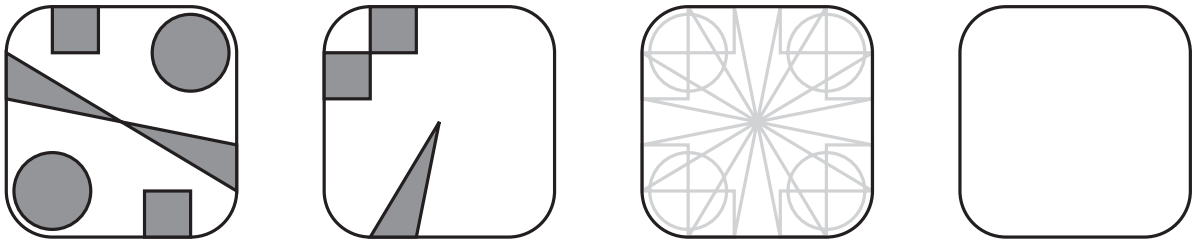
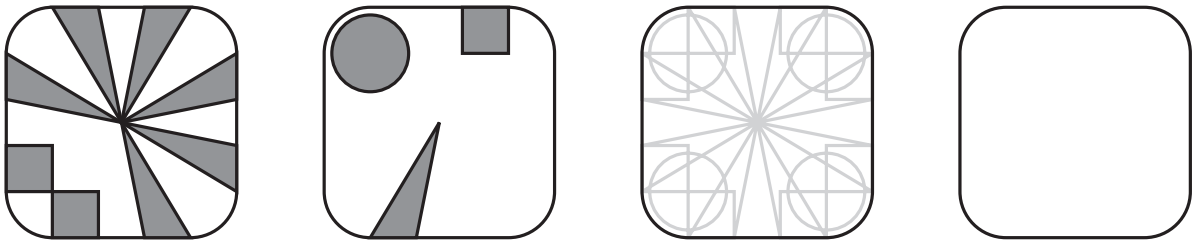


[2]



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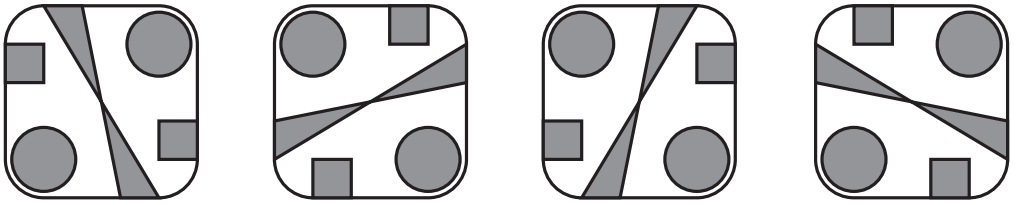
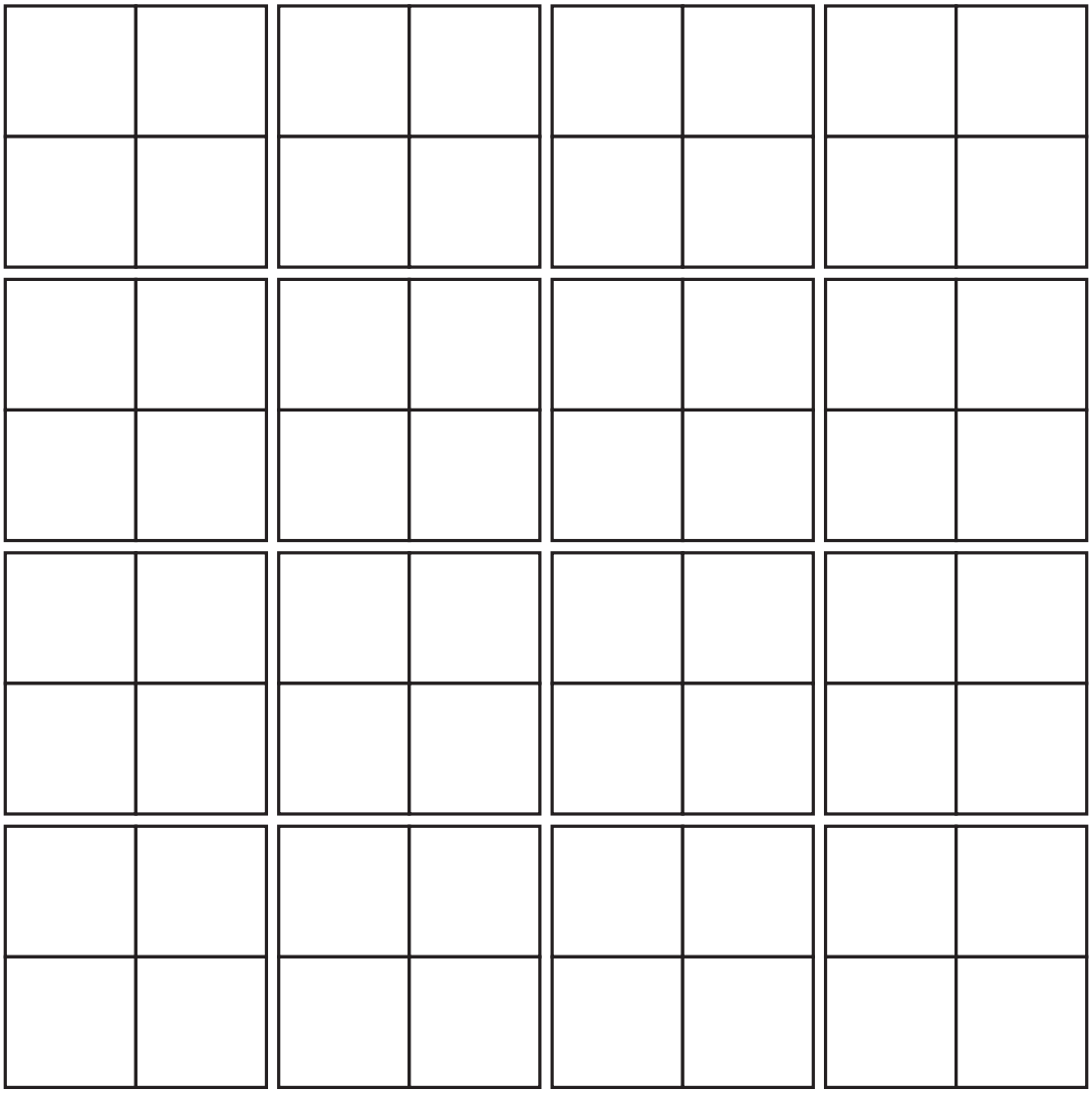
H I J K L M N P Q R S T U V W X

[**4**] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.





Practice First Exam AH

MATH V1010: Groups and Symmetry, September 25, 2003

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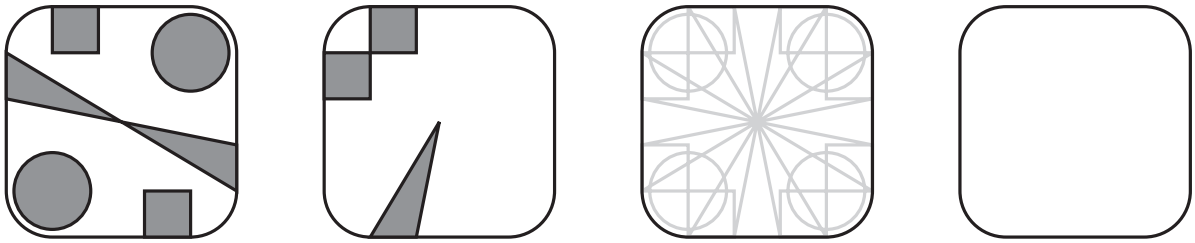
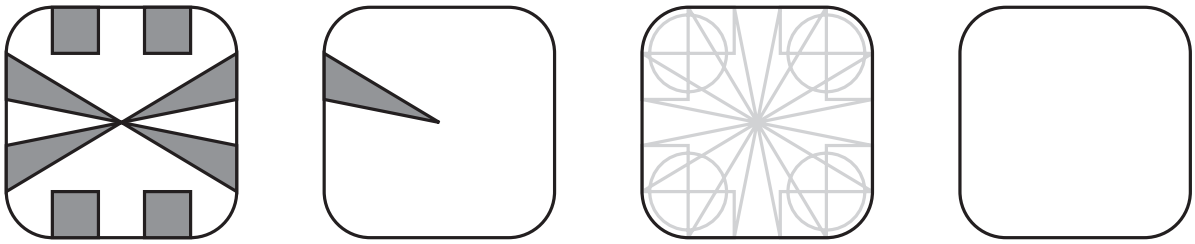


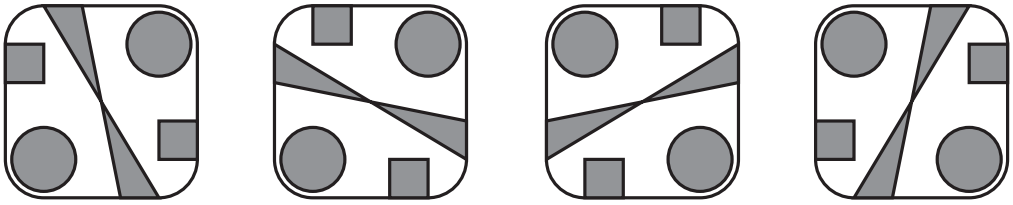
[2]



[3] What is the cycle structure of a perfect shuffle of the deck of 16 cards shown? (Use the names of the cards shown. Do not use numbers 1, 2, ...) How many perfect shuffles does it take for the deck to return to its starting position?

A B C D E F G H I J K L M N P Q

[4] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.



Practice First Exam AI

MATH V1010: Groups and Symmetry, September 25, 2003

Name: _____ **School:** _____

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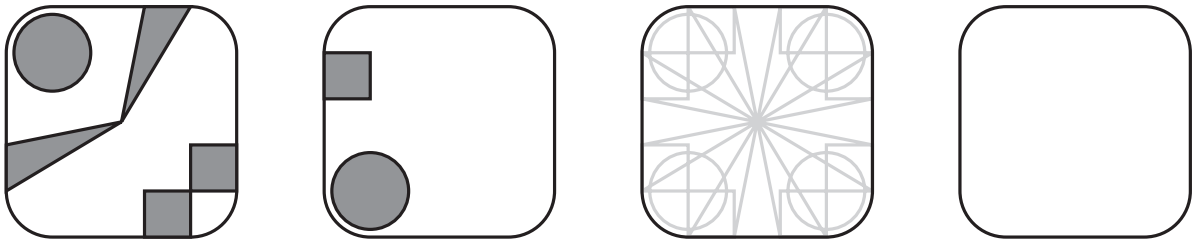
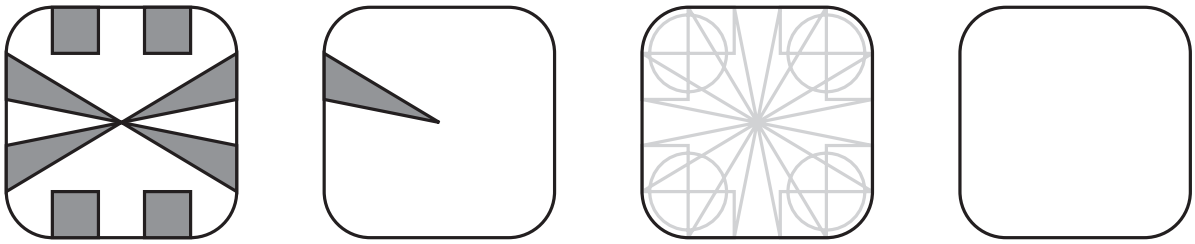


[2]



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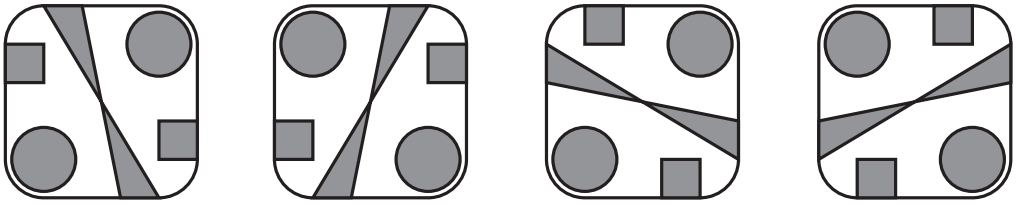
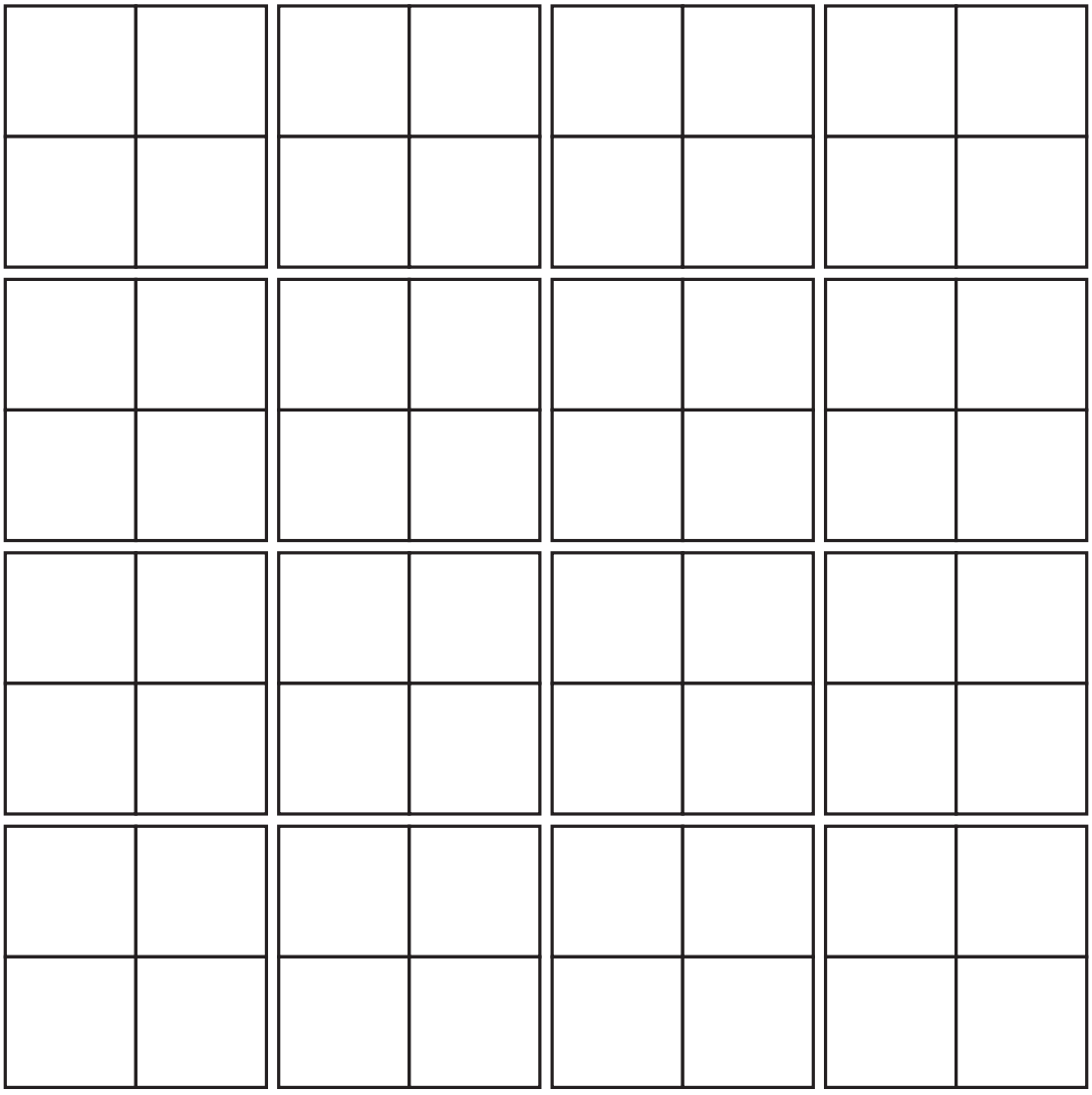
$H \quad I \quad J \quad K \quad L \quad M \quad N \quad P \quad Q \quad R \quad S \quad T \quad U \quad V \quad W \quad X$

[**4**] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.





Practice First Exam AJ

MATH V1010: Groups and Symmetry, September 25, 2003

Name: _____ **School:** _____

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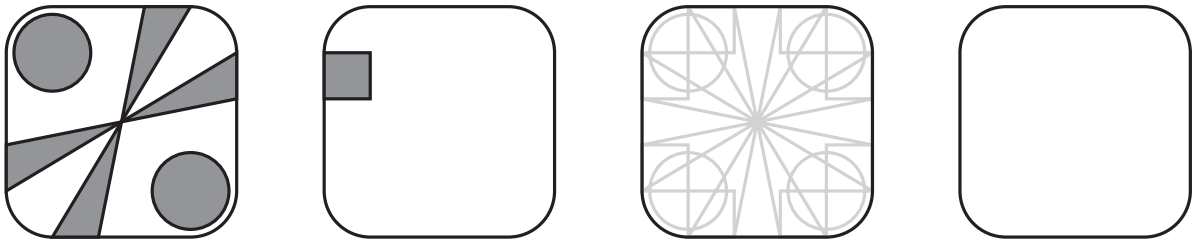
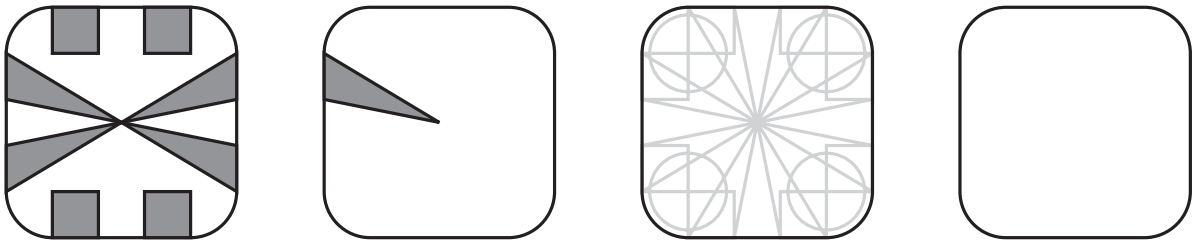


[2]



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G H I J K L M N P Q R S T U V W

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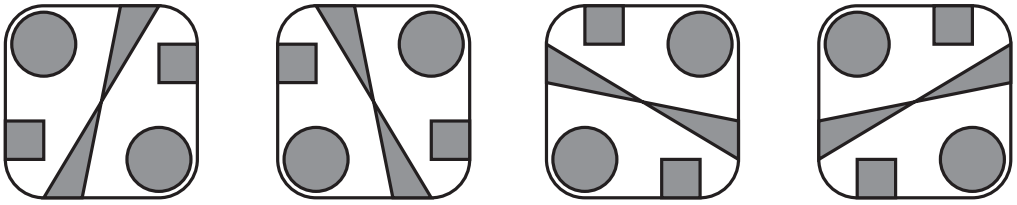

Practice First Exam AK

MATH V1010: Groups and Symmetry, September 25, 2003

Name: _____ **School:** _____

[1]	[2]	[3]	[4]	TOTAL

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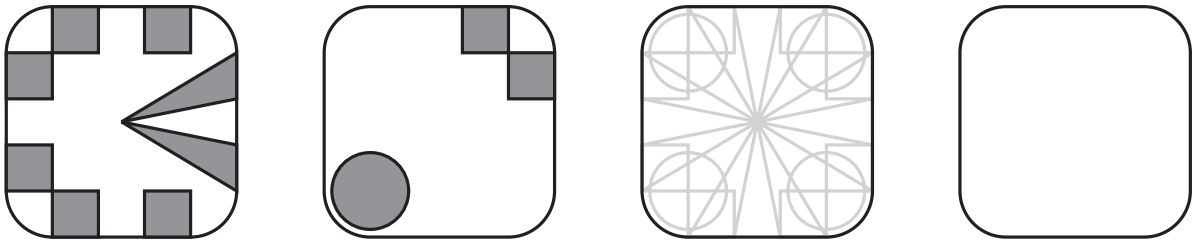
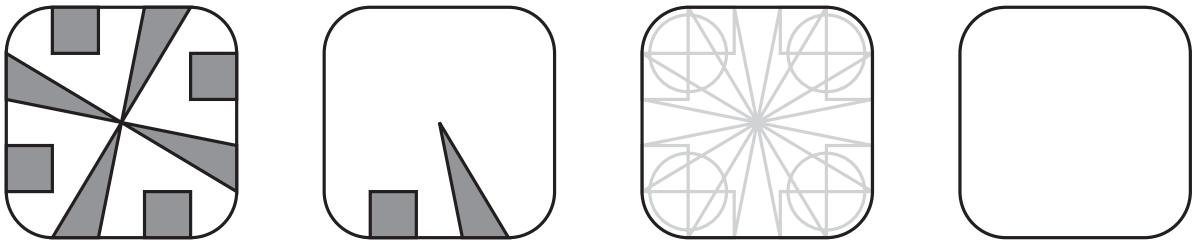


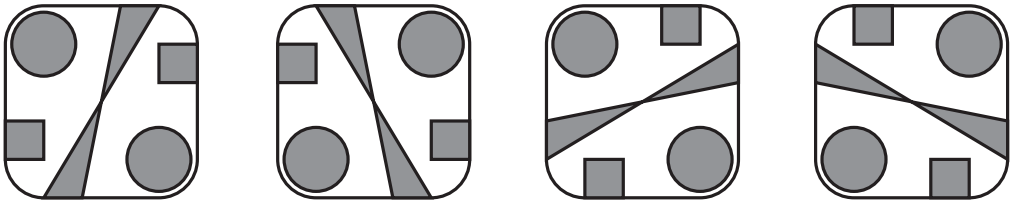
[2]

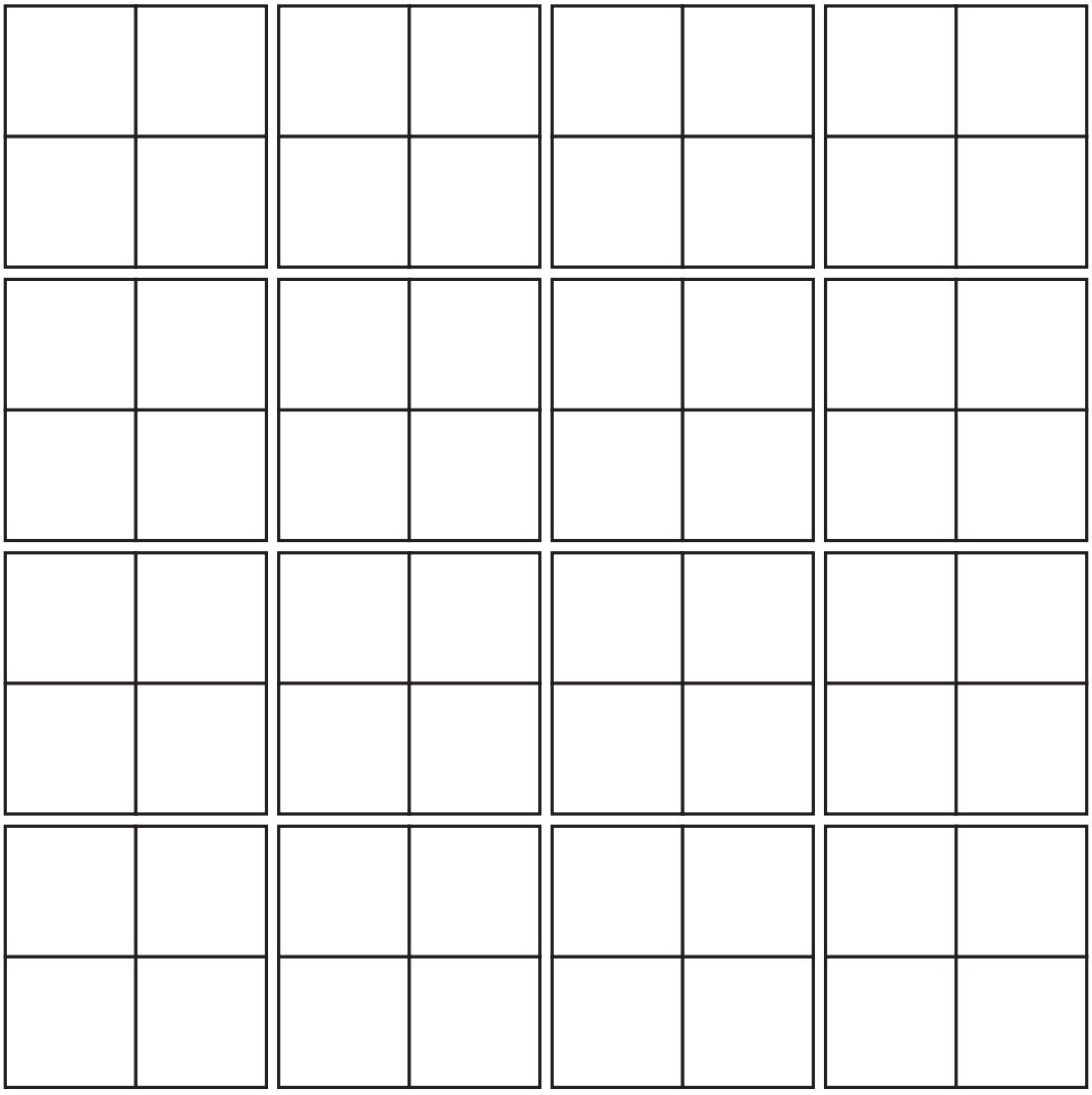


[3] What is the cycle structure of a perfect shuffle of the deck of 16 cards shown? (Use the names of the cards shown. Do not use numbers 1, 2, ...) How many perfect shuffles does it take for the deck to return to its starting position?

G H I J K L M N P Q R S T U V W

[**4**] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.





Practice First Exam AL

MATH V1010: Groups and Symmetry, September 25, 2003

Name: _____ **School:** _____

[1]	[2]	[3]	[4]	TOTAL

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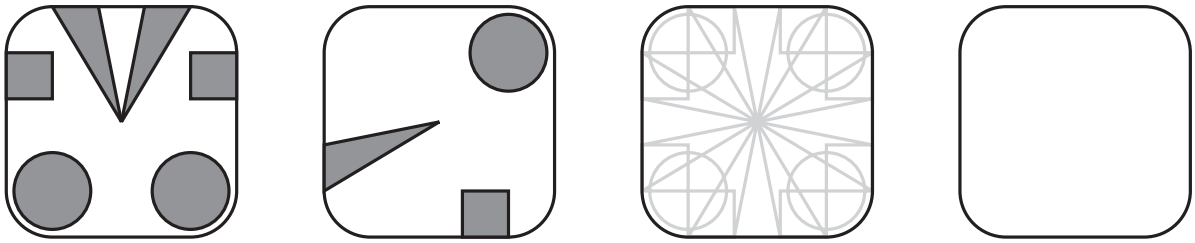
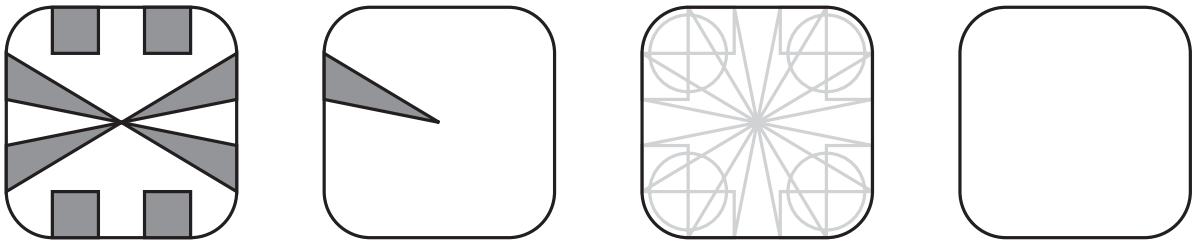


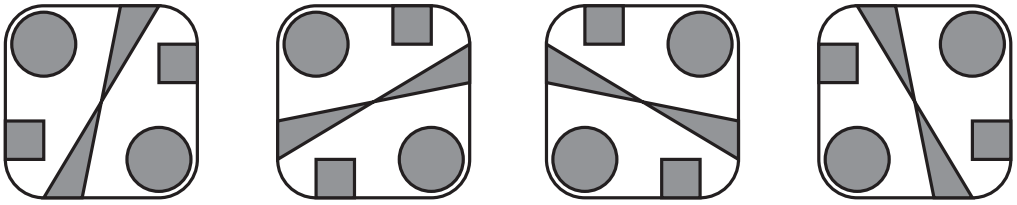
[2]

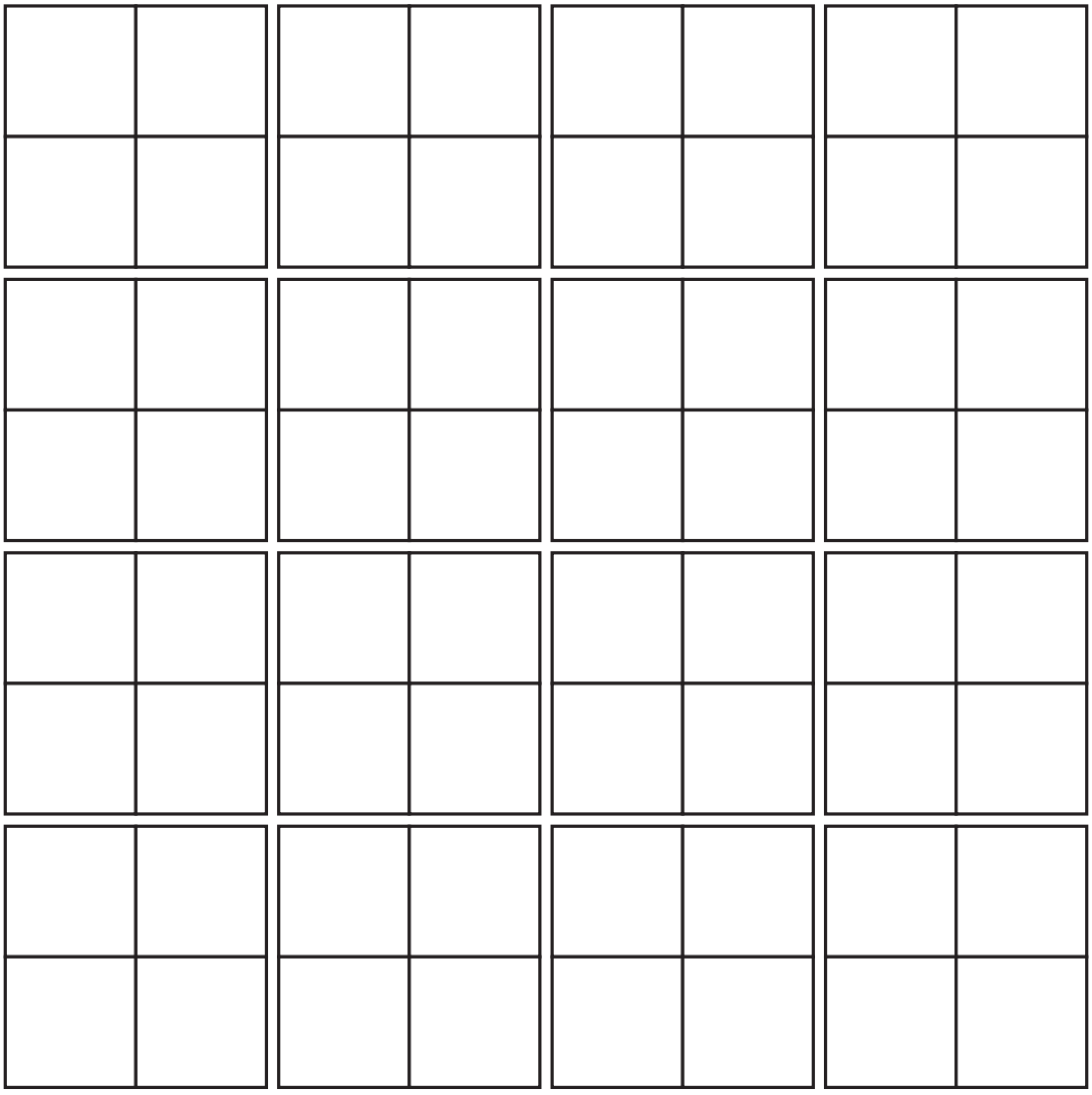


[3] What is the cycle structure of a perfect shuffle of the deck of 16 cards shown? (Use the names of the cards shown. Do not use numbers 1, 2, ...) How many perfect shuffles does it take for the deck to return to its starting position?

F G H I J K L M N P Q R S T U V

[4] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.





Practice First Exam AM

MATH V1010: Groups and Symmetry, September 25, 2003

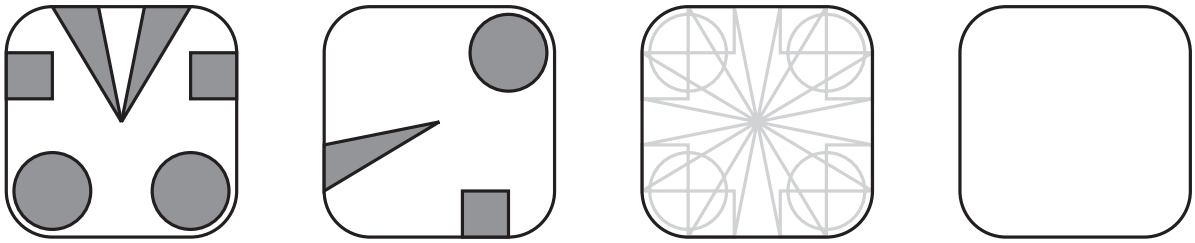
Name: _____ **School:** _____

[1]	[2]	[3]	[4]	TOTAL

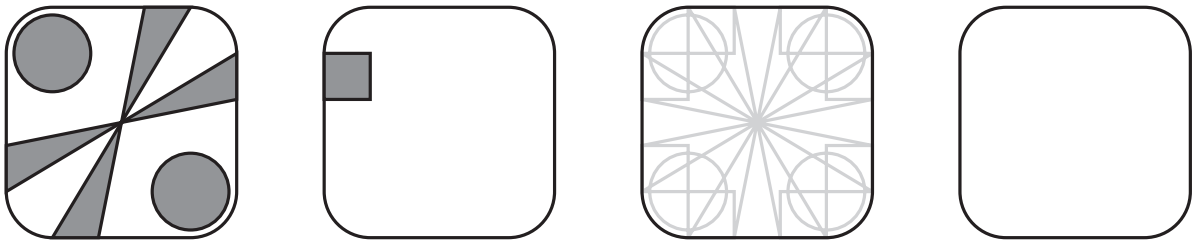
You may use scratch paper, but only this sheet will be graded; please present all answers on this sheet.

For problems [1] and [2], which symmetries of the square preserve the pattern on the left? Modify the second pattern so that it has the same subgroup of symmetries. In the blank square on the right, design your own pattern with the same subgroup of symmetries.

[1]



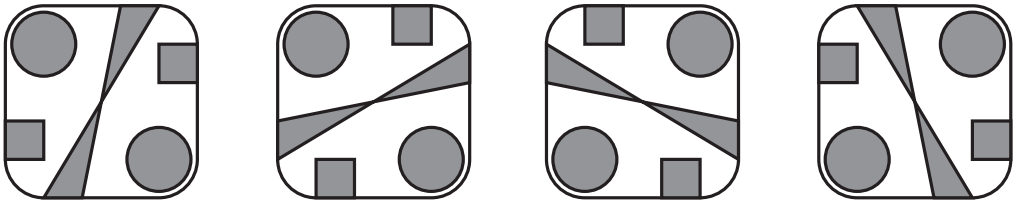
[2]

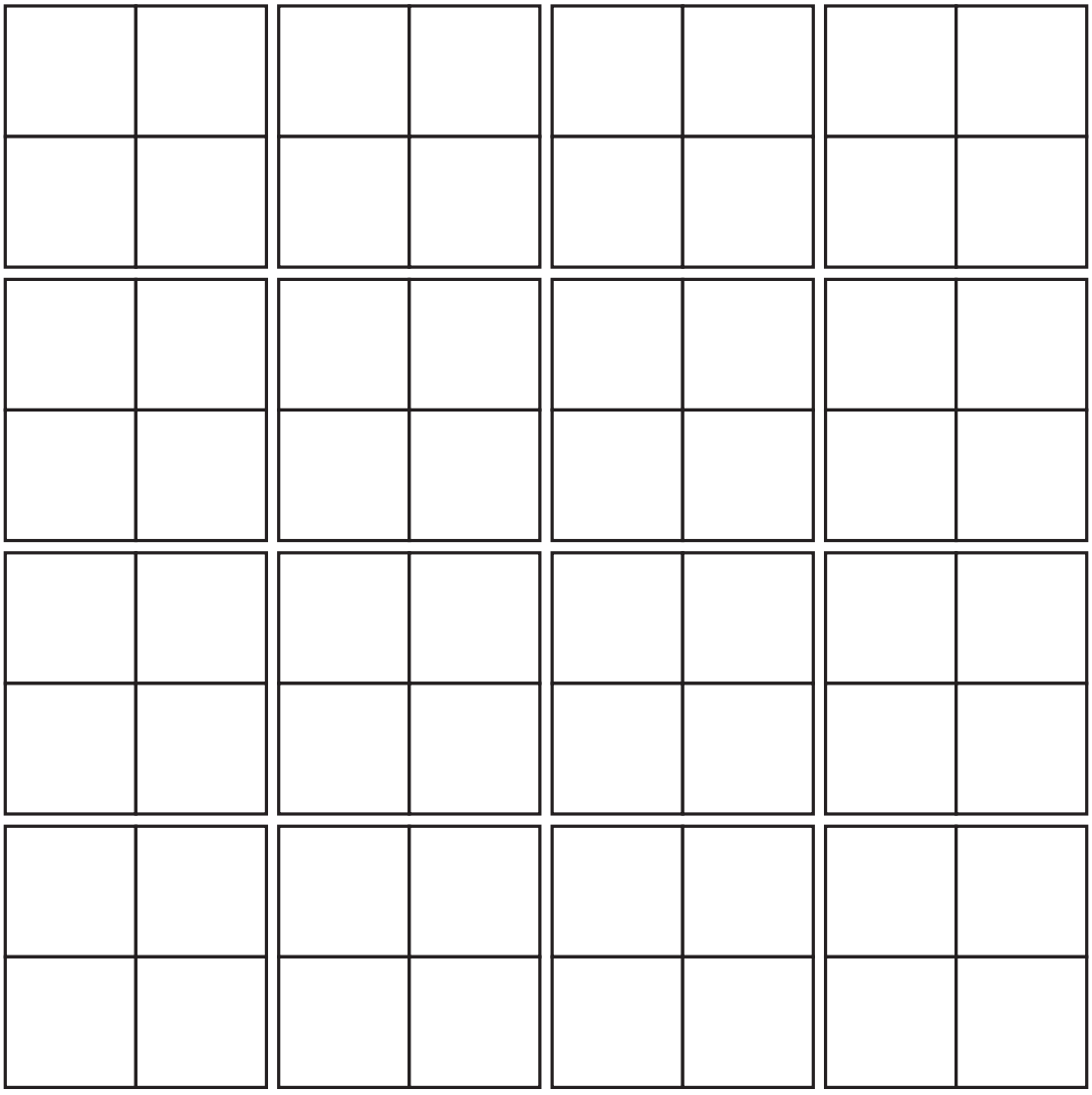


[3] What is the cycle structure of a perfect shuffle of the deck of 16 cards shown? (Use the names of the cards shown. Do not use numbers 1, 2, ...) How many perfect shuffles does it take for the deck to return to its starting position?

F G H I J K L M N P Q R S T U V

[4] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.





Practice First Exam AN

MATH V1010: Groups and Symmetry, September 25, 2003

Name: _____ **School:** _____

[1]	[2]	[3]	[4]	TOTAL

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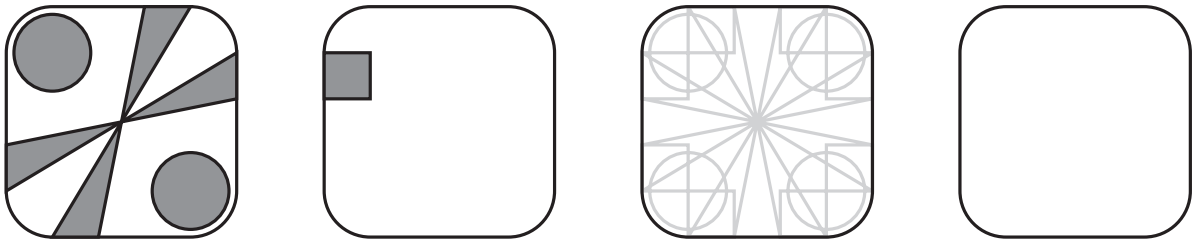
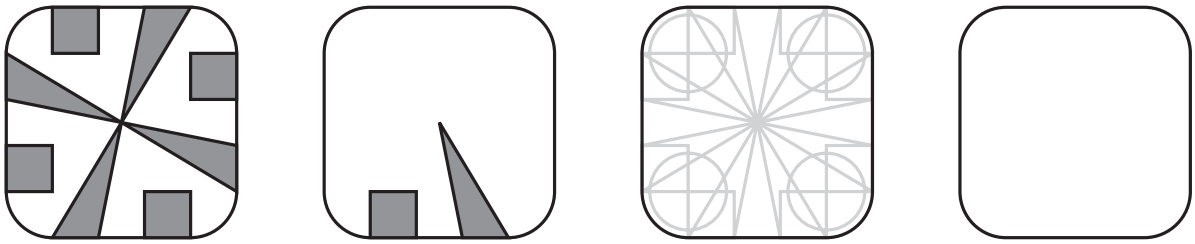
[1]



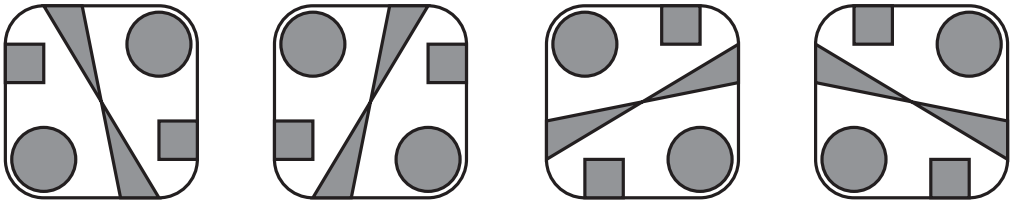
[2]

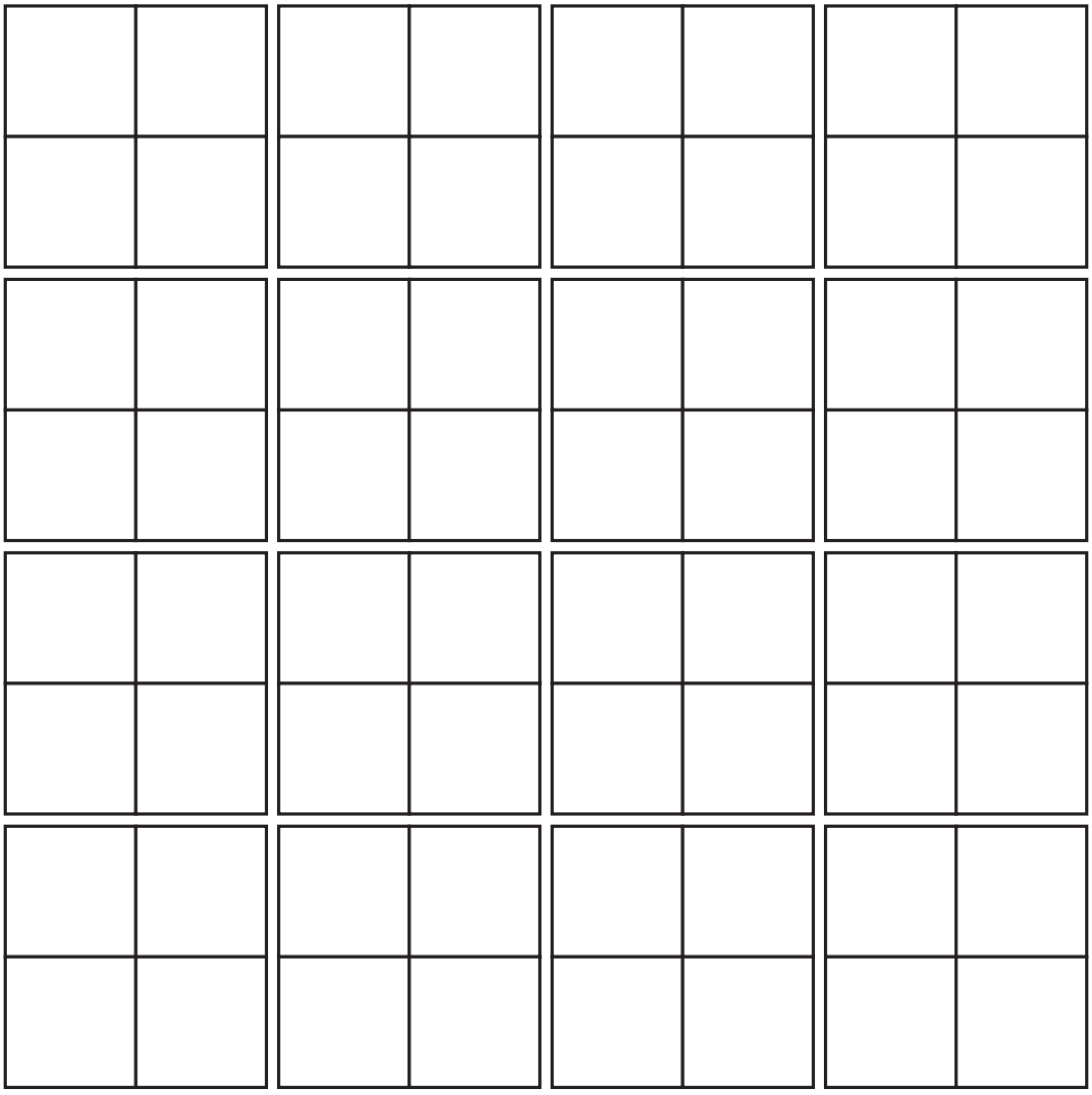


[3] What is the cycle structure of a perfect shuffle of the deck of 16 cards shown? (Use the names of the cards shown. Do not use numbers 1, 2, ...) How many perfect shuffles does it take for the deck to return to its starting position?

D E F G H I J K L M N P Q R S T

[**4**] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.





Practice First Exam BA

MATH V1010: Groups and Symmetry, September 25, 2003

Name: _____ **School:** _____

[1]	[2]	[3]	[4]	TOTAL

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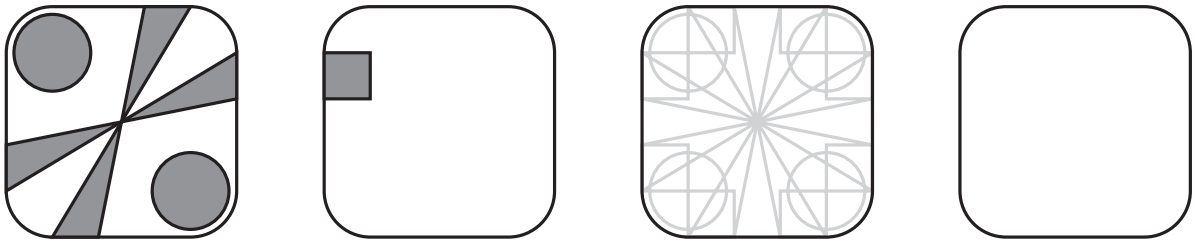
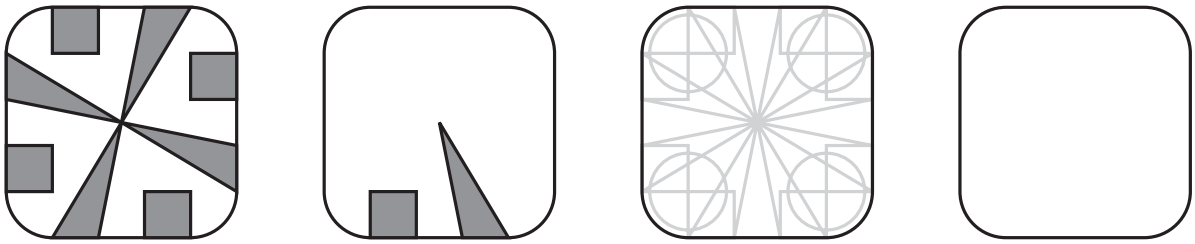
[1]



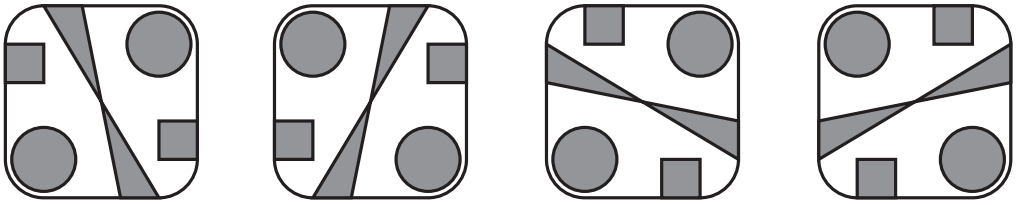
[2]

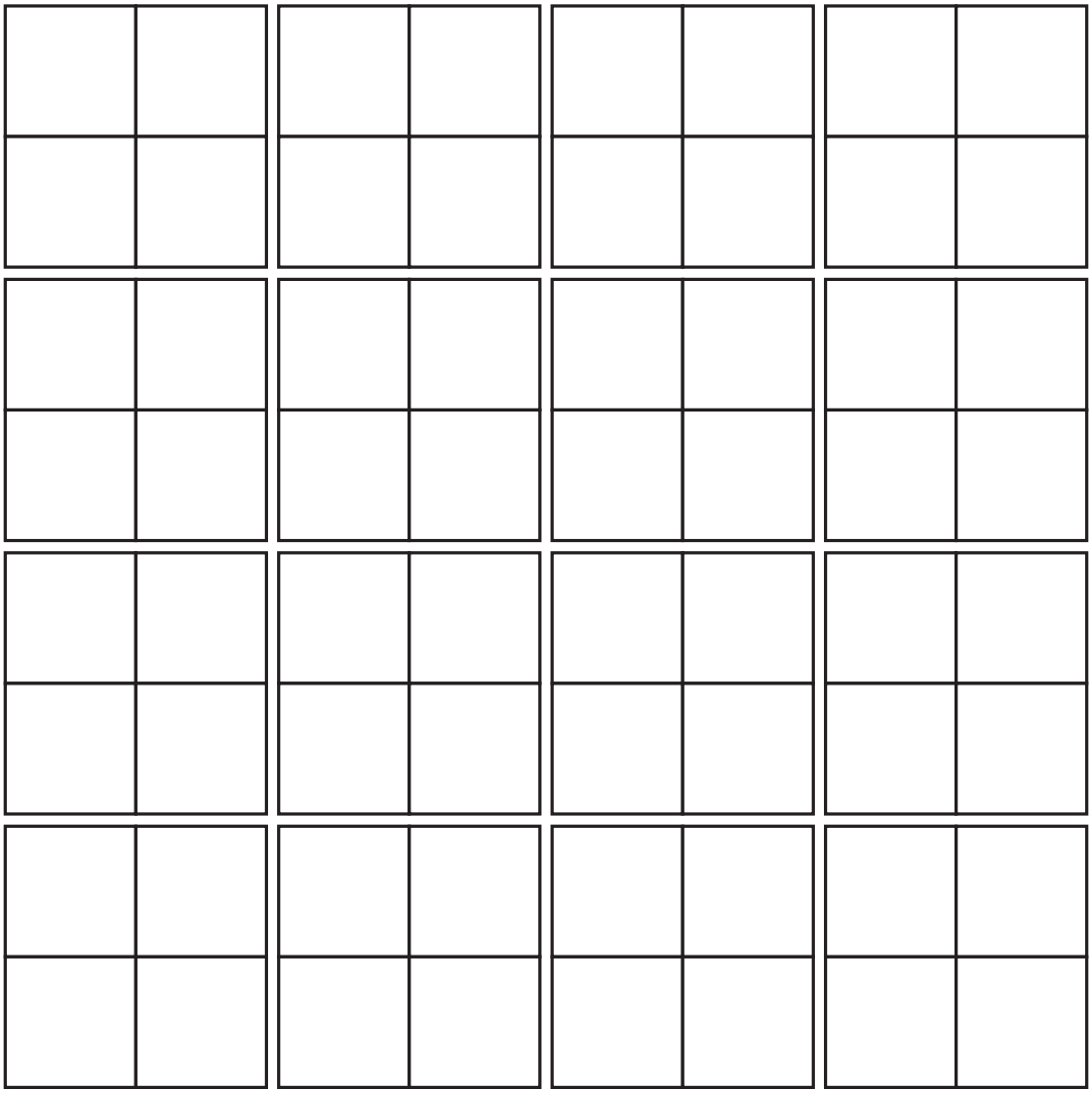


[3] What is the cycle structure of a perfect shuffle of the deck of 16 cards shown? (Use the names of the cards shown. Do not use numbers 1, 2, ...) How many perfect shuffles does it take for the deck to return to its starting position?

G H I J K L M N P Q R S T U V W

[**4**] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.





Practice First Exam BB

MATH V1010: Groups and Symmetry, September 25, 2003

Name: _____ **School:** _____

[1]	[2]	[3]	[4]	TOTAL

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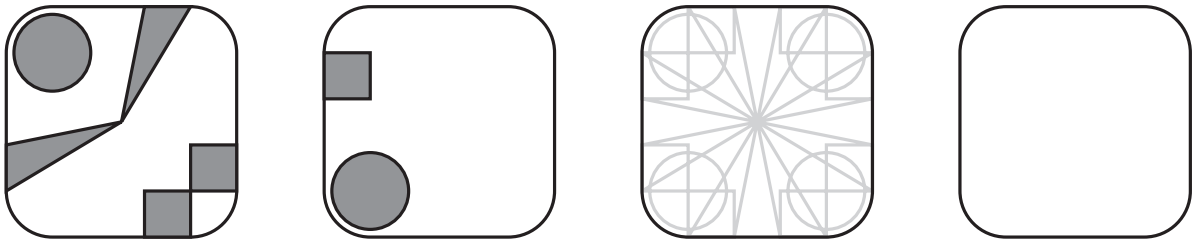
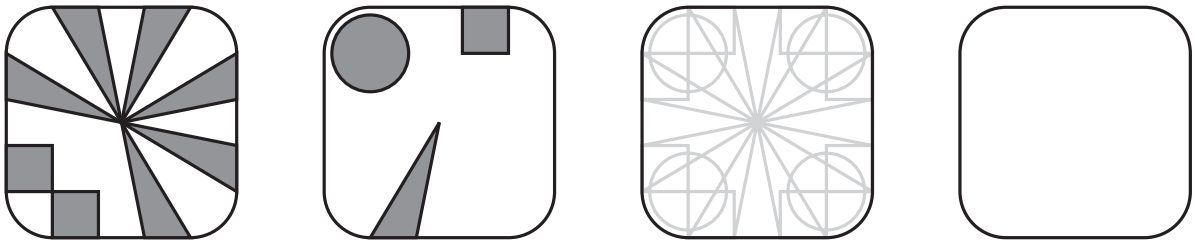


[2]



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B C D E F G H I J K L M N P Q R

[4] Under each pattern, write the symmetries of the square that transform the leftmost pattern to each pattern. Use these actions as row and column labels for the multiplication table, and fill in the multiplication table. Show the quotient group structure.