Introduction to Algebra

Chapters 8–12 | Show your work. Explain how you know.

Name: _____ Date: _____

01 CH. 8

Will the paths cross?

Two straight paths on a map both rise 3 units for every 4 units to the right. Path A passes through (0, 2). Path B passes through (8, 9). Are they the same line, parallel lines or intersecting lines?

02 CH. 9

Print whole sheets

A club has 5 loose tickets and prints 8 more on each full sheet. It wants at least 44 tickets but no more than 62. List every possible number of full sheets.

03 CH. 10

The magnet board

A board has n rows of magnets, with n + 3 magnets per row. Including the 6 spare magnets in a drawer, there are 60. How many rows are on the board?

04 CH. 11

Partners around forty

Two whole numbers are the same distance from 40, one below and one above. Their product is 1,551. Find them without testing a list of factor pairs.

05 CH. 12

Two signal pulses

A device starts at z = 1 + 2i. Each pulse multiplies the current value by i, then adds 1. What is the value after two pulses? Use $i^2 = -1$.

Introduction to Algebra

Chapters 13–17 | Show your work. Explain how you know.

Name: _____ Date: _____

06 CH. 13

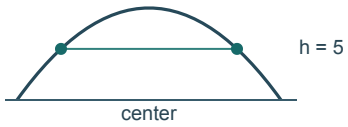
Reverse the number trick

A number trick squares a real input, subtracts six times that input and adds 4. Which inputs give an output of 2? Give both answers exactly.

07 CH. 14

Lights on an arch

An arch has height h = 9 − $(x - 4)^2$ meters, with x measured horizontally in meters. Two lights are placed where h = 5. How far apart are they? What point lies at the top?



08 CH. 15

Room for a garden

A rectangular plot uses all 26 m of fencing. One side has length x meters. For which real values of x does the plot enclose at least 40 m^2?

09 CH. 16

Two machines, two orders

Machine A doubles its input and adds 5. Machine B squares its input. Start at −1. Does switching the order change the final output? Give the two outputs and show the intermediate values.

10 CH. 17

Move the lowest point

The graph of f has a unique lowest point at (2, −4). Without knowing a formula for f, find the highest point on g(x) = 2 − f(x + 3). Why is it the highest?

Introduction to Algebra

Chapters 18–22 | Show your work. Explain how you know.

Name: _____ Date: _____

11 CH. 18

A missing constant

In P(x) = (x + a)(2x^2 − x + 3), the coefficient of x^2 is 9. Find the constant term of P without expanding the whole product.

12 CH. 19

Crossing a growth target

A light patch starts at 7 square inches and doubles every hour. Its area after t hours is 7×2^t. Complete the table.

Hour	0	1	2	3	4	5
Area (in²)	7	14	28	___	___	___

At which whole hour will you first see at least 200 square inches? Write the exact crossing time as a logarithm.

13 CH. 20

A postage step

Postage costs $3 plus $2 for every 4 ounces or part of 4 ounces. For which positive package weights w, in ounces, is the cost exactly $9? Pay attention to the endpoints.

14 CH. 21

When is the hall big enough?

The first seating row has 7 chairs. Each new row has 3 more chairs than the row before. What is the fewest number of complete rows that can seat 200 people?

15 CH. 22

Two hidden reciprocals

Two nonzero real numbers are reciprocals, and their sum is 5. Without finding either number, determine the sum of their cubes.