Name: _____ Date: _____
PC Ms. Loughran

Do Now:
Factor each of the following completely.

1. $16r^4s + 2rs^4$

$2rs(8r^3 + s^3)$

$2rs(2r+s)(4r^2 - 2rs + s^2)$

2. $16m^4 - 81$

$(4m^2 - 9)(4m^2 + 9)$

$(2m+3)(2m-3)(4m^2+9)$

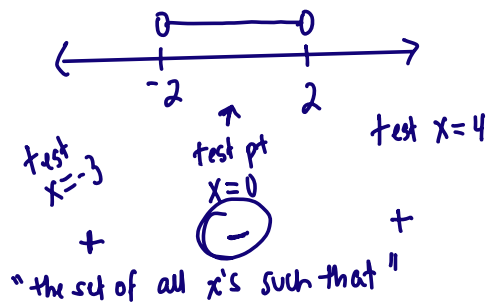
Name:_____ Date:_____

PC: Solving Non-Linear Inequalities Ms. Loughran

For each inequality below, express its solution set 3 ways:
(a) As a number line. (graphically)
(b) Using set-builder notation. SB
(c) Using interval notation. IN

1. $(x+2)(x-2)<0$ negative

a)



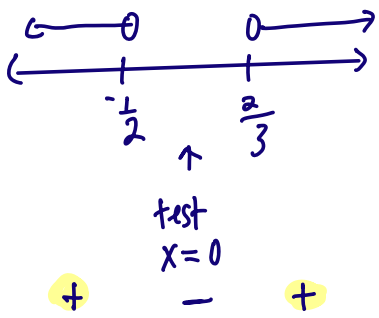
"the set of all x's such that"

b) SB: $\{x \mid -2 < x < 2\}$

c) IN: $(-2, 2)$

3. $(2x+1)(3x-2)>0$ positive

a)



b) SB: $\{x \mid x > 2/3 \text{ or } x < -\frac{1}{2}\}$

c) IN: $(\infty, -\frac{1}{2}) \cup (\frac{2}{3}, \infty)$

5. $20 - c - c^2 \geq 0$

$-c^2 - c + 20 \geq 0$

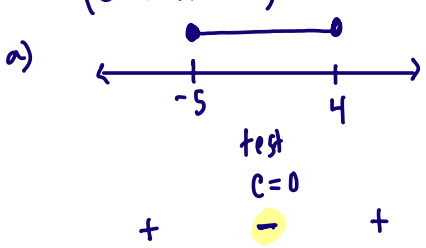
$\frac{-(c^2 + c - 20)}{-1} \geq \frac{0}{-1}$

* When you divide or multiply by a negative #, remember to flip the inequality sign *

$c^2 + c - 20 \leq 0$

$(c+5)(c-4) \leq 0$

a)



follow the inequality sign you got after factoring

b) $\{c \mid -5 \leq c \leq 4\}$

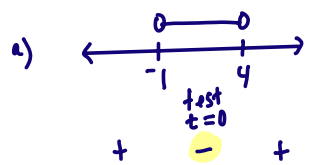
c) $[-5, 4]$

8. $2t^2 - 6t - 8 < 0$

$2(t^2 - 3t - 4) < 0$

$2(t-4)(t+1) < 0$ negative

a)



b) SB: $\{t \mid -1 < t < 4\}$

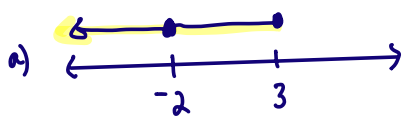
c) IN: $(-1, 4)$

13. $3(u^2-u) \geq u^2+9$

18. $(x-3)(2-x)(x+2) \geq 0$

20. $(x-3)(x+2)^2 \leq 0$

a)



test $x=-3$ test $x=0$ test $x=4$

$-$ $-$ $+$

22. $4x^3 \geq 4x^2+24x$

Classwork/Homework 09-12

a^2-121b^4

① $(a-11b^2)(a+11b^2)$

$8-27a^3$

② $(2-3a)(4+6a+9a^2)$

③ $a^2+2b-2a-ab$

$a^2-ab+2b-2a$

$a(a-b)-2(a-b)$

$(a-2)(a-b)$

④ $x^2-y-x+xy$

$x^2-x+xy-y$

$x(x-1)+y(x-1) \rightarrow (x+y)(x-1)$

⑤ $7x^3+7h^3$

$7(x^3+h^3)$

$7(x+h)(x^2-xh+h^2)$

⑥ $40ab^3-5a^4$

$5a(8b^3-a^3)$

$5a(2b-a)(4b^2+2ab+a^2)$

⑦ $5x^2+31x+6$

$5x^2+30x+x+6$

$5x(x+6)+1(x+6) \rightarrow (5x+1)(x+6)$

(8) $8x^2-16x+6$

$2(4x^2-8x+3)$

$2(4x^2-6x-2x+3)$

$2(2x(2x-3)-1(2x-3))$

$2(2x-1)(2x-3)$

(9) $12a^2-25a+12$

$12a^2-16a-9a+12$

$4a(3a-4)-3(3a-4)$

$(4a-3)(3a-4)$

(10) $15(2x+1)^2+(2x+1)-2$

let $y=2x+1$

$15y^2+y-2$

$15y^2+6y-5y-2$

$3y(5y+2)-1(5y+2)$

$(3y-1)(5y+2)$

$(3(2x+1)-1)(5(2x+1)+2)$ (6x+3, 10x+5)

$(6x+2)(10x+7) = 2(3x+1)(10x+7)$

(11) $3p^2-7p-6$

$3p^2-9p+2p-6$

$3p(p-3)+2(p-3)$

$(3p+2)(p-3)$

(12) $6x^2+7x-10$

$6x^2+12x-5x-10$

$6x(x+2)-5(x+2)$

$(6x-5)(x+2)$

(13) $4t^2-9t+6$

prime

(14) $2(x^2-7)^2-3(x^2-7)-2$

let $y=x^2-7$

$2y^2-3y-2$

$2y^2-4y+y-2$

$2y(y-2)+1(y-2)$

$(2y+1)(y-2)$

$(2(x^2-7)+1)(x^2-7-2)$

$(2x^2-14+1)(x^2-9)$

$(2x^2-13)(x-3)(x+3)$

15) $(x^3-2)^2-3(x^3-2)-18$

let $y = x^3-2$

$y^2-3y-18$

$(y-6)(y+3)$

$(x^3-2-6)(x^3-2+3)$

$(x^3-8)(x^3-1)$

$(x-2)(x^2+2x+4)(x-1)(x^2+x+1)$

16) p^5q-pq

$pq(p^4-1)$

$pq(p^2-1)(p^2+1)$

$pq(p-1)(p+1)(p^2+1)$

17) $xy+2-2y-x$

$xy-x-2y+2$

$x(y-1)-2(y-1)$

$(x-2)(y-1)$

~~18)~~ $x^2-6x+9-4y^2$

$(x-3)^2-4y^2$

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

~~19)~~ $z^2+2z+1-w^2$

$(z+1)^2-w^2$

$(z+1-w)(z+1+w)$

~~20)~~ x^2-y^2+2y-1

$x^2-(y^2-2y+1)$

$x^2-(y-1)^2$

$(x-(y-1))(x+(y-1))$

$(x-y+1)(x+y-1)$

~~21)~~ a^2-b^2-4b-4

$a^2-(b^2+4b+4)$

$a^2-(b+2)^2$

$(a-(b+2))(a+(b+2))$

$(a-b-2)(a+b+2)$

22) $81x^8-16y^4$

$(9x^4-4y^2)(9x^4+4y^2)$

$(3x^2-2y)(3x^2+2y)(9x^4+4y^2)$

~~(2)~~ $x^2 - y^2 - 5x + 5y$

$(x-y)(x+y) - 5(x-y)$

$(x-y)(x+y-5)$