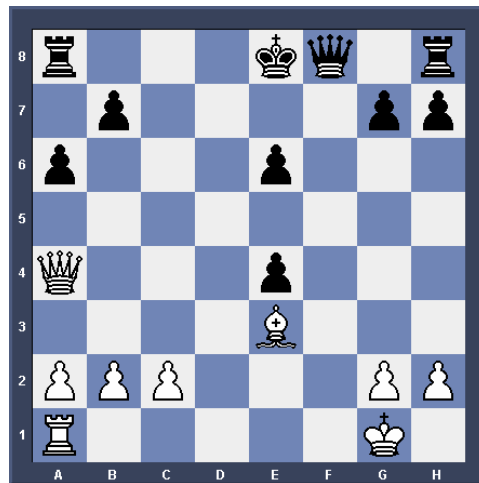


Chess, Math, and Extended Response Workbook

Student Edition

By John P. Buky and Will Tseng



The above position is taken from Robert J. Fischer vs. Peter Dely, Skopje 1967. Fischer as White just played 17. Qa4+ Write an extended response on why Black resigned.

INSTRUCTIONAL STRATEGY DESCRIPTION

TEACHERS

A complete curriculum for integrating chess into the elementary grade (1-8) math classroom.

Chess is a powerful cognitive learning tool that can be used to successfully enhance math concepts. Not only does chess engage students of all learning styles and strengths, but it also promotes problem-solving and higher-level thinking skills.

STUDENTS

Chess is one of the best tools for learning logic, problem solving, and visualization. Students learn problem solving techniques in an enjoyable fashion by using a hands-on approach. As part of this curriculum, students will learn algebraic and geometric concepts using chess as a model. Children love chess as the ultimate “mind sport”. Students will learn the basics of chess, how the pieces move and interact with each other, basic chess tactics, strategy and notation.

Lessons will be conducted using a chess demonstration board, chess boards and pieces for the students to practice with, and worksheets to reinforce the concepts learned. Collaborative discussions and analysis will be encouraged to develop problem solving, decision-making, and team building skills.

ISBN # 978-0-615-16808-1

Chess fonts (c) 2007 by ChessBase www.chessbase.com
Copyright © 2007 Chess Academy.

All rights reserved. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording or by any information storage and retrieval system, without permission in writing from the publisher.

Chess Academy
5825 W. Patterson Ave.
Chicago, IL 60634
www.thechessacademy.org
773-414-2967

First edition 2007.

TITLE SUBJECT

Chess, Math, and Extended Response Curriculum

SUBJECT

Math, Character Education

GRADE LEVEL

1-8

SUBJECTS ALSO INCORPORATED

Language Arts, Problem Solving & Critical Thinking Skills, Technology

INSTRUCTIONAL STRATEGY DESCRIPTION

Chess is a powerful cognitive learning tool that can be used to successfully enhance math concepts. Not only does chess engage students of all learning styles and strengths, but it also promotes problem-solving and higher-level thinking skills.

NATIONAL MATH STANDARDS ADDRESSED

NM-ALG.1: Understand patterns, relations, and functions

NM-ALG.2: Represent and analyze mathematical situations and structures using algebraic symbols

NM-GEO.1: Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships

NM-GEO.2: Specify locations and describe spatial relationships using coordinate geometry and other representational systems

STUDENTS

Chess is one of the best tools for learning logic, problem solving, and visualization. Students learn problem-solving techniques in an enjoyable fashion by using a hands-on approach.

As part of this curriculum, students will learn algebraic and geometric concepts using chess as a model. Children love chess as the ultimate “mind sport”. Students will learn the basics of chess, how the pieces move and interact with each other, basic chess tactics, strategy and notation.

Lessons will be conducted using a chess demonstration board, chessboards and pieces for the students to practice with, and worksheets to reinforce the concepts learned. Collaborative discussions and analysis will be encouraged to develop problem solving, decision-making, and team building skills.

CHESS MATH AND EXTENDED RESPONSE CURRICULUM

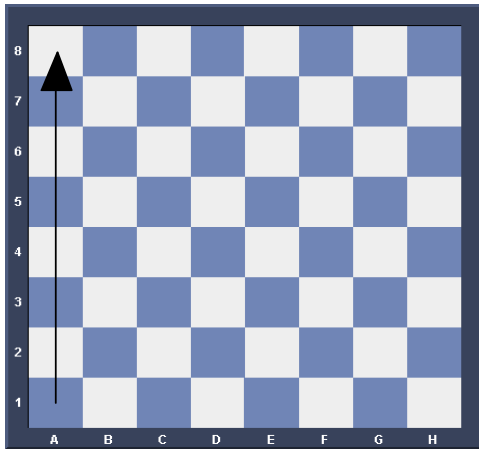
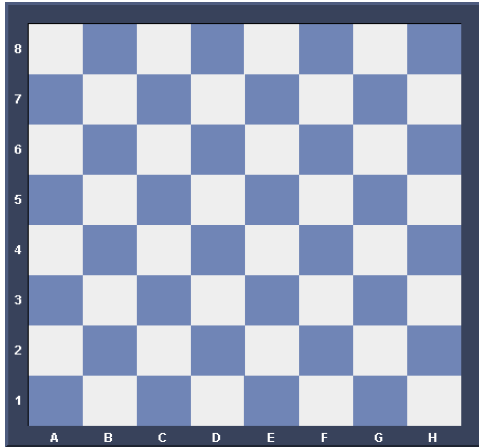
- p. 5 Chess and Math Lesson 1: Chessboard & Pieces
- p. 11 Chess and Math Lesson 2: Pawns (Pawn Game)
- p. 14 Chess and Math Lesson 3: King (King and Pawn Game)
- p. 17 Chess and Math Lesson 4: Rooks (King, Pawn and Rook Game)
- p. 20 Chess and Math Lesson 5: Bishops (King, Pawn, Rook and Bishop Game)
- p. 23 Chess and Math Lesson 6: Queen (King, Pawn, Rook, Bishop and Queen Game)
- p. 26 Chess and Math Lesson 7: Knights (All Chess Pieces Game)
- p. 29 Chess and Math Lesson 8: Special Moves (All Chess Pieces Game)
- p. 34 Chess and Math Lesson 9: Check and Mate (All Chess Pieces Game)
- p. 39 Chess and Math Lesson 10: Pawn Promotion and Checkmate (All Chess Pieces Game)
- p. 47 Chess and Math Lesson 11: Checkmate with Queen (All Chess Pieces Game)
- p. 58 Chess and Math Lesson 12: Checkmate with 2 Rooks (All Chess Pieces Game)
- p. 65 Chess and Math Lesson 13: Checkmate with 1 Rook (All Chess Pieces Game)
- p. 73 Chess and Math Lesson 14: Checkmate with 2 Bishops (All Chess Pieces Game)
- p. 82 Chess and Math Lesson 15: Annotating and Analyzing a Chess Game
- p. 89 Chess and Math Lesson 16: Basic Chess Strategy

Required materials: Chess Demonstration Board, Chess Boards and Pieces, and the Chess, Math and Extended Response Workbook for students.

Procedure: Each lesson is approximately 60 min. in length and is divided into three parts. For the first part of the lesson, the teacher will use the chess demo board to illustrate the lesson. Next, the students will have worksheets to reinforce the lesson. In the last part, the students play chess in teams of two.

Beginning Chess Lesson 1

Objective: To identify the squares on a chessboard using chess algebraic notation.



This is a vertical line.
In chess this is called a file.

What are the endpoints of this line?

_____ and _____

The chessboard is made up of 64
light and dark squares.

What color square is at the bottom right?

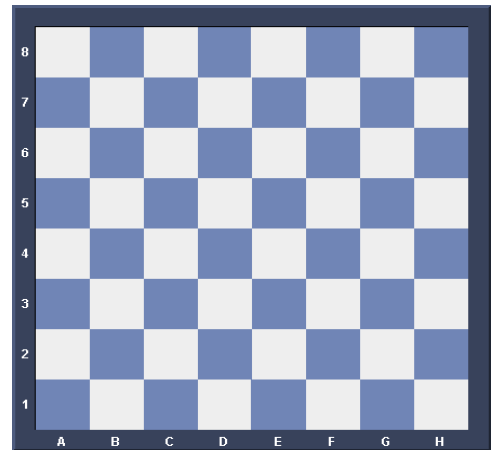
What color square is at the bottom left?

How many dark squares are there? _____

How many light squares are there? _____

What % of the squares are light? _____

What % of the squares are dark? _____

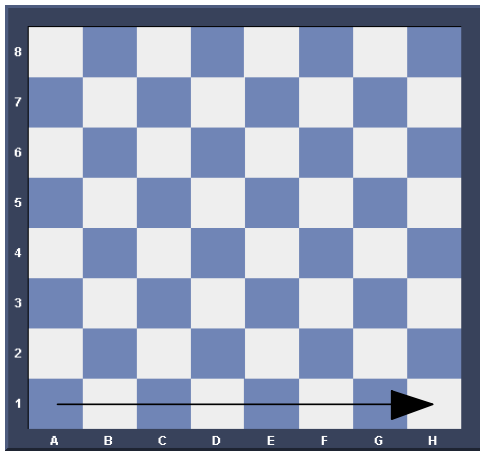


Draw a vertical line on e.

What are the endpoints of this line?

_____ and _____

How many files are on a chessboard?



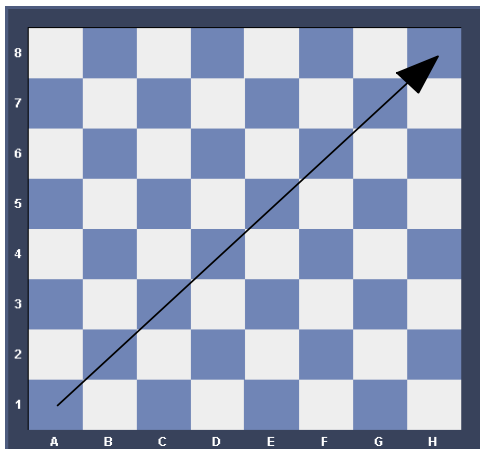
This is a horizontal line.
 In chess this is called a rank.
 What are the endpoints of this line?

_____ and _____

This is a diagonal line.
 What are the endpoints of this diagonal?

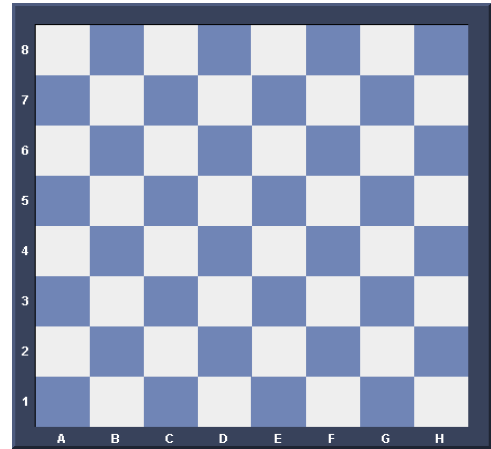
_____ and _____

How many squares is this diagonal? _____



Draw a horizontal line along the 3rd rank.

What are the endpoints of this line?



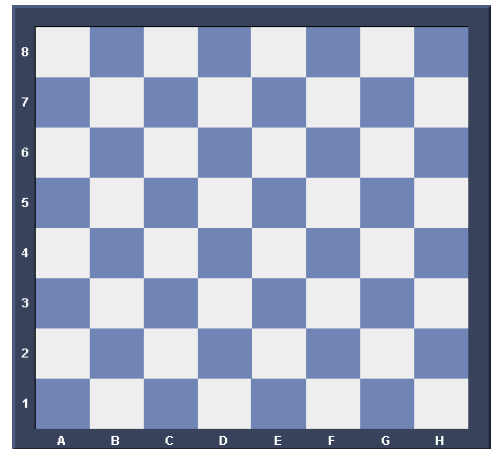
_____ and _____

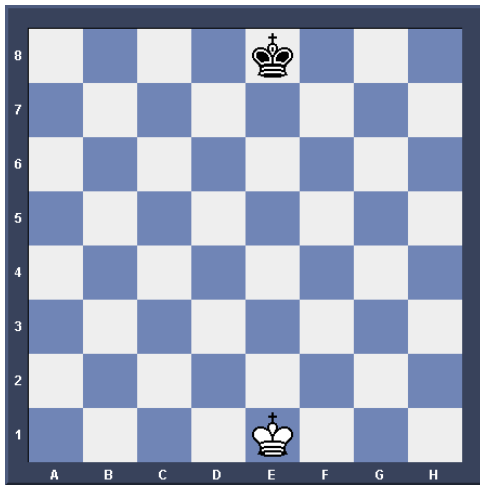
Draw a diagonal line from h1 to a8.

How many squares is this diagonal? _____

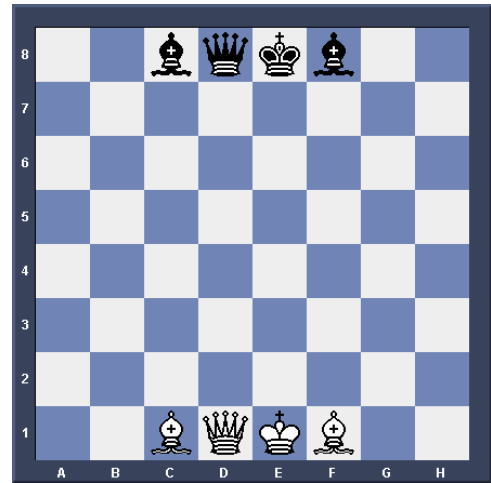
Draw another diagonal from f1 to h3.

How many squares is this diagonal? _____

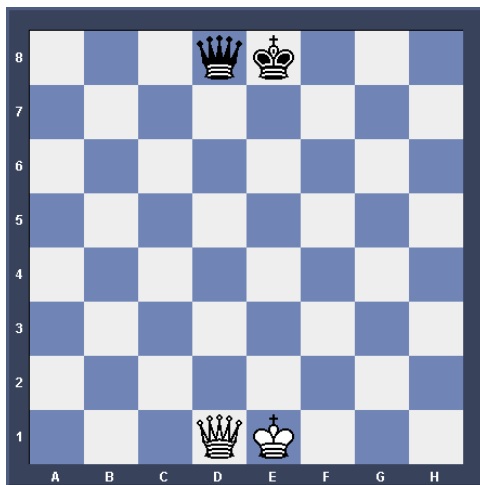




The King is placed along the edge of the board in the middle of the edge. When the board is set up, the White King is placed on the square **e1** and the Black King is placed on the square **e8**. Notice that the White pieces are set up on the first and second rank.

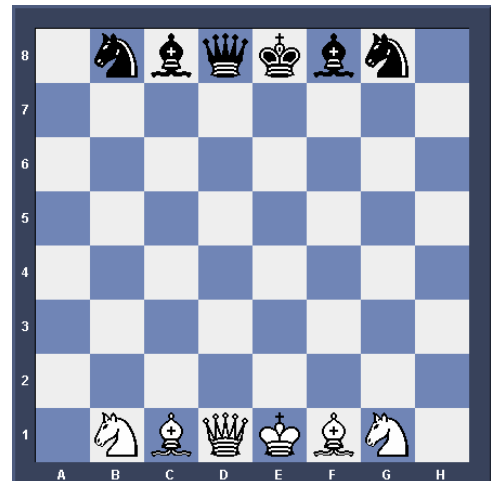


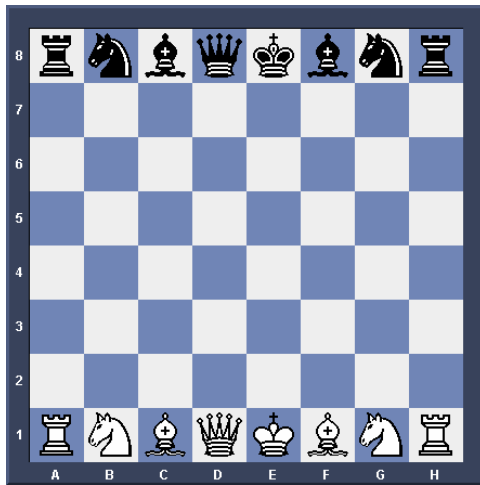
The Bishops are placed next to the King and Queen. The White Bishops are placed on squares **c1** and **f1**. The Black Bishops are placed on the squares **c8** and **f8**. Notice how each side's bishops goes on a different color.



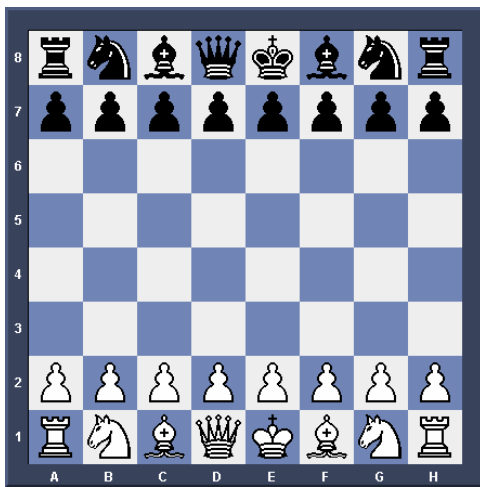
The Queen is next to the King. When the board is set up, the White Queen is placed on the square **d1** and the Black Queen is placed on the square **d8**. Notice how the Queens go on their own color. (White Queen goes on a White square; Black Queen goes on a Black square).

The Knights are placed next to the Bishops. The White Knights are placed on squares **b1** and **g1**. The Black Knights are placed on the squares **b8** and **g8**. Notice how each side's knights goes on a different color.





The Rooks are placed in the corners of the chessboard. The White Rooks are placed on squares **a1** and **h1**. The Black Rooks are placed on the squares **a8** and **h8**. Notice how each side's rooks go on a different color.



The Pawns are placed in front of the pieces. White pawns go on the 2nd rank while Black pawns go on the 7th rank. The Chessboard is now set up correctly.

Piece values.

King: Infinity = ∞

Queen: 9

Rook: 5

Bishop & Knight: 3

Pawn: 1

In general, the higher the point value the stronger the piece. Overall, a Queen is more powerful than a Rook ($9 > 5$), and a Rook is more powerful than a Bishop or a Knight ($5 > 3$).

Likewise, a Bishop or a Knight is stronger than a Pawn ($3 > 1$).

Using translation logic, if a Queen is stronger than a Rook ($9 > 5$), and a Rook is stronger than a Bishop ($5 > 3$), then a Queen is stronger than a Bishop. ($9 > 3$)

In terms of point values,
 $Q + P (10) = R + R (10)$

Similarly,
 $B + N (6) = R + P (6)$

In terms of point values,

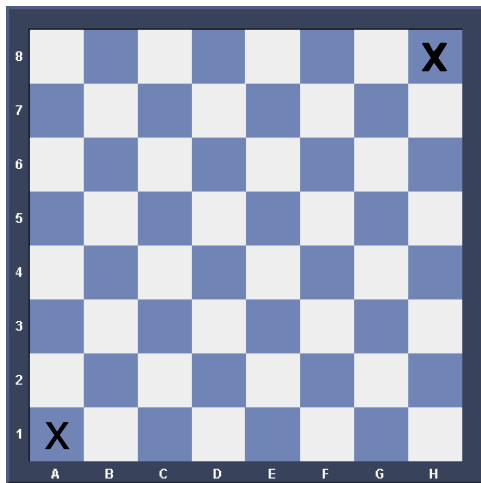
What is $B + N$? _____

What is $R + P$? _____

Which is better? Q or R+R

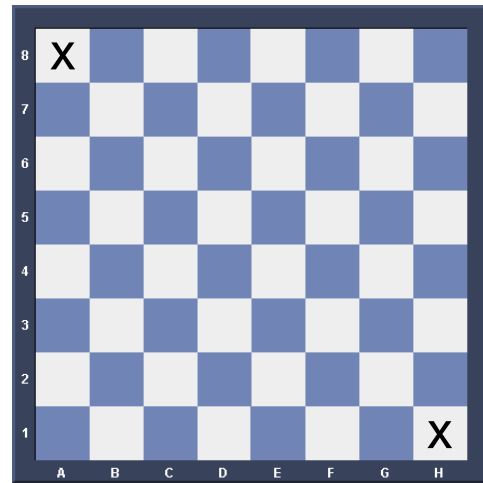
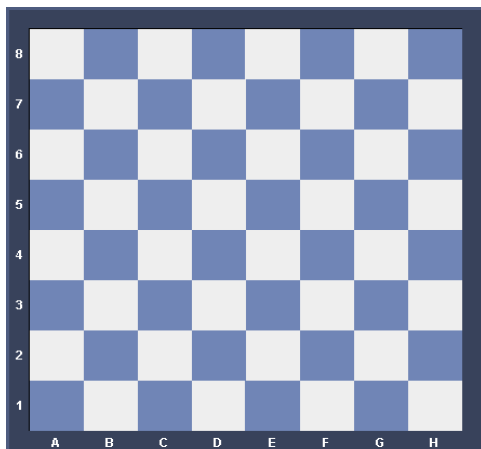
Which is better? R or B+N

Lesson 1 Worksheet

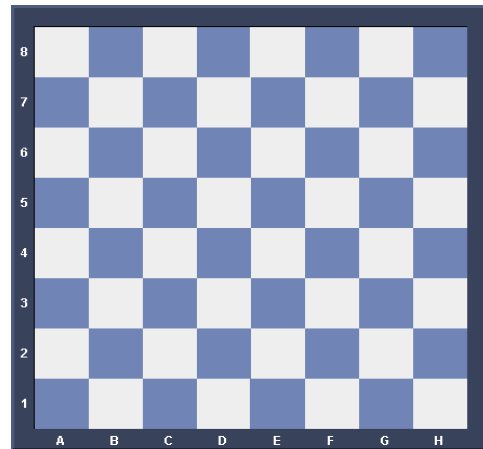


The coordinates of the marked squares are a1 and h8.

Mark an X on the squares d4 and g8.
Mark an O on squares h2 and b7.

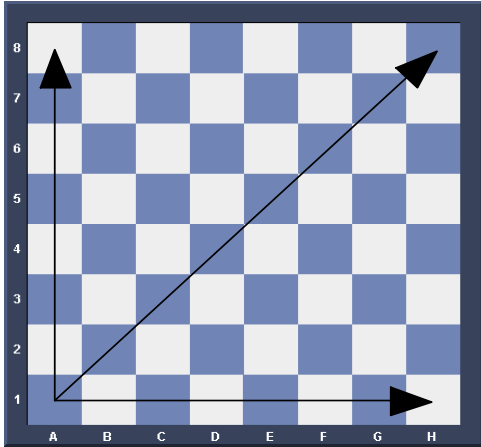


What are the coordinates of these marked squares? _____



Mark an X on the squares e5 and a3.
Mark an O on squares c1 and f6

Lesson 1 Extended Response

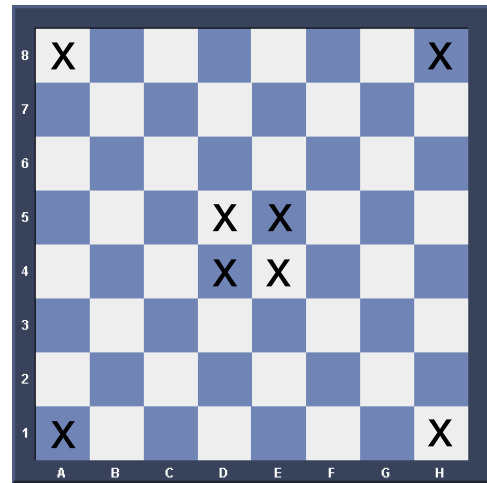


Explain the 3 types of lines that exist on the chessboard.

What are they called in chess?

What are the endpoints of the arrows?

Explain how the squares on the chessboard are identified.



Which squares do you think are more important, the 4 in the center or the 4 in the corner? (Note: the squares in reference are the ones with X's on them). Why?
