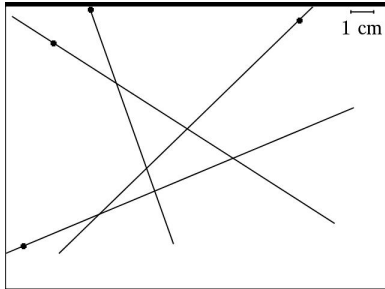


Number of Regions Solution Screen Captures and Solutions to Student Worksheet

1.3



1.4

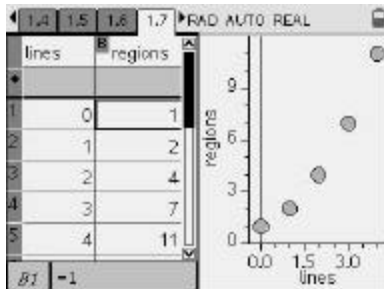
lines	regions
0	1
1	2
2	4
3	7
4	11

1.5 possible solution

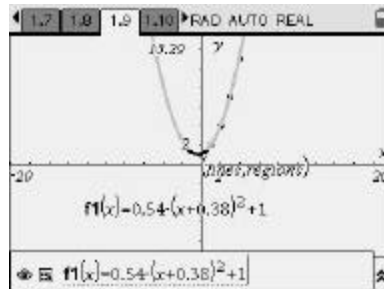
Is this relationship linear? Explain why or why not.

This is not linear. As the number of lines goes up by 1, the maximum number of regions does not increase by a constant amount. The differences on the maximum number of regions are 1, 2, 3, 4. Therefore there is no constant slope/rate of change.

1.7



1.9



1.10 multiple possible solutions – See page 1.9

Hand fit quadratic function

$$f1(x) = 0.54(x + 0.38)^2 + 1$$

1.11 – See page 1.12 for work

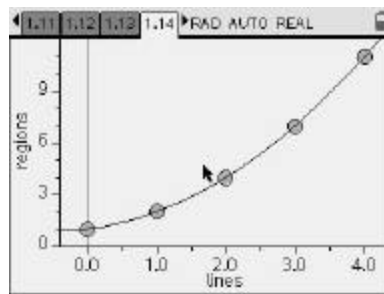
Record the quadratic you got from this regression.

$$f2(x) = 0.5x^2 + 0.5x + 1$$

1.12

lines	regions
0	1
1	2
2	4
3	7
4	11

New 1.14



1.14 multiple solutions – See page 1.9 & 1.10.

Expanded form of $f_1(x) = 0.54x^2 + 0.4104x + 1.07798$

$f_2(x) = 0.5x^2 + 0.5x + 1$

Describe how well your $f_1(x)$ compares to the $f_2(x)$.

Various responses – for the f_1 above, the match is pretty good.

New 1.15

Text	Calculator Display
We want to compare the quadratic you found by handfitting the graph of x^2 to the 4 data points and the quadratic found using regression. Note that to compare them, we	expand($f_1(x),x$) $0.54x^2 + 0.4104x + 1.07798$
	$f_2(x)$ $0.5x^2 + 0.5x + 1$

New 1.16

System of three equations and three unknowns:

$A(1^2) + B(1) + C = 2$	$A + B + C = 2$
$A(2^2) + B(2) + C = 4$	$4A + B + C = 4$
$A(3^2) + B(3) + C = 7$	$9A + B + C = 7$

New 1.17

$\text{rref}\left(\begin{bmatrix} 1 & 1 & 1 & 2 \\ 4 & 2 & 1 & 4 \\ 9 & 3 & 1 & 7 \end{bmatrix}\right)$

$\begin{bmatrix} 1 & 0 & 0 & \frac{1}{2} \\ 0 & 1 & 0 & \frac{1}{2} \\ 0 & 0 & 1 & 1 \end{bmatrix}$

1/99

Record the matrix you entered.

$$\text{rref}\left(\begin{bmatrix} 1 & 1 & 1 & 2 \\ 4 & 2 & 1 & 4 \\ 9 & 3 & 1 & 7 \end{bmatrix}\right)$$

Record the reduced row echelon form of your matrix.

$$\begin{bmatrix} 1 & 0 & 0 & 1/2 \\ 0 & 1 & 0 & 1/2 \\ 0 & 0 & 1 & 1 \end{bmatrix}$$

Record the coefficient solutions to your system below.

$$A = 1/2$$

$$B = 1/2$$

$$C = 1$$

Record the quadratic $Ax^2 + Bx + C = y$ obtained by substituting these values in:

$$\frac{1}{2}x^2 + \frac{1}{2}x + 1 = y$$

How does this quadratic compare to the hand fit quadratic $f1(x)$ and the regression quadratic $f2(x)$ that you found earlier?

It's the same.