Algebra 1 - Week 3 & 4 – Raley

Name _____ Per ____

Complete the following packet and return to school by Friday, April 24th. Make sure that you join the Remind for our class so that you may ask questions. Text @sralg20 to 81010 to join. I will post videos on YouTube answering your questions.

N#_____ _____/_____/_____

9-4 Part 1

Factoring to Solve Quadratic Equations

SLG : Students will be able to solve quadratic equations by factoring. They will also understand the Zero-Product Property.

A#_____ ___/___/___

WS 9-4 Part 1

Zero Product Property

If the product of 2 factors is 0, then at least one of the factors must be 0.

ab = 0, so either a or b must equal 0 or they must both equal 0.

E1 Solve $(2d + 6)(3d - 15) = 0$

E2 Solve $3x(x + 2) = 0$

E3 Solve $8b^2 - 40b = 0$

E4 Solve $x^2 = -10x$

Find the Zeros.

E5 $x^2 + 2x - 15 = 0$

E6 $x^2 + 5x = 6$

E7 $17s + s^2 = -52$

E8 $3x^2 + 2x - 16 = 0$

E9 $2x^2 + 3x - 5 = 0$

E10 $8x^2 - 9x - 5 = 4 - 3x$

N#_____ _____/_____/_____

9-4 Part 1

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WS 9-4 Part 1

Zero Product Property

If the product of 2 factors is 0, then at least one of the factors must be 0.

ab = 0, so either a or b must equal 0 or they must both equal 0.

E1 Solve $(2d + 6)(3d - 15) = 0$ $\{3, 5\}$

X—

$2d + 6 = 0$ $\quad 3d - 15 = 0$

$-6 \quad -6$

$\frac{2d}{2} = \frac{6}{2}$ $\quad 3d = 15$

$d = 3$ $\quad d = 5$

E2 Solve $3x(x + 2) = 0$ $\{-2, 0\}$

$3x = 0 \quad x + 2 = 0$

$x = 0 \quad x = -2$

E3 Solve $8b^2 - 40b = 0$ $\{0, 5\}$

$\frac{8b^2}{8b} - \frac{40b}{8b}$

$8b(b - 5) = 0$

$8b = 0 \quad b - 5 = 0$

$b = 0 \quad b = 5$

E4 Solve $x^2 = -10x$ $\{-10, 0\}$

$+10x \quad +10x$

$\frac{x^2}{x} + \frac{10x}{x} = 0$

$x(x + 10) = 0$

$x = 0 \quad x + 10 = 0$

$x = -10$

Find the Zeros. $\{-5, 3\}$

E5 $x^2 + 2x - 15 = 0$

$(x-3)(x+5) = 0$

$3 \qquad -5$

E6 $x^2 + 5x = 6$ $\{-6, 1\}$

$-6 \quad -6$

$x^2 + 5x - 6 = 0$

$(x-1)(x+6) = 0$

$1 \qquad -6$

E7 $17s + s^2 = -52$

$+52 \quad +52$

$s^2 + 17s + 52 = 0$

$(s+4)(s+13) = 0$

$-4 \qquad -13$

$\{-13, -4\}$

E8 $3x^2 + 2x - 16 = 0$

$\left(\frac{3x}{3} - \frac{6}{3}\right)(3x+8) = 0$

$(x-2)(3x+8) = 0$

$2 \qquad \frac{-8}{3}$

$\left\{-\frac{8}{3}, 2\right\}$

E9 $2x^2 + 3x - 5 = 0$

$\left(\frac{2x}{2} - \frac{2}{2}\right)(2x+5) = 0$

$(x-1)(2x+5) = 0$

$1 \qquad \frac{-5}{2}$

$\left\{-\frac{5}{2}, 1\right\}$

E10 $8x^2 - 9x - 5 = 4 - 3x$

$+3x \qquad +3x$

$8x^2 - 6x - 5 = 4$

$-4 \quad -4$

$8x^2 - 6x - 9 = 0$

$\left(\frac{8x}{4} - \frac{12}{4}\right)\left(\frac{8x}{2} + \frac{6}{2}\right) = 0$

$(2x-3)(4x+3) = 0$

$\frac{3}{2} \qquad \frac{-3}{4}$

$\left\{-\frac{3}{4}, \frac{3}{2}\right\}$

WS 9-4 Part 1
Algebra 1

NAME _____
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Solve each equation.

1. $x^2 - 5x + 4 = 0$ {1,4}

2. $x^2 = x + 2$ {-1,2}

3. $x^2 = 9x - 14$ {2,7}

4. $x^2 - 12x + 36 = 0$ {6}

5. $x^2 - 18x = -72$ {6,12}

6. $3x^2 - 2x - 5 = 0$ {-1,5/3}

7. $2x^2 = -21x - 40$ {-8,-5/2}

8. $12x^2 - 15 = -8x$ {-3/2,5/6}

9. $16x^2 - 2x - 3 = 0$ {-3/8,1/2}

N#_____ _____/_____/_____

9-4 Part 2
Factoring to Solve Quadratic Equations

SLG : Students will be able to solve quadratic equations by factoring. They will also understand the Zero-Product Property.

A#_____ _____/_____/_____

WS 9-4 Part 2

Ex 1 Solve: $25x^2 - 4=0$

Ex 2 Solve: $48y^3 = 3y$

Ex 3 Solve: $4x^2 + 36x + 81=0$

Ex 4 Solve: $(b-7)^2 = 36$

Ex 5 Solve: $y^2 + 12y + 36 = 100$

Ex 6 Solve: $\frac{4}{9}x^2 - 9 = 0$

Ex 7 Solve: $64x^2 = 25$

N#_____ _____/_____/_____

9-4 Part 2

Factoring to Solve Quadratic Equations

SLG : Students will be able to solve quadratic equations by factoring. They will also understand the Zero-Product Property.

A#_____ _____/_____/_____

WS 9-4 Part 2

Ex 1 Solve: $\sqrt{25x^2} - \sqrt{4} = 0$ $\left\{-\frac{2}{5}, \frac{2}{5}\right\}$

$(5x + 2)(5x - 2) = 0$

$-\frac{2}{5}$ $\frac{2}{5}$

Ex 2 Solve: $48y^3 = 3y$ $\left\{-\frac{1}{4}, 0, \frac{1}{4}\right\}$

$\frac{48y^3}{3y} - \frac{3y}{3y} = 0$

$3y(\sqrt{16y^2} - \sqrt{1}) = 0$

$3y(4y + 1)(4y - 1) = 0$

$\frac{3y}{3} = \frac{0}{3}$ $-\frac{1}{4}$ $\frac{1}{4}$

$y = 0$

Ex 3 Solve: $\sqrt{4x^2} + 36x + \sqrt{81} = 0$ $\left\{-\frac{9}{2}\right\}$

$\sqrt{(2x + 9)^2} = \sqrt{0}$

$2x + 9 = 0$

$-\frac{9}{2}$

Ex 4 Solve: $\sqrt{(b-7)^2} = \sqrt{36}$ $\{1, 13\}$

$b - 7 = \pm 6$

$b - 7 = 6 \quad b - 7 = -6$

$b = 13 \quad b = 1$

$(b-7)(b-7) = 36$

$b^2 - 7b - 7b + 49 = 36$

$b^2 - 14b + 49 = 36$

$b^2 - 14b + 13 = 0$

$(b-13)(b-1) = 0$

$13 \quad 1$

13, -13×-1, -14

Ex 5 Solve: $y^2 + 12y + 36 = 100$

$-100 \quad -100$

$y^2 + 12y - 64 = 0$

$(y-4)(y+16) = 0$

$4 \quad -16$

$\{-16, 4\}$

-64, -4×16, 12

Ex 6 Solve: $\frac{4}{9}x^2 - 9 = 0$ $\{-\frac{9}{2}, \frac{9}{2}\}$

$\sqrt{4x^2} - \sqrt{81} = 0$

$(2x+9)(2x-9) = 0$

$\frac{-9}{2} \quad \frac{9}{2}$

Ex 7 Solve: $64x^2 = 25$ $\{-\frac{5}{8}, \frac{5}{8}\}$

$-25 \quad -25$

$\sqrt{64x^2} - \sqrt{25} = 0$

$(8x+5)(8x-5) = 0$

$\frac{-5}{8} \quad \frac{5}{8}$

$\sqrt{64x^2} = \sqrt{25}$

$8x = \pm 5$

$\frac{8x}{8} = \frac{5}{8} \quad \frac{8x}{8} = -\frac{5}{8}$

$x = \frac{5}{8} \quad x = -\frac{5}{8}$

N#_____ _____/_____/_____

9-6 The Quadratic Formula & the Discriminant

SLG : Students will be able to solve quadratic equations using the quadratic formula. They will also be able to determine how many real solutions an equation has using the discriminant.

A#_____ _____/_____/_____

PWS 9-6a

Used to solve $ax^2 + bx + c = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Called the discriminant: $\sqrt{b^2 - 4ac}$

If the discriminant is positive there are
If the discriminant is zero there is
If the discriminant is negative there are

Ex 1 $x^2 - 2x - 35 = 0$

Ex 2 $15x^2 - 8x = 4$

Ex 3 $25w^2 + 2 = 15w$

Ex 4 $x^2 - 3x + 5 = 0$

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WS 9-4 Part 2 Factoring to Solve Quadratic Equations

Solve each equation by factoring.

1. $36n^2 = 1$ {-1/6,1/6}

2. $16y^2 = 25$ {-5/4,5/4}

3. $16n^2 + 16n + 4 = 0$ {-1/2}

4. $x^2 + 10x + 25 = 0$ {-5}

5. $p^2 + 2p + 1 = 49$ {-8,6}

6. $16y^2 + 8y + 1 = 0$ {-1/4}

N#_____ _____/_____/_____

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A#_____ _____/_____/_____

PWS 9-6a

Used to solve $ax^2 + bx + c = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Called the discriminant: $\sqrt{b^2 - 4ac}$

If the discriminant is positive there are 2 solutions
If the discriminant is zero there is 1 solution
If the discriminant is negative there are 0 solutions

Ex 1 $x^2 - 2x - 35 = 0$

$a = 1 \quad b = -2 \quad c = -35$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-35)}}{2(1)}$$

$$x = \frac{2 \pm \sqrt{4 + 140}}{2}$$

$$x = \frac{2 \pm \sqrt{144}}{2}$$

$$x = \frac{2 \pm 12}{2}$$

$$x = \frac{2+12}{2} \quad x = \frac{2-12}{2}$$

$$x = 7 \quad x = -5$$

$\{-5, 7\}$

Ex 2 $15x^2 - 8x = 4$

* 2 Decimal Places

$15x^2 - 8x - 4 = 0$

$a = 15 \quad b = -8 \quad c = -4$

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(15)(-4)}}{2(15)}$$

$$x = \frac{8 \pm \sqrt{64 + 240}}{30}$$

$$x = \frac{8 \pm \sqrt{304}}{30}$$

$$x = \frac{8 \pm 17.44}{30}$$

$$x = \frac{8+17.44}{30} \quad x = \frac{8-17.44}{30}$$

$$x = 25.44 \quad x = -9.44$$

$$x = .85 \quad x = -.31$$

$\{-.31, .85\}$

Ex 3 $25w^2 + 2 = 15w$

$25w^2 - 15w + 2 = 0$

$a = 25 \quad b = -15 \quad c = 2$

$$w = \frac{-(-15) \pm \sqrt{(-15)^2 - 4(25)(2)}}{2(25)}$$

$$w = \frac{15 \pm \sqrt{225 - 200}}{50}$$

$$w = \frac{15 \pm \sqrt{25}}{50}$$

$$w = \frac{15 \pm 5}{50}$$

$$w = \frac{\overset{20}{\cancel{15+5}}}{50} \qquad w = \frac{\overset{10}{\cancel{15-5}}}{50}$$

$$w = \frac{2}{5} \qquad w = \frac{1}{5}$$

$$\left\{ \frac{1}{5}, \frac{2}{5} \right\}$$

Ex 4 $x^2 - 3x + 5 = 0$

$a = 1 \quad b = -3 \quad c = 5$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(5)}}{2(1)}$$

$$x = \frac{3 \pm \sqrt{9 - 20}}{2}$$

$$x = \frac{3 \pm \sqrt{-11}}{2}$$

No Solution

$$x = \frac{5 \pm \sqrt{0}}{4}$$

$$x = \frac{5}{4} \qquad \left\{ \frac{5}{4} \right\}$$

Name _____ Class _____ Date _____ A#_____

PWS 9-6a The Quadratic Formula and the Discriminant

Use the quadratic formula to solve each equation. Round answers to the nearest hundredth.

1. $3x^2 + x - 4 = 0$ {2,7} **2.** $3x^2 - 13x + 4 = 0$ {2,7} **3.** $x^2 + 12x = -16$ {2,7}

Find the value of the discriminant <u>and</u> the number of real-number solutions of each equation.

4. $x^2 - 10x + 9 = 0$ D=64, #=2 **5.** $x^2 + 10x + 25 = 0$ D=0, #=1

6. $x^2 + 7x + 5 = 0$ D=29, #=2 **7.** $5x^2 + 11x + 8 = 0$ D=-39, #=0

N#_____ ____/____/____

9-7 Linear, Quadratic, & Exponential Models

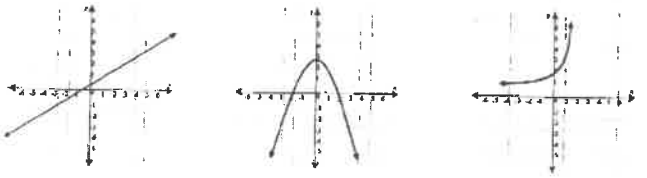
SLG : Students will be able to recognize patterns in functions as linear, quadratic, or exponential from graphs and tables.

A#_____ ____/____/____

PWS 9-7a

Types of Functions

Linear: $y=mx+b$ Quadratic: $y=ax^2+bx+c$ Exponential: $y=ab^x$



Graph each set of points. Which model is most appropriate for each set?

E1 (1,3), (0,0), (-3,3) (-1,-1), (-2,0)

E2 (0,2), (-1,4), (1,1), (2,0.5)

E3 (-1,-2), (0,-1), (1,0), (3,2)

Tables can also show us what kind of function we have. As long as the x values have a common difference you can use the y values to determine the type of function.

Linear

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

Exponential

x	y
-2	.25
-1	.5
0	1
1	2

Quadratic

x	y
-1	1
0	-1
1	1
2	7
3	17

What kind of function is represented in the table? Linear, Exponential, or Quadratic?

E4

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

E5

x	y
0	0
1	-.25
2	-1
3	-2.25
4	-4

E6

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

N#_____ ____/____/____

9-7 Linear, Quadratic, & Exponential Models

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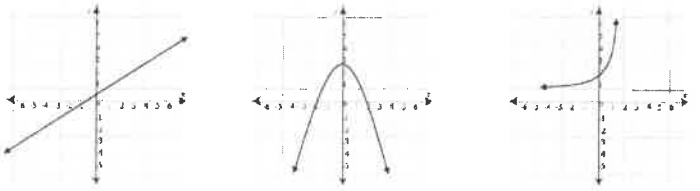
A#_____ ____/____/____

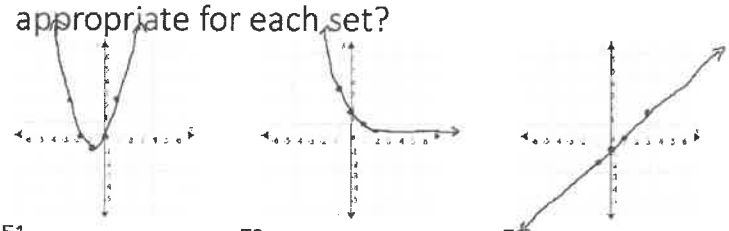
PWS 9-7a

Types of Functions

Linear: $y=mx+b$ Quadratic: $y=ax^2+bx+c$ Exponential: $y=ab^x$



Graph each set of points. Which model is most appropriate for each set?



E1 (1,3), (0,0), (-3,3) (-1,-1), (-2,0)

Quadratic

E2 (0,2), (-1,4), (1,1), (2,0.5)

Exponential

E3 (-1,-2), (0,-1), (1,0), (3,2)

Linear

Tables can also show us what kind of function we have. As long as the x values have a common difference you can use the y values to determine the type of function.

Linear (+ #)

x	y	
-2	-1	+1 → +3
-1	2	+1 → +3
0	5	+1 → +3
1	8	

Constant Rate of Change

(Slope)

Exponential (· #)

x	y	
-2	.25	+1 → ·2
-1	.5	+1 → ·2
0	1	+1 → ·2
1	2	

Constant Ratio

Quadratic

x	y		
-1	1		+1 → -2
0	-1		+1 → +2
1	1		+1 → +6
2	7		+1 → +10
3	17		

Add the same # on 2ND Level

What kind of function is represented in the table? Linear, Exponential, or Quadratic?

E4

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

+1 +1 +1 +1

Exponential

E5

x	y	
0	0	
1	-.25	-.25
2	-1	-.75
3	-2.25	-1.25
4	-4	-1.75

+1 +1 +1 +1

-.5 -.5 -.5

Quadratic

E6

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

+1 +1 +1 +1

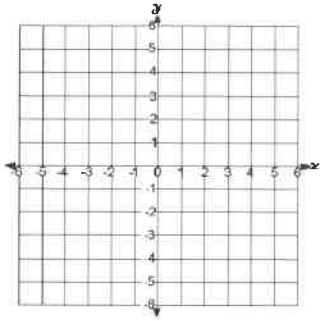
Linear

Name _____ Class _____ Date _____ A#_____

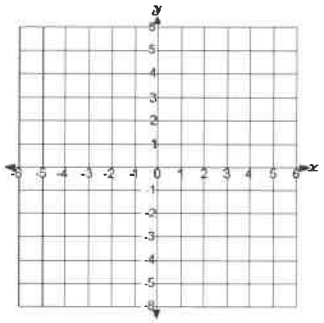
PWS 9-7a Linear, Quadratic, and Exponential Models

Graph each set of points. Which model is most appropriate for each set?

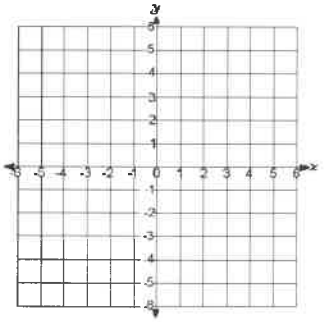
1. (–2, –0.25), (–1, –0.5), (0, –1), (1, –2)



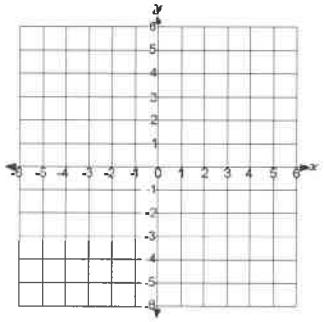
2. (–4, 0), (–2, 2), (0, 3), (2, 2), (4, 0)



3. (–6, 6), (–4, 4), (–2, 2), (0, 0)



4. (–2, 0.25), (–1, 0.5), (0, 1), (1, 2)



Which type of function best models the data in each table?

5.

x	y
0	–2
1	–4
2	–8
3	–16
4	–32

6.

x	y
0	–2
1	–5
2	–8
3	–11
4	–14

7.

x	y
0	1
1	1.5
2	3
3	5.5
4	9

8.

x	y
–2	12
–1	6
0	3
1	1.5
2	0.75

A1 RWSb 9-4, 9-6, & 9-7 **Name** _____ **Date** _____ **Period** ____

Solve each equation. Show ALL work.

1. $2x^2 - 3x = 9$ $\left\{-\frac{3}{2}, 3\right\}$

2. $7x^2 + x = 6x^2 + 20$ $\{-5,4\}$

3. $25x^2 + 20x + 4 = 0$ $\left\{-\frac{2}{5}\right\}$

4. $25x^2 - 16 = 0$ $\left\{-\frac{4}{5}, \frac{4}{5}\right\}$

5. $5x^2 - 17x = -14$ $\left\{\frac{7}{5}, 2\right\}$

6. $-2x^2 + 13x = -15$ $\left\{-1, \frac{15}{2}\right\}$

Find the discriminant. Then find the number of solutions to each equation.

-63, 0 *solutions*

7. $9x^2 - 3x - 8 = -10$

0, 1 *solution*

8. $4x^2 = 8x - 4$

337, 2 *solutions*

9. $-9x^2 - 8x - 1 = x - x^2 - 9$

Solve each equation using the quadratic formula. If necessary, round to the nearest hundredth.

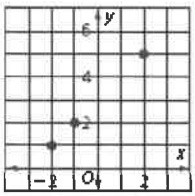
10. $9x^2 - 7x - 4 = 0$ $\{-.38,1.16\}$

11. $8x^2 + 7x - 15 = -7$ $\{-1.53,.65\}$

12. $2x^2 - 7x - 3 = 0$ $\{-.39,3.89\}$

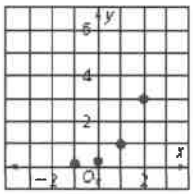
Which model is most appropriate for the data shown in each graph? Exponential, Quadratic, or Linear?

13.



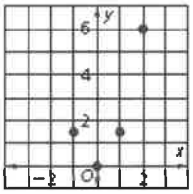
L

14.



E

15.



Q

Which model is most appropriate for the data shown in each table? Exponential, Quadratic, or Linear?

16. Q

x	y
0	5
1	8
2	13
3	20
4	29

17. E

x	y
-1	2
0	10
1	50
2	250
3	1250

18. L

x	y
-4	.9
-3	1.1
-2	1.3
-1	1.5
0	1.7