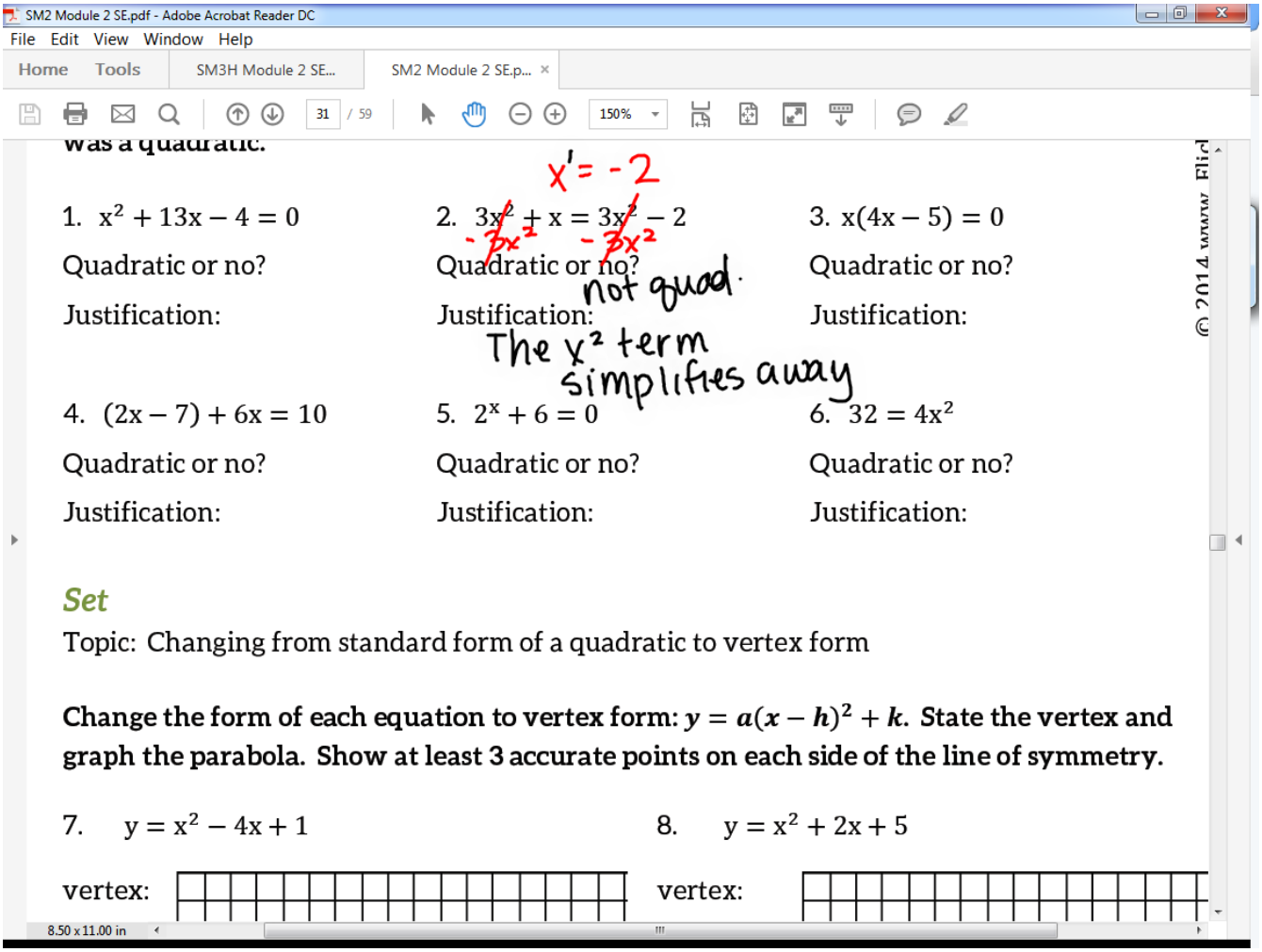
Questions on 2.5 HW? 2.4 HW is due today and there's a quiz...

Oct 4-10:16 AM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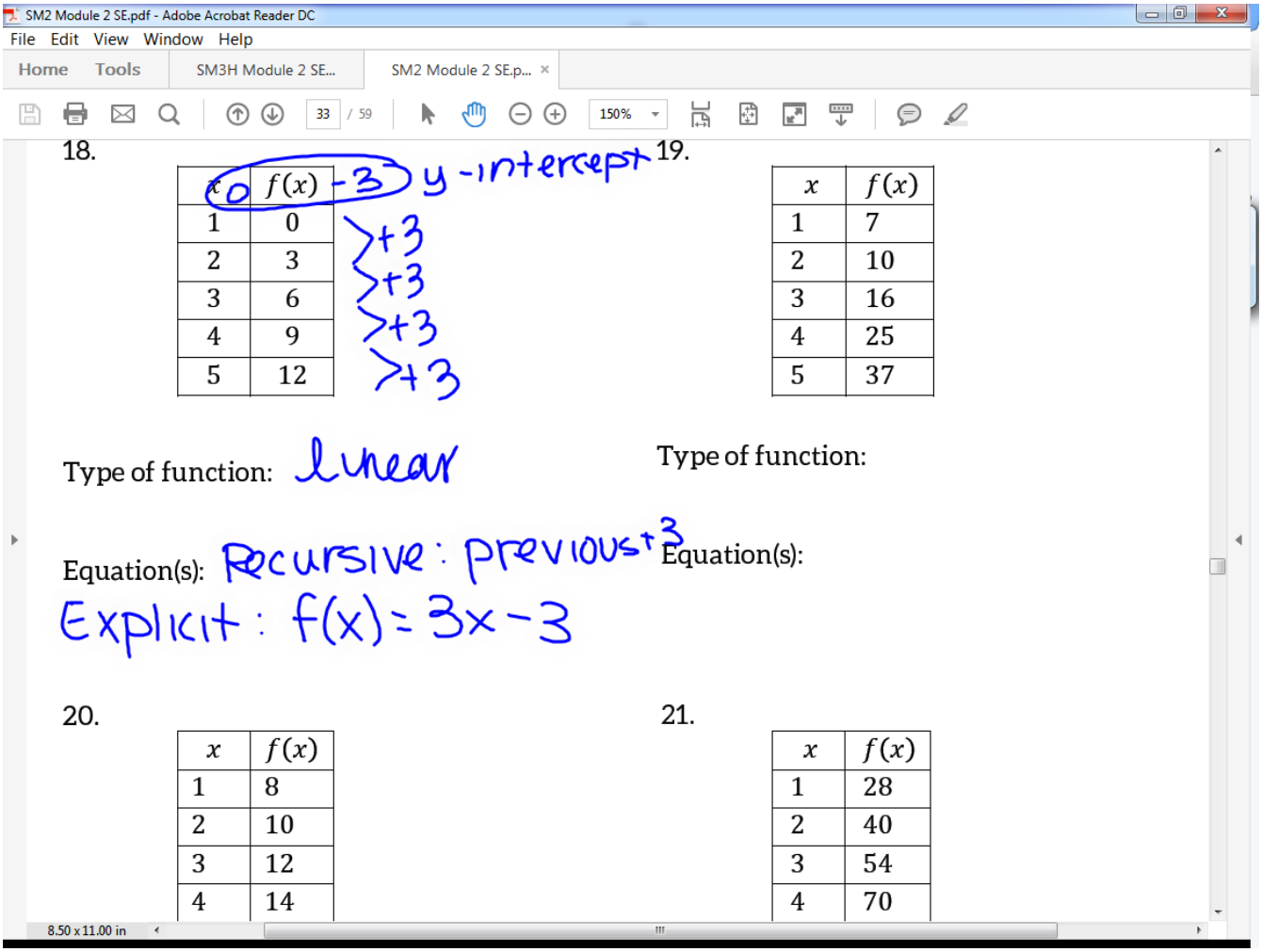
was a quadratic.
1. $x^2 + 13x - 4 = 0$
Quadratic or no?
Justification:
2. $3x^2 + x = 3x^2 - 2$
Quadratic or no?
Justification:
3. $x(4x - 5) = 0$
Quadratic or no?
Justification:
4. $(2x - 7) + 6x = 10$
Quadratic or no?
Justification:
5. $2^x + 6 = 0$
Quadratic or no?
Justification:
6. $32 = 4x^2$
Quadratic or no?
Justification:
Set
Topic: Changing from standard form of a quadratic to vertex form
Change the form of each equation to vertex form: $y = a(x - h)^2 + k$. State the vertex and graph the parabola. Show at least 3 accurate points on each side of the line of symmetry.
7. $y = x^2 - 4x + 1$
vertex:
8. $y = x^2 + 2x + 5$
vertex:
8.50 x 11.00 in

Oct 5-11:36 AM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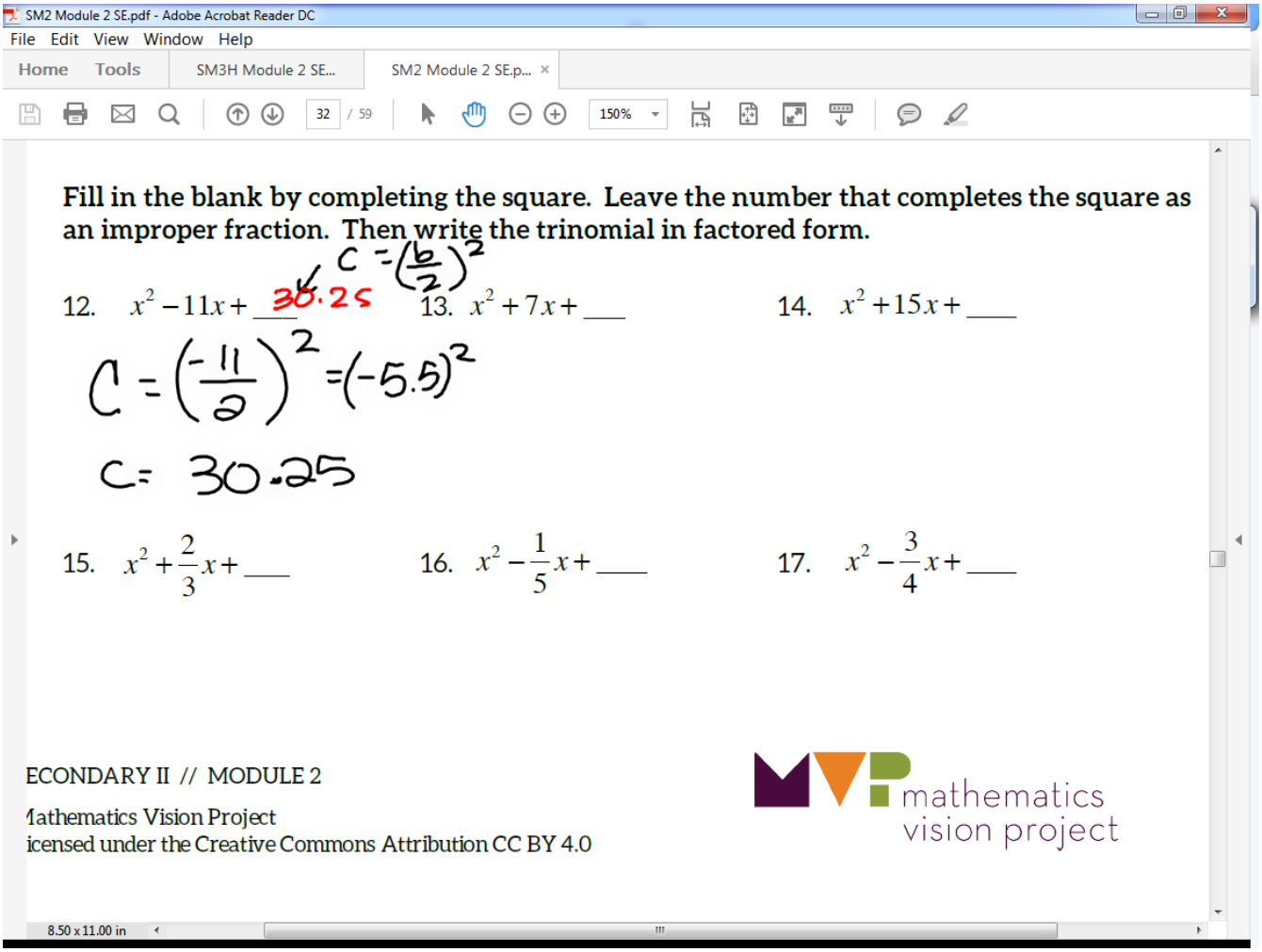
18.
x f(x)
1 0
2 3
3 6
4 9
5 12
-3
y-intercept
+3
+3
+3
+3
Type of function: linear
Equation(s): Recursive: previous+3
Explicit: f(x) = 3x - 3
19.
x f(x)
1 7
2 10
3 16
4 25
5 37
Type of function:
Equation(s):
20.
x f(x)
1 8
2 10
3 12
4 14
21.
x f(x)
1 28
2 40
3 54
4 70
8.50 x 11.00 in

Oct 5-11:39 AM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**Fill in the blank by completing the square. Leave the number that completes the square as an improper fraction. Then write the trinomial in factored form.**

$c = \left(\frac{b}{2}\right)^2$

12. $x^2 - 11x + \_\_\_$ 30.25 13. $x^2 + 7x + \_\_\_$ 14. $x^2 + 15x + \_\_\_$

$c = \left(\frac{-11}{2}\right)^2 = (-5.5)^2$

$c = 30.25$

15. $x^2 + \frac{2}{3}x + \_\_\_$ 16. $x^2 - \frac{1}{5}x + \_\_\_$ 17. $x^2 - \frac{3}{4}x + \_\_\_$

ECONDARY II // MODULE 2

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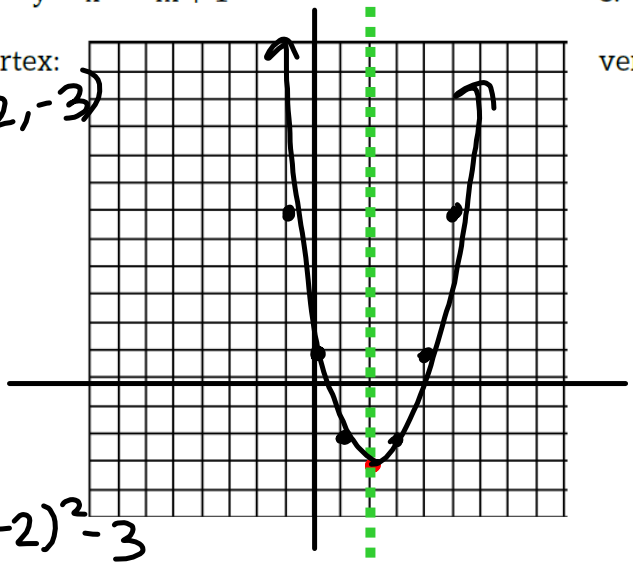
8.50 x 11.00 in

Oct 5-11:43 AM

7. $y = x^2 - 4x + 1$

vertex:

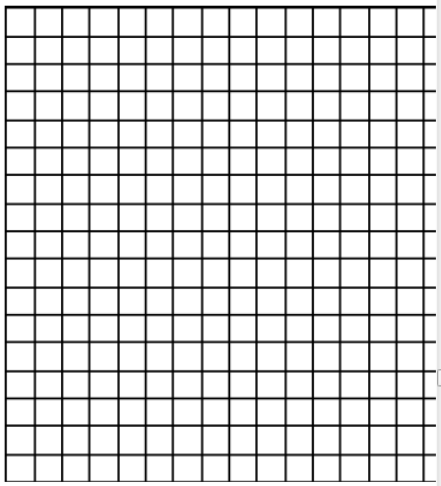
(2,-3)



$(x-2)^2-3$

8. $y = x^2 + 2x + 5$

vertex:





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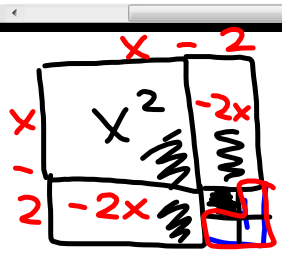
$x^2-4x+1$

not a perfect □.

8.50 x 11.00 in




$x^2-4x+1+3 = 0+3$

$(x-2)^2-3=3$

$(x-2)^2-3=0$

→2 ↓3

# Module 2 Quiz #2: Graphing Quadratics

Determine what c needs to be to "complete the square."

1) $f(x) = x^2 + 6x + \_c\_$

2) $f(x) = x^2 + 14x + \_c\_$

Sep 21-2:28 PM

# 2.5 BE THERE OR BE SQUARE

## *A Practice Understanding Task*

**Quilts and Quadratic Graphs**

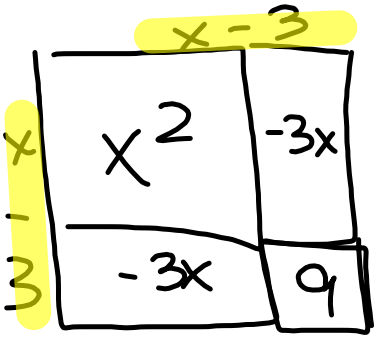
Optima's niece, Jenny works in the shop, taking orders and drawing quilt diagrams. When the shop isn't too busy, Jenny pulls out her math homework and works on it. One day, she is working on graphing parabolas and notices that the equations she is working with looks a lot like an order for a quilt block. For instance, Jenny is supposed to graph the equation: $y = (x-3)^2 + 4$. She thinks, "That's funny. This would be an order where the length of the standard square is reduced by 3 and then we add a little piece of fabric that has as area of 4. We don't usually get orders like that, but it still makes sense. I better get back to thinking about parabolas. Hmmm…"

1. Fully describe the parabola that Jenny has been assigned to graph.

Vertex @ (3,4)
The graph has been translated to the right 3 units and up 4 units. No dilation.

2. Jenny returns to her homework, which is about graphing quadratic functions. Much to her dismay, she finds that she has been given: $y = x^2 - 6x + 9$. "Oh dear", thinks Jenny. "I can't tell where the vertex is or identify any of the transformations of the parabola in this form. Now what am I supposed to do?"

"Wait a minute—is this the area of a perfect square?" Use your work from *Building the Perfect Square* to answer Jenny's question and justify your answer.




Yes, it's a perfect □.

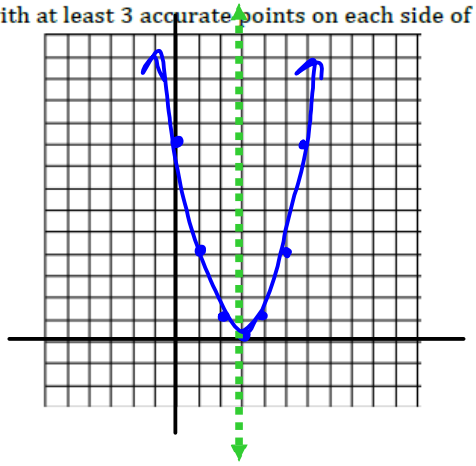
3. Jenny says, "I think I've figured out how to change the form of my quadratic equation so that I can graph the parabola. I'll check to see if I can make my equation a perfect square." Jenny's equation is: $y = x^2 - 6x + 9$.

See if you can change the form of the equation, find the vertex, and graph the parabola.

a. $y = x^2 - 6x + 9$ New form of the equation: $(x-3)^2 + 0$

b. Vertex of the parabola: $(3,0)$

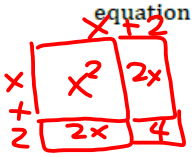
c. Graph (with at least 3 accurate points on each side of the line of symmetry):



4. The next quadratic to graph on Jenny's homework is $y = x^2 + 4x + 2$. Does this expression fit the pattern for a perfect square? Why or why not?

no

a. Use an area model to figure out how to complete the square so that the equation can be written in vertex form, $y = a(x-h)^2 + k$.




add 2

$x^2+4x+2+2=0+2$

$(x+2)^2-2=2-2$

$(x+2)^2-2=0$

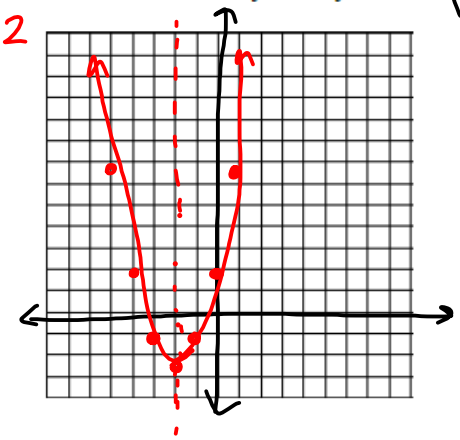
b. Is the equation you have written equivalent to the original equation? If not, what adjustments need to be made? Why?

yes;

c. Identify the vertex and graph the parabola with three accurate points on both sides of the line of symmetry.

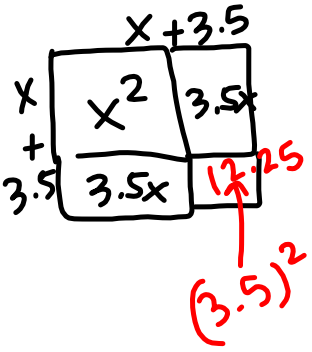
vertex: $(-2,2)$

$(x+2)^2-2$



5. Jenny hoped that she wasn't going to need to figure out how to complete the square on an equation where $b$ is an odd number. Of course, that was the next problem. Help Jenny to find the vertex of the parabola for this quadratic function:

$g(x) = x^2 + 7x + 10$ $=0$




$x^2+7x+10+2.25=0+2.25$

$(x+3.5)^2=2.25$

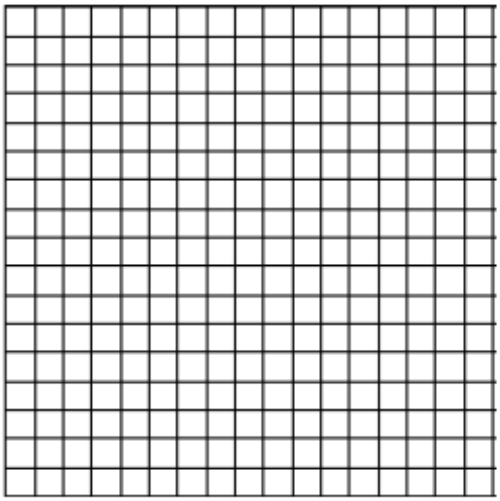
$-2.25 \quad -2.25$

$(x+3.5)^2-2.25=0$

vertex: $(-3.5, -2.25)$

6. Don't worry if you had to think hard about #5. Jenny has to do a couple more:
   a. $g(x) = x^2 - 5x + 3$ b. $g(x) = x^2 - x - 5$

7. It just gets better! Help Jenny find the vertex and graph the parabola for the quadratic function: $h(x) = 2x^2 - 12x + 17$



8. This one is just too cute—you've got to try it! Find the vertex and describe the parabola that is the graph of: $f(x) = \frac{1}{2}x^2 + 2x - 3$

Sep 29-1:17 PM

# 2.6 Factor Fixin'

## *A Develop Understanding Task*

At first, *Optima's Quilts* only made square blocks for quilters and Optima spent her time making perfect squares. Customer service representatives were trained to ask for the length of the side of the block, $x$, that was being ordered, and they would let the customer know the area of the block to be quilted using the formula $A(x) = x^2$.

Optima found that many customers that came into the store were making designs that required a combination of squares and rectangles. So, *Optima's Quilts* has decided to produce several new lines of rectangular quilt blocks. Each new line is described in terms of how the rectangular block has been modified from the original square block. For example, one line of quilt blocks consists of starting with a square block and extending one side length by 5 inches and the other side length by 2 inches to form a new rectangular block. The design department knows that the area of this new block can be represented by the expression: $A(x) = (x + 5)(x + 2)$, but they do not feel that this expression gives the customer a real sense of how much bigger this new block is (e.g., how much more area it has) when compared to the original square blocks.

1. Can you find a different expression to represent the area of this new rectangular block? You will need to convince your customers that your formula is correct using a diagram.

Here are some additional new lines of blocks that *Optima's Quilts* has introduced. Find two different algebraic expressions to represent each rectangle, and illustrate with a diagram why your representations are correct.

2. The original square block was extended 3 inches on one side and 4 inches on the other.

3. The original square block was extended 4 inches on only one side.

4. The original square block was extended 5 inches on each side.

5. The original square block was extended 2 inches on one side and 6 inches on the other.

Mar 28-9:27 AM

Customers start ordering custom-made block designs by requesting how much additional area they want beyond the original area of $x^2$. Once an order is taken for a certain type of block, customer service needs to have specific instructions on how to make the new design for the manufacturing team. The instructions need to explain how to extend the sides of a square block to create the new line of rectangular blocks.

The customer service department has placed the following orders on your desk. For each, describe how to make the new blocks by extending the sides of a square block with an initial side length of $x$. Your instructions should include diagrams, written descriptions and algebraic descriptions of the area of the rectangles in using expressions representing the lengths of the sides.

6. $x^2 + 5x + 3x + 15$

7. $x^2 + 4x + 6x + 24$

8. $x^2 + 9x + 2x + 18$

9. $x^2 + 5x + x + 5$

Mar 28-9:28 AM

Some of the orders are written in an even more simplified algebraic code. Figure out what these entries mean by finding the sides of the rectangles that have this area. Use the sides of the rectangle to write equivalent expressions for the area.

10. $x^2 + 9x + 10$

11. $x^2 + 7x + 10$

12. $x^2 + 9x + 8$

13. $x^2 + 6x + 8$

14. $x^2 + 8x + 12$

15. $x^2 + 7x + 12$

16. $x^2 + 13x + 12$

Mar 28-9:28 AM

17. What relationships or patterns do you notice when you find the sides of the rectangles for a given area of this type?

18. A customer called and asked for a rectangle with area given by: $x^2 + 7x + 9$. The customer service representative said that the shop couldn't make that rectangle. Do you agree or disagree? How can you tell if a rectangle can be constructed from a given area?

# Homework

# Finish 2.6 "Ready, Set, Go"

Mar 28-9:36 AM