hw 1-1 ☐ All ☐ Most ☐ None _______ initials — Name Key

Algebra 1C 8.1.1 Intro to factoring — Date __________ Period ______ Table _______

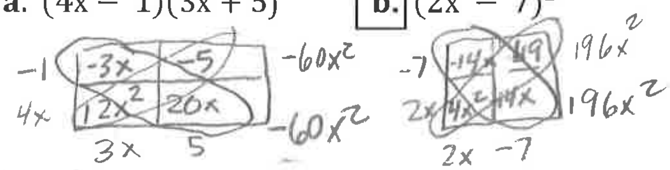
8-6. Write the area of the rectangle at right as a sum and as a product.

$(2x-3)(x+2y-4) = 2x^2 - 11x + 4xy - 6y + 12$

	x	$2y$	-4
-3	$-3x$	$-6y$	12
$2x$	$2x^2$	$4xy$	$-8x$

8-7. Multiply the expressions below using a generic rectangle. Then verify that the product of one diagonal equals the product of the other diagonal.

a. $(4x - 1)(3x + 5)$ **b.** $(2x - 7)^2$



8-8. Review problem 7-108. Write the equation for the following sequences in "first term" form.

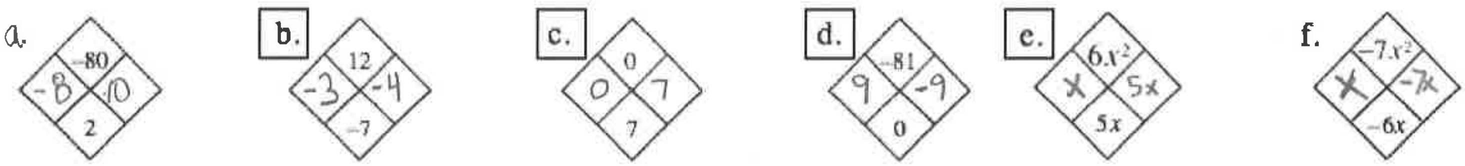
a. 500, 2000, 3500, ... (1500)

$t(n) = 500 + 1500(n-1)$

b. 30, 150, 750, 3750, ... (5)

$t(n) = 30(5)^{n-1}$

8-9. Complete each Diamond Problem below.



8-10. Use the greatest common factor to rewrite each sum as a product.

a. $4x + 8$
Example:
$4(x+2)$

b. $10x + 25y + 5$

$5(2x + 5y + 1)$

c. $2x^2 - 8x$

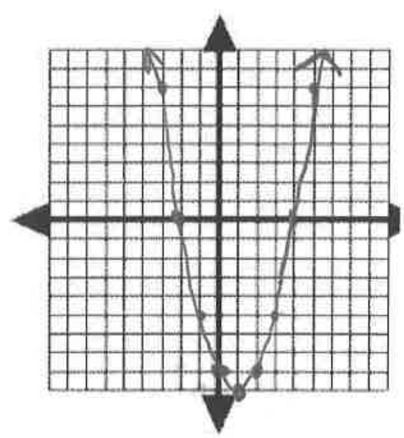
$2x(x-4)$

d. $9x^2y + 12x + 3xy$

$3x(3xy + 4 + y)$

8-11 On graph paper, graph $y = x^2 - 2x - 8$.

x	-3	-2	-1	0	1	2	3	4
y	7	0	-5	-8	-9	-8	-5	0



a. Name the y-intercept. How can you tell by looking at the equation? Why?

(0,-8) because its where x=0 and if x=0 the only term that is not zero is the -8.

b. Name the x-intercepts.

(-2,0) and (4,0) where y=0

c. Find the lowest point of the graph, called the vertex.

(1,-9) is lowest point.

8-12. Calculate the value of each expression below.

a. $5 - \sqrt{36}$

$5 - 6 = -1$

b. $1 + \sqrt{39} \approx 1 + 6.24 \approx 7.24$

c. $-2 - \sqrt{5}$

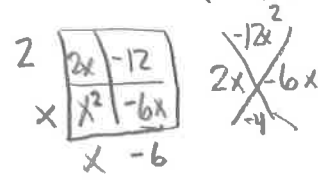
$\approx -2 - 2.24 = -4.24$

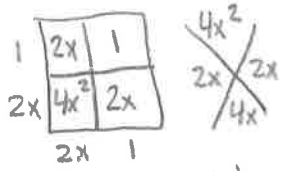
hw 1-2 ☐ All ☐ Most ☐ None _____ initials Name Key

alg 1C 8.1.2a Factoring with generic rectangles Date _____ Period _____ Table _____

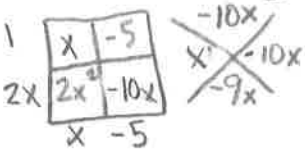
8-17. Use the process you developed in problem 8-14 to factor the following quadratics, if possible.

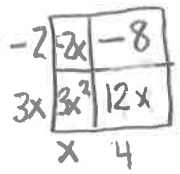
a. $x^2 - 4x - 12 = (x-6)(x+2)$ **b.** $4x^2 + 4x + 1 = (2x+1)(2x+1)$ **c.** $2x^2 - 9x - 5 = (2x+1)(x-5)$ **d.** $3x^2 + 10x - 8 = (3x-2)(x+4)$





Can write this as $(2x+1)^2$

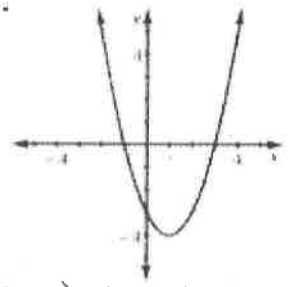




start to try with just generic rectangle if you can.

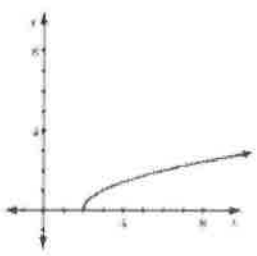
8-18. For each rule represented below, state the x- and y-intercepts, if possible.

a.



(0,-1) (0,3) (-3,0)

b.



(0,2) no y-int

c.

x	-5	-4	-3	-2	-1	0	1	2
y	8	4	0	-4	0	2	0	-4

(-3,0) (0,2) (-1,0)

d. $5x - 2y = 40$

x	y
0	-20
8	0

(8,0) (0,-20)

8-19. Write the equation for the following two sequences in "first term" form.

a. $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \ldots$

$t(n) = \frac{1}{2}\left(\frac{1}{2}\right)^{n-1}$

b. -7.5, -9.5, -11.5, ...

$t(n) = -7.5 - 2(n-1)$

8-20. The value of Bulls Eye stock has decreased 8% each year for the past several years. If in 2010 the stock was worth \$50 and that pattern continues, how much will it be worth in 2015? $y = ab^x$

$b = 1 - .08 = .92$

$a = 50$

$x = 5$

$y = 50(.92)^5 = 32.95$

Bulls Eye stock will be worth \$32.95 in 2015

8-21. Find the point of intersection for each system.

a. $y = 2x - 3$, $x + y = 15$

mult 2

$-2x + y = -3$

$2x + 2y = 30$

$3y = 27$

$y = 9$

$x = 6$

(6,9)

check:

$9 = 12 - 3$

$9 = 9$ ✓

b. $(3x = y - 2) \cdot 2$, $6x = 4 - 2y$

$3x = 2 - 2$

$3x = 0$

$x = 0$

Check $0 = 4 - 4$ ✓

$-6x = 4 - 2y$

$6x = 4 - 2y$

$0 = 8 - 4y$

$4y = 8$

$y = 2$

(0,2)

8-22. Solve each equation below for the given variable, if possible.

a. $\frac{4x}{5} = \frac{x-2}{7}$

$5x - 10 = 28x$

$-10 = 23x$

$x = \frac{-10}{23}$

b. $-3(2b - 7) = -3b + 21 - 3b$

$-6b + 21 = -3b + 21 - 3b$

$-6b = -3b - 3b$

$-6b = -6b$

b = all real number

c. $6 - 2(c - 3) = 12$

$6 - 2c + 6 = 12$

$-2c = 0$

$c = 0$

hw 1-3 ☐ All ☐ Most ☐ None _____ initials Name Key

alg 1C 8.1.2 More Factoring using Generic Rectangles Date _____ Period _____ Table _____

Factor the following quadratic expressions using generic rectangles.

1. $2x^2 - 5x - 3 = (2x+1)(x-3)$

1	x	-3
2x	$2x^2$	-6x
	x	-3

$-6x^2$, $-6x$, $-5x$

2. $3x^2 - 14x - 5 = (3x+1)(x-5)$

-5	-15x	-5
x	$3x^2$	x
	3x	1

draw out diamond if you need to do so

3. $6x^2+11x+4 = (3x+4)(2x+1)$

1	3x	4
2x	$6x^2$	8x
	3x	4

$24x^2$, 3x, 8x, 11x

4. $7x^2 - 9x + 2 = (7x-2)(x-1)$

5. $12x^2 + 5x - 2 = (4x-1)(3x+2)$

-1	-3x	-2
4x	$12x^2$	8x
	3x	2

$-24x^2$, -3x, 8x, 5x

6. $5x^2 + 13x - 6 = (5x-2)(x+3)$

	-6
$5x^2$	

7. ~~$4x^2 + 2x - 2$~~ $2x^2 + x - 1 = (2x-1)(x+1)$

-x	-1
$2x^2$	2x

8. $10x^2 - 11x - 6 = (5x+2)(2x-3)$

2	4x	-6
5x	$10x^2$	-15x
	2x	-3

-60x, 4x, -15x, -11x

hw 1-4 ☐ All ☐ Most ☐ None _____ initials Name Key

alg 1C 8.1.3 factoring special cases Date _____ Period _____ Table _____

8-29. At 3:25 p.m., two trains left Kalamazoo, Michigan. One train traveled westward at a constant rate of 82 miles per hour, while the other traveled eastward at a constant rate of 66 miles per hour. If they are now 111 miles apart, what time is it now? Write and solve an equation (or system of equations) to answer this question.

$111 = 82x + 66x$

$111 = 148x$

$x = \frac{111}{148} = .75$

One hour 148 miles apart

So $\frac{3}{4}$ hour or 45 min. they will be 111 miles apart.

8-30. Remember that a square is a rectangle with four equal sides.

a. If a square has an area of 81 square units, how long is each side?

$x^2 = 81$ $x = 9$ units

$x \cdot x = 81u^2$

b. Find the length of the side of a square with area 225 square units.

$x^2 = 225$

$x = 15$ units

c. Find the length of the side of a square with area 10 square units.

$x = \sqrt{10}$ unit

≈ 3.16

d. Find the area of a square with side 11 units.

$11^2 = 121u^2$

8-33. Solve each equation below for x. Check each solution.

a. $2x - 10 = 0$

$2x = 10$

$x = 5$

$2(5) - 10 = 0$

$10 - 10 = 0$

$0 = 0$ ✓

b. $x + 6 = 0$

$x = -6$

$-6 + 6 = 0$ ✓

c. $(2x - 10)(x + 6) = 0$

$(0)(11) = 0$ ✓ $2x - 10 = 0$ $x - 6 = 0$

$(2)(0) = 0$ ✓ $2x = 10$ $x = 6$

$x = 5$

d. $4x + 1 = 0$

$4x + 1 = 0$

$4x = -1$

$x = -\frac{1}{4}$

$4(-\frac{1}{4}) + 1 = 0$

$-1 + 1 = 0$

e. $x - 8 = 0$

$x - 8 = 0$

$x = 8$

f. $(4x + 1)(x - 8) = 0$

$x = -\frac{1}{4}$ $x = 8$

$(0)(-8\frac{1}{4}) = 0$

$(33)(0) = 0$

Zero-product property

8-31. Factor the following quadratic expressions, if possible.

a. $x^2 - 12x + 20 =$

$(x - 2)(x - 10)$

b. $6x^2 + 17x - 14 =$

$(3x - 2)(2x + 7)$

	$-4x$	-14
$3x$	$6x^2$	$21x$

$2x \quad 7$

$-84x^2$, $-4x$, $21x$, $17x$

c. $x^2 - 8x + 16 =$

$(x - 4)(x - 4) =$

$(x - 4)^2$

Perfect square trinomial

d. $9x^2 - 1 =$ difference of squares

$(3x - 1)(3x + 1)$

	$3x$	-1
$3x$	$9x^2$	$3x$

$3x \quad 1$

$9x^2$, $-3x$, $3x$, 0

e. Parts (a) through (c) are trinomials while part (d) is a binomial, yet they are all quadratics. What makes each of them a quadratic? There is an x^2 term and there is nothing with a higher power. x^2 is the highest power.

8-32. Change each expression into radical form and then give the value. No calculators should be necessary

a. $125^{\frac{2}{3}}$

$(\sqrt[3]{125})^2$

$5^2 = 25$

b. $16^{\frac{1}{2}}$

$\sqrt{16}$

4

c. $16^{-\frac{1}{2}}$

$\frac{1}{\sqrt{16}} = \frac{1}{4}$

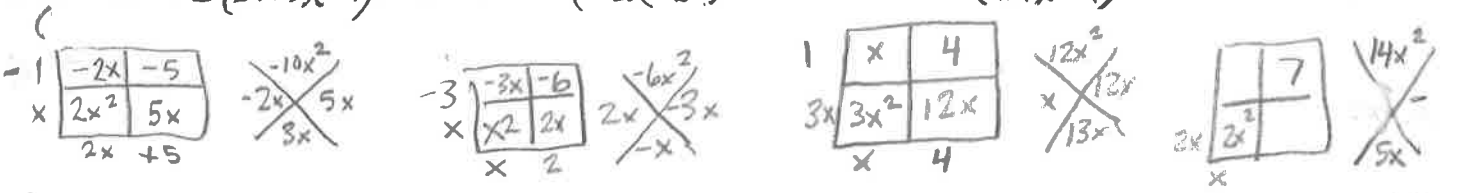
d. $\left(\frac{1}{81}\right)^{\frac{1}{4}} = \frac{1}{\sqrt[4]{81}} = \frac{1}{3}$

hw 1-5 ☐ All ☐ Most ☐ None _____ initials Name Key

alg 1C 8.1.4 Factoring completely Date _____ Period _____ Table _____

8-39. Factor the quadratic expressions below. If the quadratic is not factorable, explain why not.

a. $2x^2 + 3x - 5 = (2x+5)(x-1)$ **b.** $x^2 - x - 6 = (x+2)(x-3)$ **c.** $3x^2 + 13x + 4 = (3x+1)(x+4)$ **d.** $2x^2 + 5x + 7 = (\ X\ )$



not possible
no factors 14
sum to 5

8-40. A sequence starts –3, 1, 5, 9...

a. If you wanted to find the 50th term of the sequence, would an explicit equation or a recursive equation be more useful? Explain Explicit, don't need to know 49th, 48th...

b. Write the equation in "first term" form as you did in problem 7-108.

$t(n) = -3 + 4(n-1)$

c. What is the 50th term of the sequence?

$t(50) = -3 + 4(50-1)$
$= -3 + 4(49)$
$= -588$

d. Write the explicit equation for the sequence $3, 2\frac{2}{3}, 2\frac{1}{3}, 2, 1\frac{2}{3}$... in "first term" form. $d = -\frac{1}{3}$

$t(n) = 3 - \frac{1}{3}(n-1)$

8-41. As Jhalil and Joman practice for the SAT, their scores on practice tests rise. Jhalil's current score is 850, and it is rising by 10 points per week. On the other hand, Joman's current score is 570 and is growing by 50 points per week.

a. When will Joman's score catch up to Jhalil's?

$10x + 850 = 50x + 570$
$-40x = -280$
$x = 7$

Joman's score will catch up at 7 weeks.

b. If the SAT test is in 12 weeks, who will score highest?

Joman's because he catches up at 7 weeks and will surpass Jhalil's score after 7 weeks because his score is growing at a faster rate.

8-42. Mary says that you can find an x-intercept by substituting 0 for x, while Michelle says that you need to substitute 0 for y.

a. Who, if anyone, is correct and why?

Michelle. x-intercepts have a y value that is equal to zero. The x-axis is the line $x = 0$.

b. Use the correct approach to find the x-intercept of $-4x + 5y = 16$.

$-4x = 16$
$x = -4$ $(-4, 0)$

8-43. Find three consecutive numbers whose sum is 138 by writing and solving an equation.

$x + (x+1) + (x+2) = 138$
$3x + 3 = 138$
$3x = 135$
$x = 45$

45, 46, 47 are the numbers

8-44. Match each rule below with its corresponding graph. Can you do this without making any tables? Explain your selections.

a. $y = -x^2 - 2$ **b.** $y = x^2 - 2$ **c.** $y = -x^2 + 2$

1. **2.** **3.**