Name:_____

Per: _____

Due: _____

Algebra I Review

****100 points****

**DIRECTIONS:

1. Complete each page as directed by your HW calendar.
2. Each page has an example or two to help you get started.
3. I will ***stamp*** your page when it is complete.
4. Keep in mind – **ALL** of these topics *could* appear on the final exam.
   ALL of these topics are necessary to know for success in Algebra 2.

Topic 1: Equations - Solve for the variable.

Ex.1: $10 - (r + 3) = 2(r + 5)$

1. $4y - 12y + 3 = -21$

2. $5x + 4 = x + 12$

3. $3(x - 4) - 2(x + 4) = 6$

4. $3.6x + 0.81 = 1.08$

5. $\frac{1}{6}x + \frac{1}{3} = \frac{1}{4}x - \frac{1}{2}$

Topic 2: Proportions - Solve for the variable.

Ex. $\frac{a}{4} = \frac{5}{6}$

6. $\frac{x}{24} = \frac{2}{3}$

7. $\frac{2}{4} = \frac{7}{t}$

8. $\frac{k}{8} = \frac{-2}{5}$

9. $\frac{10}{21} = \frac{8}{2w+1}$

10. $\frac{3h-5}{14} = \frac{12}{5}$

Topic 3: Graphing Lines

A line is a function whose graph is a straight line. Fill in the three forms of a line:

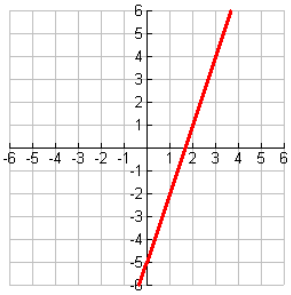
Slope Intercept: _____ Point Slope: _____ Standard: _____

SLOPE

Ways to find slope:

1. From a graph

Ex.1: slope: _____



2. From two points

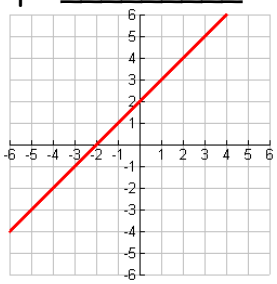
Ex.2: Find the slope of (-3,1) and (2,-5)

3. From the equation

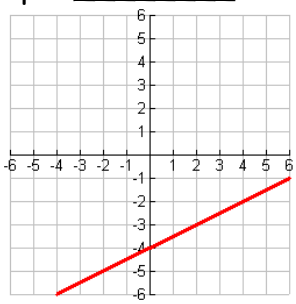
Ex.3: Find the slope of $3y - 5x = -11$

1. Find the slope of each line:

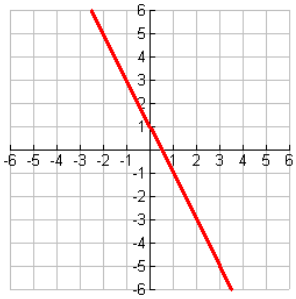
Slope:_____



slope: _____



slope: _____



2. Find the slope between the points:

a. (4, 0) and (-2, -2)

b. (3, -1) and (-7, -1)

c. (2, 3) and (2, -5)

3. Find the slope from the given equation:

a. $y = 4x-7$ m = _____

b. $y - 5 = -\frac{1}{2}(x + 8)$ m = ___

c. $-4x - 3y = 12$ m = ___

Topic 4: Writing Equations Review

Steps:

1. Find the slope.
2. Find a point.
3. Plug into Point slope form.
4. Solve for y.

Parallel lines: _____ slope.

Perpendicular lines: _____slope.

Ex.1: Write the equation of the line that passes through (7, -4) and (-3, 1).

1. Write the equation of the line that passes through (-3, 7) and has a slope of -2.

2. Write the equation for the line containing the point (4,0) and m = $-\frac{3}{4}$.

3. Write the equation for a line containing the points (3,-2) and (0,1).

4. Write the equation of the line containing (-1, 5) and (3, -1).

Ex.2: Write the equation of the line *perpendicular* to y = $-\frac{3}{4}$x + 14 and passes through (4, 0).

5. Write an equation for the line containing (1,2) and *perpendicular* to the line y = 3x – 1.

6. Write the equation of the line that is *parallel* to y=4x-7 and goes through (3, -2).

7. Write the equation for the line containing (-2,-2) and *parallel* to the line 2y + x = 4.

Topic 5: Variation

DIRECT VARIATION	INVERSE VARIATION
EX: The weight (J) of an object on Jupiter varies directly as its weight (E) on Earth. An object that weighs 225lb. on Earth has a weight of 594 lb on Jupiter. What is the weight on Jupiter of an object that has a weight of 115 lb on Earth?	EX. Find an equation of inverse variation where y varies inversely as x. One pair of values is y = 105 when x = 0.6. Then find what y equals when x is 3.
1. Find an equation of direct variation where y varies directly as x. One pair of values is y = 7 when x = 25. Then find what x is when y = 13.	1. Find an equation of inverse variation where y varies inversely as x. One pair of values is y = 45 when x = 20.
2. The number (b) of bolts a machine can make varies **directly** as the time (t) it operates. It can make 6578 bolts in 2 hours. How many bolts can it make in 5 hours?	2. The time (t) required to drive a fixed distance varies inversely as the speed (r). It takes 5 hours at 60 km/h to drive a fixed distance. How long would it take to drive the same distance at 40 km/h?
3. The amount (a) that a family gives to charity varies **directly** as its income (i). Last year, the family earned $32,000 and gave $2560 to charity. How much will they give if they make $42,000 this year?	3. The current (I) in an electrical conductor varies inversely as the resistance (r) of the conductor. The current is 2 amperes when the resistance is 960 ohms. What is the current when the resistance is 480 ohms?

JOINT/COMBINED VARIATION:

1. *d* varies directly as *e* and inversely as *f*. One set of values is *d* = 10 when *e* = 4 and *f* = 2. Find d when *e* = 50 and *f* = 10.

2. The volume (v) of a cone varies jointly as the height (h) of the cone and the area of the base (b). A cone has a volume of 140 with height 15 and base 28. Find the volume of a cone with height 7 and base 12.

Topic 6: Functions

Tables: Function or relation?

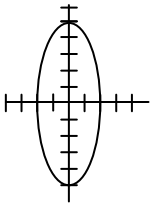
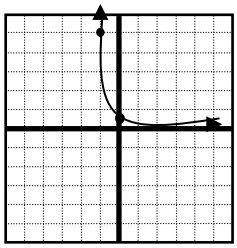
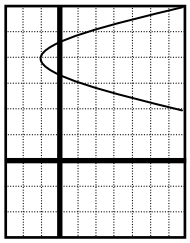
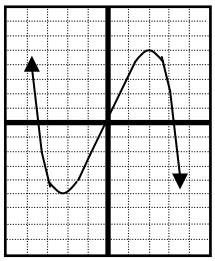
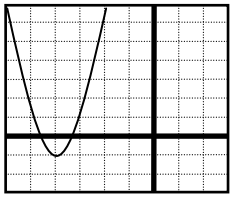
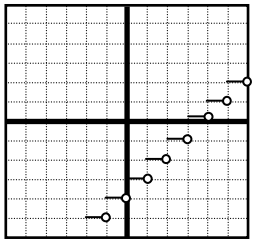
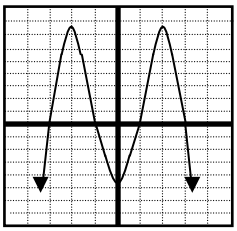
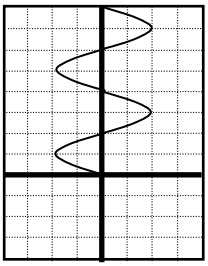
Input x	Output y		Domain x	Range y		Input x	Output y		Domain x	Range y
-2	-3		4	-2		-2	.44		-2	-3
-1	-1		1	-1		-1	.67		-1	-5
0	1		0	0		0	1		1	-1
1	3		1	1		1	1.5		1	-3
2	5		4	2		2	2.25		2	-10
3	7		9	3		3	3.37		3	-2
4	9		16	4		4	5.06		3	-8

_____ _____ _____ _____

Sets of Pairs: Function or Relation?

1. {(4,0), (3,3), (4,-6)} 2. {(2,3),(4,5),(-1,0)} 3. {(3, 0),(-2, 1),(3, -1)}

Graphs: Function or Relation? Use the _____.

Function Notation:

Ex.1: $f(x) = 2x^2 - 3x + 2$ find f(0), f(-1), f(2)

1. $f(x) = -x + 4$ find f(-1), f(2), f(5)

2. $g(x) = |x| - 3$ find f(-3), f(-2), f(2)

Topic 7: POLYNOMIALS

Add/Subtract	Multiply	Factor
Ex: $(3x^3+2x^2-5x+1)+(-4x^3+2x^2-3x+5)$	Ex: $(x+3y)(x-2y)$	Ex: $2x^4 + 8x^3 + 6x^2$
1. $(3x^2-2)+(15x-3)$	1. $(x+5)(x-2)$	1. $4y^2+22y+24$
2. $(-5y^7+4y^4-6)+(3y^7+2y^4+3y^3)$	2. $(5x-4)(x+3)$	2. $5x^2+13x-6$
3. $(5x^4+3x^3-2x^2)-(-3x^4-5x^3+2x)$	3. $(x^2-x)(x^3+x^2-x)$	3. $2x^2-50$
4. $(4x^2-5x)-(3x^2-7)+(2x+9)$	4. $(x^2+1)(3x^2-2x+5)$	4. $m^4+8m^3+8m^2+64m$

Topic 8: Square Roots

Evaluate.

Ex: $-\sqrt{49}$ = _____ 1. $\sqrt{121}$ 2. $-\sqrt{36}$ 3. $\sqrt{144}$ 4. $-\sqrt{64}$

What has to be true about a square root in order for it to be a real number?

_____

5. Which expressions will result in a real number if x = -2?

a. $\sqrt{x-5}$ b. $\sqrt{9-2x}$ c. $\sqrt{-4x-1}$ d. $\sqrt{2x-9}$

6. If $\sqrt{14}$ is irrational and $-\sqrt{16}$ is rational, determine whether the following are "R" or "I".

a. $-\sqrt{54}$ b. $\sqrt{50}$ c. $\sqrt{100}$ d. $-\sqrt{12}$

Simplify.

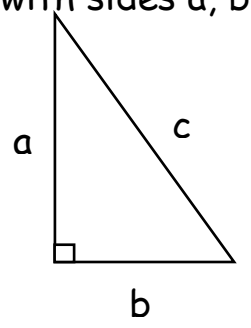
Ex. $\sqrt{72x^3}$ 7. $\sqrt{12x^3y^2}$ 8. $\sqrt{(x+2)^9}$ 9. $3\sqrt{40x^5y^3}$ 10. $\sqrt{48}$

Multiply	Divide	Rationalize	Add/Subtract
Ex. $\sqrt{4x^8}\cdot\sqrt{49y^2}$	Ex. $\dfrac{\sqrt{54w^2y}}{\sqrt{9wy}}$	Ex. $\sqrt{\dfrac{2}{5}}$	Ex. $\sqrt{9x}+\sqrt{25x}$
1. $\sqrt{10}\cdot\sqrt{60}$	1. $\dfrac{\sqrt{12x^2v}}{\sqrt{6xv}}$	1. $\dfrac{8}{\sqrt{5}}$	1. $8\sqrt{a}+12\sqrt{a}$

Multiply	Divide	Rationalize	Add/Subtract
2. $\sqrt{14ab^3}\cdot\sqrt{21a^5b}$	2. $\sqrt{\frac{y^2}{9}}$	2. $\frac{\sqrt{12}}{\sqrt{2}}$	2. $\sqrt{18}-3\sqrt{8}+\sqrt{50}$
3. $2\sqrt{xy}\cdot 5\sqrt{20x^3y^2}$	3. $-\sqrt{\frac{5x^5}{125x}}$	3. $\frac{\sqrt{9}}{\sqrt{8}}$	3. $7\sqrt{45}+4\sqrt{5}$

Topic 9: *The Pythagorean Theorem*: In a right triangle with sides a, b and *hypotenuse* c,

$$a^2 + b^2 = c^2$$



Ex.: $a=\sqrt{5}, \quad b=?, \quad c=6$

1. $a=7, \quad b=7, \quad c=?$

2. $a=?, \quad b=1, \quad c=\sqrt{2}$

3. A cable 20 feet long runs from the top of a utility pole to a point on the ground 13 feet from the base of the pole. How tall is the utility pole?

4. In a right triangle, the length of the hypotenuse is 15 and the length of one leg is 14. Find the length of the other leg.

Topic 10: Graphing Parabolas

1. The graph of $y = \frac{1}{2}x^2 + 2x + 2$ will be a (*smile* or *frown*).

2. The graph of $y = 3x^2 - 2$ will be (*narrower* or *wider*) than $y = x^2$.

3. The graph of $y = \frac{1}{2}x^2 - 7$ will have a shift (*up* or *down*).

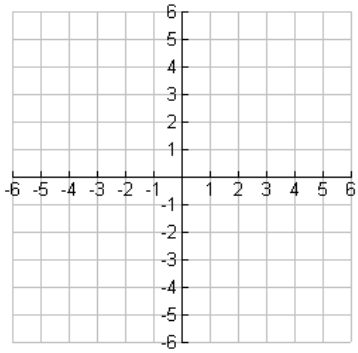
4. We use $-\frac{b}{2a}$ to find the (*intercepts* or *vertex* or *solutions*).

Ex.: Graph $y = -x^2 + 4x + 1$

a = ____ → _____

c = ____ → _____

x	y

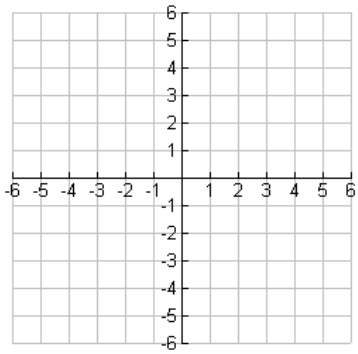


1. Graph $f(x) = 3x^2 - 6x + 2$

a = ____ → _____

c = ____ → _____

x	y

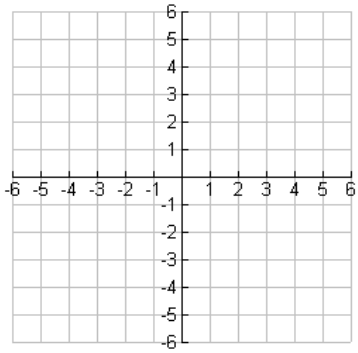


2. Graph $y = x^2 - 2x - 3$

a = ____ → _____

c = ____ → _____

x	y

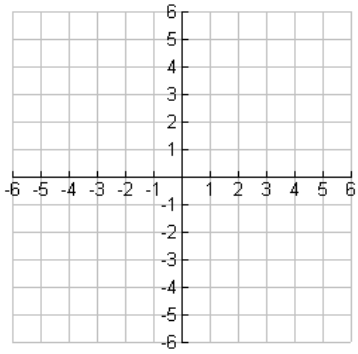


3. Graph $f(x) = -2x^2 - 4x + 1$

a = ____ → _____

c = ____ → _____

x	y



Topic 11: Solving Quadratic Equations

Finding Intercepts/roots/zeros

Is the function quadratic?
If so, what method should we choose?

Factorable

no bx term
(b = 0) or $(x - h)^2 = c$

a = 1

any

Find the roots (x-intercepts, solutions, zeros) using the given method. If you solve them both correctly, your answers should be the same.

1. $x^2 - 10x - 24 = 0$

a) *Factor:*

b) *Complete the Square:*

1. _____

2. $x^2 + 12x + 32 = 0$

a) *Quadratic Formula:*

b) *Complete the Square:*

2. _____

3. $3x^2 + 14x - 5 = 0$

a) *Factor:*

b) *Quadratic Formula:*

3. _____

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

(your choice)

a) _____ **b)**_____ **4.** _____

5. $6y^2 - 15 = -y$

(your choice)

a) _____ **b)**_____ **4.** _____

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

(your choice)

a) _____ **b)**_____ **4.** _____

What is the equation to find the discriminant? _____

Find the Discriminant and determine how many solutions the quadratic equation has.

7. $4q^2 - 2q + 5 = 0$ 8. $t^2 - 6t + 9 = 0$ 9. $x^2 + 6x + 7 = 0$

Discriminant _____ _____ _____

# of solutions _____ _____ _____

Final Exam Mixed Review

**The following pages are mixed review of Algebra C material. The questions are very similar to the final exam problems (except they are not multiple choice!)

1-4: Add or subtract the following fractions.

1. $\frac{3}{8}-\frac{3}{4}$ **2.** $\frac{5}{12}+\frac{1}{6}$

1. _____ **(2.3)**

2. _____ **(2.3)**

3. $\frac{3}{14}\times\frac{6}{7}$ **4.** $\frac{3}{5}\div\frac{9}{11}$

3. _____ **(2.5)**

4. _____ **(2.6)**

5-6: Solve the following equations.

5. $6x-4=x-3$ **6.** $y+7=3(2y-2)$

5. _____ **(3.5)**

6. _____ **(3.5)**

7-8: Multiply the following binomials.

7. $(x-4)(x+8)$ **8.** $(a-7)^2$

7. _____ **(5.9)**

8. _____ **(5.10)**

9-12: Factor the following polynomials.

9. $9x^2-16y^2$ **10.** $x^2-11x+18$

9. _____ **(6.2)**

10. _____ **(6.4)**

11. $6m^2-5m-6$ **12.** x^3-21x^2+x-3

11. _____ **(6.5)**

12. _____ **(6.6)**

13-14: Multiply or divide the following rational expressions.

13. $\frac{x^2}{x-9}\cdot\frac{x^2-15x+54}{x^2+9x}$ **14.** $\frac{x+5}{x-5}\div(x^2-25)$

13. _____ **(10.2)**

14. _____ **(10.3)**

15-16: Add or subtract the following rational expressions.

15. $\dfrac{-3x+5}{x^2-9}-\dfrac{-2x+2}{x^2-9}$ **16.** $\dfrac{3}{k^2-9}+\dfrac{7}{k-3}$

15. _____ (10.4)

16. _____ (10.5)

17-18: Solve the following rational equations.

17. $\dfrac{y+7}{y-8}=\dfrac{y-2}{y+1}$ **18.** $\dfrac{1}{5x}-\dfrac{4}{x}=-2$

17. _____ (10.6)

18. _____ (10.6)

19-20: Divide.

19. $\dfrac{20x^3y^3+25xy^2+5x^2y^2}{5xy}$ **20.** $\dfrac{\frac{a^4}{8}}{\frac{a}{2}}$

19. _____ (10.9)

20. _____ (10.10)

21-22: Simplify the following radical expressions.

21. $\sqrt{24}$ **22.** $\sqrt{50}$

21. _____ (11.3)

22. _____ (11.3)

23-24: Multiply the following radical expressions.

23. $\sqrt{4x^5y}\cdot\sqrt{12xy^4}$ **24.** $\sqrt{20x^5y}\cdot\sqrt{6xy^2}$

23. _____ (11.4)

24. _____ (11.4)

25-26: Divide the following radical expressions.

25. $\dfrac{\sqrt{27y^2b}}{\sqrt{3yb}}$ **26.** $\dfrac{15}{\sqrt{7}}$

25. _____ (11.5)

26. _____ (11.5)

27-28: Add or subtract the following radical expressions.

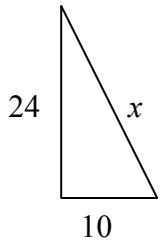
27. $\sqrt{75}+\sqrt{108}$ **28.** $6\sqrt{7}+5\sqrt{7}-4\sqrt{7}$

27. _____ (11.6)

28. _____ (11.6)

29-30: Use the Pythagorean Theorem to solve for x.

29.



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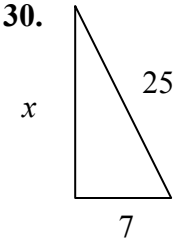


29. _____ (11.7)

30. _____ (11.7)

31-32: Solve the following radical equations.

31. $\sqrt{4x-1}=\sqrt{3x+5}$ **32.** $\sqrt{y+20}=y$

31. _____ (11.9)

32. _____ (11.9)

33-34: Find the range of the following functions.

33. Find the range of $y=-x^2+3x$ when the domain is {-2, 0, 2}?

33. _____ (12.1)

34. Find the range of the relation {(-2, 3), (-1, -3), (5, 6)}.

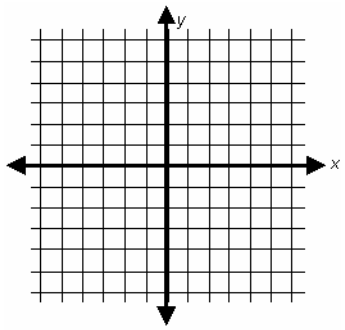
34. _____ (12.1)

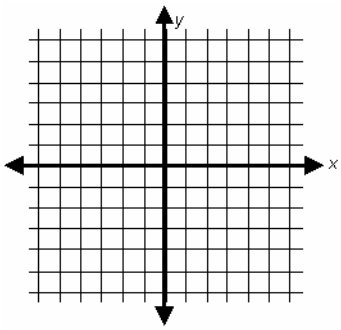
35-36: Graph the following functions.

35. $f(x)=2x+1$ **36.** $f(x)=x^2-3$

35. (12.2)

36. (12.4)





37-38: Solve the following variation problems.

37. The wattage rating of an appliance, W, varies ***directly*** as the square of the current, I, **and** the resistance, R. If the wattage is 3 watts when the current is 0.1 ampere and the resistance is 300 ohms, find the wattage when the current is 0.2 ampere and the resistance is 50 ohms.

37. _____ (12.7)

38. Find the quantity indicated when V varies ***directly*** with d and ***inversely*** with the square of e. If $V = 2$ when $d = 4$ and $e = 4$, find V when $d = 10$ and $e = 11$. Round your answer to the nearest hundredth.

38. _____ (12.7)

39-40: Solve the following quadratic equations by using any method.

39. $5x^2 - 7x = 0$

40. $x^2 + 7x + 10 = 0$

39. _____ (13.1)

40. _____ (13.1)

41-48: Solve the following quadratic equations by using any method.

41. $(x+8)^2 = 4$

42. $x^2 + 6x + 2 = 0$

41. _____ (13.2)

42. _____ (13.3)

43. $x^2 + 10x = 3$

44. $5x^2 + 8x + 2 = 0$

43. _____ (13.3)

44. _____ (13.4)

45. $3x^2 - 8x + 5 = 0$

46. $\frac{x^2}{4} - \frac{x}{2} = \frac{3}{4}$

45. _____ **(13.4)**

46. _____ **(13.5)**

47. $\frac{1}{x+2} + \frac{5}{x} = 1$

48. $\sqrt{k+16} + 4 = k$

47. _____ **(13.5)**

48. _____ **(13.6)**

49-50: Use the discriminant to find the number of real solutions.

49. $-4x^2 - 3x + 5 = 0$

50. $x^2 + 2x + 1 = 0$

49. _____ **(13.4)**

50. _____ **(13.4)**

1. $-\frac{3}{8}$
2. $\frac{7}{12}$
3. $\frac{9}{49}$
4. $\frac{11}{15}$
5. $\frac{1}{5}$
6. 2
7. $x^2 + 4x - 32$
8. $a^2 - 14a + 49$
9. $(3x + 4y)(3x - 4y)$
10. $(x - 9)(x - 2)$
11. $(3m + 2)(2m - 3)$
12. $(x - 3)(7x^2 + 1)$
13. $\frac{x(x-6)}{x+9}$
14. $\frac{1}{(x-5)^2}$
15. $\frac{-1}{x+3}$
16. $\frac{7k+24}{(k+3)(k-3)}$
17. $\frac{1}{2}$
18. $\frac{19}{10}$
19. $4x^2y^2 + 5y + xy$
20. $\frac{a^3}{4}$
21. $2\sqrt{6}$
22. $5\sqrt{2}$
23. $4x^3y^2\sqrt{3y}$
24. $2x^3y\sqrt{30y}$
25. $3\sqrt{y}$
26. $\frac{15\sqrt{7}}{7}$
27. $11\sqrt{3}$
28. $7\sqrt{7}$
29. 26
30. 24
31. 6
32. 5, -4
33. {-10, 0, 2}
34. {3, -3, 6}
35. graph
36. graph
37. 2
38. 0.66
39. $0, \frac{7}{5}$
40. -5, -2
41. -6, -10
42. $-3 \pm \sqrt{7}$
43. $-5 \pm 2\sqrt{7}$
44. $\frac{-4 \pm \sqrt{6}}{5}$
45. $1, \frac{5}{3}$
46. 3, -1
47. -7
48. 9
49. 2 Real #'s
50. 1 Real #'s