MATH 032077 Step

use for → co-Requisite Courses 134, 1332, 144L

(1) $4x - 7 < 8x + 13$

$4x - 7 + 7 < 8x + 13 + 7$

$4x < 8x + 20$

$4x - 8x < 8x + 20 - 8x$

$-4x < 20$

$\frac{-4x}{-4} > \frac{20}{-4}$

divide by -4 at turn the allisgator around

$x > -5$

$(-5, \infty)$

2. $f(x) = |x+2|$

$f(4) = |(4)+2|$

$f(4) = |4+2|$

$f(4) = |6|$

$f(4) = 6$ ✓

$f(-5) = |(-5)+2|$

$f(-5) = |-5+2|$

$f(-5) = |-3|$

$f(-5) = 3$ ✓

$f(0) = |(0)+2|$

$f(0) = |0+2|$

$f(0) = |2|$

$f(0) = 2$ ✓

3. $h(x) = 6x^2 - 3$

$h(-3) = 6(-3)^2 - 3$

$h(-3) = 6(-3)(-3) - 3$

$h(-3) = 6(9) - 3$

$h(-3) = 54 - 3$

$h(-3) = 51$ ✓

$h(0) = 6(0)^2 - 3$

$h(0) = 6(0)(0) - 3$

$h(0) = 6(0) - 3$

$h(0) = 0 - 3$

$h(0) = -3$ ✓

$h(2) = 6(2)^2 - 3$

$h(2) = 6(2)(2) - 3$

$h(2) = 6(4) - 3$

$h(2) = 24 - 3$

$h(2) = 21$ ✓

(4) $f(x) = x^2 - 13$

$f(13) = (13)^2 - 13$

$f(13) = (13)(13) - 13$

$f(13) = 169 - 13$

$f(13) = 156$ ✓

$f(a) = (a)^2 - 13$

$f(a) = a^2 - 13$ ✓

(5) $x+y=8$
$4x+3y=26$

Is $(2, 6)$ a solution? (x, y)

$(2)+(6)=8$ Subst
$2+6=8$
$8=8$ ✓

YES $(2, 6)$ (x, y) is a solution ✓

$4(2)+3(6)=26$ Subst
$8+18=26$
$26=26$ ✓

$x+y=8$
$4x+3y=26$

Is $(3, 5)$ a solution? (x, y)

$(3)+(5)=8$ Subst
$3+5=8$
$8=8$ ✓

No $(3, 5)$ is not a solution

$4(3)+3(5)=26$
$12+15=26$
$27 \neq 26$ ✗

6. $2x + 6y = 2$

$5x - 6y = -37$

$7x + 0 = -35$

$7x = -35$

$\frac{7x}{7} = \frac{-35}{7}$

$x = -5$ ✓

Subst

$2x + 6y = 2$

$2(-5) + 6y = 2$

$-10 + 6y = 2$

$-10 + 6y + 10 = 2 + 10$

$6y = 12$

$\frac{6y}{6} = \frac{12}{6}$ ✓

$y = 2$

$(x, y) = (-5, 2)$

1. $x+2y=-2$

$3x+3y=-9$

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

$3x+3y=-9\ (2)$

$-3x-6y=6$

$6x+6y=-18$

$3x+0=-12$

$3x=-12$

$\frac{3x}{3}=\frac{-12}{3}$

$x=-4$

Subst

$x+2y=-2$

$(-4)+2y=-2$

$-4+2y=-2$

$-4+2y+4=-2+4$

$2y=2$

$\frac{2y}{2}=\frac{2}{2}$

$y=1$

$(x, y)=(-4, 1)$

8. $(7x^2+12x+8) \div (x+1)$

use synthetic division

$$\frac{7x^2+12x+8}{x+1}$$

opp

$$\begin{array}{r|rrr} -1 & 7 & 12 & 8 \\ & & -7 & -5 \\ \hline & 7 & 5 & 3 \end{array}$$ rem

$$7x+5+\frac{3}{x+1}$$

9. $8x+24 =$ factor

GCF $8(x+3) =$

10. $2x^2-4xy-5x+10y =$ factor by grouping

$(2x^2-4xy)+(-5x+10y) =$

$2x(x-2y)-5(x-2y) =$

$(x-2y)(2x-5) =$

11. $-45x^6y^7-18x^7y^5 =$ factor

$9x^6y^5(-5y^2-2x) =$

GCF

12. $81x^2 - 169y^2 =$ factor

formula: $a^2 - b^2 = (a+b)(a-b)$

$(9x)^2 - (13y)^2 =$

$(9x+13y)(9x-13y) =$

13. $(x-1)(x+2) = 0$

Set $x-1=0$ OR $x+2=0$

$x-1+1 = 0+1$ OR $x+2-2 = 0-2$

$x = 1$ OR $x = -2$

14. $7x(x-6) = 0$

Set $7x = 0$ OR $x-6=0$

$\frac{7x}{7} = \frac{0}{7}$ OR $x-6+6 = 0+6$

$x = 0$ OR $x = 6$

15. $x^2 - 14x + 40 = 0$

$(x-4)(x-10) = 0$

Let $x-4=0$ OR $x-10=0$

$x-4+4=0+4$ OR $x-10+10=0+10$

$x=4$ OR $x=10$

40.1
20.2
10.4
8.5
Possible

16. $x^2 + 3x - 10 = 0$

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

Let $x-2=0$ OR $x+5=0$

$x-2+2=0+2$ OR $x+5-5=0-5$

$x=2$ OR $x=-5$

10.1
2.5
Possible

17. $x^2 - 10x = 0$

$x(x-10) = 0$

Let $x=0$ OR $x-10=0$

OR $x-10+10=0+10$

$x=10$

18. $x^2 - 4x = 32$

$x^2 - 4x - 32 = 32 - 32$

$x^2 - 4x - 32 = 0$

$(x+4)(x-8) = 0$

32.1
16.2
4.8
Possible

Let $x+4=0$ OR $x-8=0$

$x+4-4=0-4$ OR $x-8+8=0+8$

$x=-4$ OR $x=8$

19. $x^2 = 16$

$x^2 - 16 = 16 - 16$

$x^2 - 16 = 0$

$(x)^2 - (4)^2 = 0$

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

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

Let $x+4=0$ OR $x-4=0$

$x+4-4=0-4$ OR $x-4+4=0+4$

$x=-4$ OR $x=4$

20 $(x+3)(x-4) = 3x$

$x^2 - 4x + 3x - 12 = 3x$

$x^2 - 1x - 12 = 3x$

$x^2 - 1x - 12 - 3x = 3x - 3x$

$x^2 - 4x - 12 = 0$

$(x+2)(x-6) = 0$

Let $x+2=0$ OR $x-6=0$

$x+2-2 = 0-2$ OR $x-6+6 = 0+6$

$x = -2$ OR $x = 6$

12.1 6.2 3.4 Possible

21 $x(4x-5) = 9$

$4x^2 - 5x = 9$

$4x^2 - 5x - 9 = 9 - 9$

$4x^2 - 5x - 9 = 0$

$(4x-9)(x+1) = 0$

Let $4x-9=0$ OR $x+1=0$

$4x-9+9 = 0+9$ OR $x+1-1 = 0-1$

$4x = 9$ OR $x = -1$

$\frac{4x}{4} = \frac{9}{4}$

$x = \frac{9}{4}$

4.1 2.2 3.3 Possible

22. $10x^2+58x=12$

$10x^2+58x-12=12-12$

$10x^2+58x-12=0$

$2(5x^2+29x-6)=0$

$2(5x-1)(x+6)=0$

$5\cdot1$ $6\cdot1$ $2\cdot5$ Possible

$2\neq0$ OR $5x-1=0$ OR $x+6=0$

$5x-1+1=0+1$ OR $x+6-6=0-6$

$5x=1$

$\frac{5x}{5}=\frac{1}{5}$

$x=\frac{1}{5}$ OR $x=-6$

23. $x^3-11x^2+10x=0$

$10\cdot1$ $2\cdot5$ Possible

$x(x^2-11x+10)=0$

$x(x-1)(x-10)=0$

$x=0$ OR $x-1=0$ OR $x-10=0$

$x-1+1=0+1$ OR $x-10+10=0+10$

$x=1$ OR $x=10$

24. $4x^3 - x = 0$

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

$x(4x^2 - 1) = 0$

$x((2x)^2 - (1)^2) = 0$

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

Let $x = 0$ OR $2x+1 = 0$ OR $2x-1 = 0$

$2x + x - x = 0 - 1$ OR $2x - 1 + 1 = 0 + 1$

$2x = -1$ OR $2x = 1$

$\frac{2x}{2} = \frac{-1}{2}$ OR $\frac{2x}{2} = \frac{1}{2}$

$x = -1/2$ OR $x = 1/2$

25. $50x^3 - 15x^2 - 5x = 0$

10·1 1·1 2·5 possible

$5x(10x^2 - 3x - 1) = 0$

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

Let $5x = 0$ OR $2x - 1 = 0$ OR $5x + 1 = 0$

$\frac{5x}{5} = \frac{0}{5}$ OR $2x - x + x = 0 + 1$ OR $5x + 1 - x = 0 - 1$

$x = 0$ OR $2x = 1$ OR $5x = -1$

$\frac{2x}{2} = \frac{1}{2}$ OR $\frac{5x}{5} = \frac{-1}{5}$

$x = 1/2$ OR $x = -1/5$

26 $x^2 + 26x = 0$

$x(x+26) = 0$

let $x = 0$ OR $x + 26 = 0$

$x + 26 - 26 = 0 - 26$

$x = -26$

27. $4x^2 - 25 = 0$

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

rewrite $(2x)^2 - (5)^2 = 0$

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

let $2x + 5 = 0$ OR $2x - 5 = 0$

$2x + 5 - 5 = 0 - 5$ OR $2x - 5 + 5 = 0 + 5$

$2x = -5$ OR $2x = 5$

$\frac{2x}{2} = \frac{-5}{2}$ OR $\frac{2x}{2} = \frac{5}{2}$

$x = -\frac{5}{2}$ OR $x = \frac{5}{2}$

28. $(4x+3)(4x^2-19x-5)=0$

4.1 5.1 2.2

$(4x+3)(4x+1)(x-5)=0$

$4x+3=0$ OR $4x+1=0$ OR $x-5=0$

$4x+3-3=0-3$ OR $4x+1-1=0-1$ OR $x-5+5=0+5$

$4x=-3$ OR $4x=-1$ OR $x=5$

$\frac{4x}{4}=\frac{-3}{4}$ OR $\frac{4x}{4}=\frac{-1}{4}$

$x=-\frac{3}{4}$ OR $x=-\frac{1}{4}$

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

$x^2-8+2x=-2x+2x$

8.1 2.4

$x^2+2x-8=0$

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

$x-2=0$ OR $x+4=0$

$x-x+2=0+2$ OR $x+4-4=0-4$

$x=2$ OR $x=-4$

30. $6x^2 - x - 5 = 0$

6·1, 2·3 (5·1) possible

$(6x+5)(x-1)=0$

$6x+5=0$ OR $x-1=0$

$6x+5-5=0-5$ OR $x-1+1=0+1$

$6x=-5$ OR $x=1$

$\frac{6x}{6}=\frac{-5}{6}$

$x=-\frac{5}{6}$

31. $5x^2-10x-40=0$ (8·1, 2·4) Possible

$5(x^2-2x-8)=0$

$5(x+2)(x-4)=0$

$5=0$ OR $x+2=0$ OR $x-4=0$

OR $x+2-2=0-2$ OR $x-4+4=0+4$

OR $x=-2$ OR $x=4$

32) $2x^3+5x^2-25x=0$

2·1 | 25·1, 5·5 Possible

$x(2x^2+5x-25)=0$

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

Let $x=0$ or $2x-5=0$ or $x+5=0$

or $2x-5+5=0+5$ or $x+5-5=0-5$

$2x=5$ or $x=-5$

$\frac{2x}{2}=\frac{5}{2}$

$x=\frac{5}{2}$

33) $x^2+8x+16=0$

16·1, 2·8, 4·4 Possible

$(x+4)(x+4)=0$

Let $x+4=0$ or $x+4=0$

$x+4-4=0-4$ or $x+4-4=0-4$

$x=-4$ or $x=-4$

34) $10y = 25y^2$

$10y - 10y = 25y^2 - 10y$

$0 = 25y^2 - 10y$

$0 = 5y(5y - 2)$

$5y = 0$ OR $5y - 2 = 0$

$\frac{5y}{5} = \frac{0}{5}$ OR $5y - 2 + 2 = 0 + 2$

$y = 0$ OR $5y = 2$

OR $\frac{5y}{5} = \frac{2}{5}$

$y = \frac{2}{5}$

35c) $7x^3 - 7x = 0$

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

$7x(x^2 - 1) = 0$

$7x((x)^2 - (1)^2) = 0$

$7x(x+1)(x-1) = 0$

$7x = 0$ OR $x + 1 = 0$ OR $x - 1 = 0$

$\frac{7x}{7} = \frac{0}{7}$ OR $x + 1 - 1 = 0 - 1$ OR $x - 1 + 1 = 0 + 1$

$x = 0$ OR $x = -1$ OR $x = 1$

36 $4x^2 + 21x - 4 = 20 - 8x$

$4x^2 + 21x - 4 - 20 + 8x = 0$

$4x^2 + 29x - 24 = 0$

$(4x - 3)(x + 8) = 0$

let $4x - 3 = 0$ OR $x + 8 = 0$

$4x - 3 + 3 = 0 + 3$ OR $x + 8 - 8 = 0 - 8$

$4x = 3$ OR $x = -8$

$\frac{4x}{4} = \frac{3}{4}$ OR

$x = 3/4$

4.1
2.2
24.1
12.2
6.4
3.8
possible

37. $\frac{3}{189 - 21}$ simplify

$\frac{3(1)}{3(63 - 7)} =$

$\frac{1}{63 - 7} =$

38. $\frac{-3x-3y}{x+y}$ simplify

$\frac{-3(x+y)}{(x+y)} =$

$-3 =$

39. $f(x) = \frac{x+6}{2x-1}$

$f(4) = \frac{(4)+6}{2(4)-1}$

$f(4) = \frac{4+6}{8-1}$

$f(4) = \frac{10}{7}$ ✓

$f(0) = \frac{(0)+6}{2(0)-1}$

$f(0) = \frac{0+6}{0-1}$

$f(0) = \frac{6}{-1}$ ✓

$f(0) = -6$

$f(-1) = \frac{(-1)+6}{2(-1)-1}$

$f(-1) = \frac{-1+6}{-2-1}$

$f(-1) = \frac{5}{-3}$ ✓

40) $\frac{x}{5x-35} \cdot \frac{x^2-7x}{5} =$

$\frac{x}{5(x-7)} \cdot \frac{x(x-7)}{5} =$

$\frac{x}{5(x-7)} \cdot \frac{x(x-7)}{5} =$

$\frac{x^2}{25} =$

41) $\frac{m^2-n^2}{m+n} \div \frac{m}{m^2+nm} =$

$\frac{m^2-n^2}{m+n} \cdot \frac{m^2+nm}{m} =$

$\frac{(m+n)(m-n)}{(m+n)} \cdot \frac{m(m+n)}{m} =$

$\frac{(m+n)(m-n)}{(m+n)} \cdot \frac{m(m+n)}{m} =$

b.t $(m+n)(m-n) =$

$m^2 - mn + mn - n^2 =$

$m^2 - n^2 =$

42. $\frac{x^2+10x+16}{x-3} \div \frac{x^2-5x-14}{x-3} =$

$\frac{x^2+10x+16}{x-3} \cdot \frac{x-3}{x^2-5x-14} =$

16.1
8.2
44 Possibly

$\frac{(x+2)(x+8)}{(x-3)} \cdot \frac{(x-3)}{(x+2)(x-7)} =$

14.1
2.7

$\frac{\cancel{(x+2)}(x+8)}{\cancel{(x-3)}} \cdot \frac{\cancel{(x-3)}}{\cancel{(x+2)}(x-7)} =$

$\frac{x+8}{x-7} =$

43. $\frac{5}{6+y} + \frac{y+2}{6+y} =$

$\frac{(5)+(y+2)}{6+y} =$

$\frac{5+y+2}{6+y} =$

$\frac{y+7}{6+y} =$

(44) $\frac{3x^2+4x}{x-7} - \frac{23x+14}{x-7} =$

$\frac{(3x^2+4x)-(23x+14)}{(x-7)} =$

$\frac{3x^2+4x-23x-14}{(x-7)} =$

3.1 14.1 2.7 Possible

$\frac{3x^2-19x-14}{(x-7)} =$

$\frac{(3x+2)(x-7)}{(x-7)} =$

$3x+2 =$ ✓

(45) $\frac{6x+9}{x^2-4x+3} - \frac{5x+12}{x^2-4x+3} =$

$\frac{(6x+9)-(5x+12)}{x^2-4x+3} =$

$\frac{6x+9-5x-12}{x^2-4x+3} =$

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

$\frac{(x-3)}{(x-1)(x-3)}$

$\frac{1(x-3)}{(x-1)(x-3)} =$

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

46 $f(x) = -3x + 2$ graph

$f(0) = -3(0) + 2$

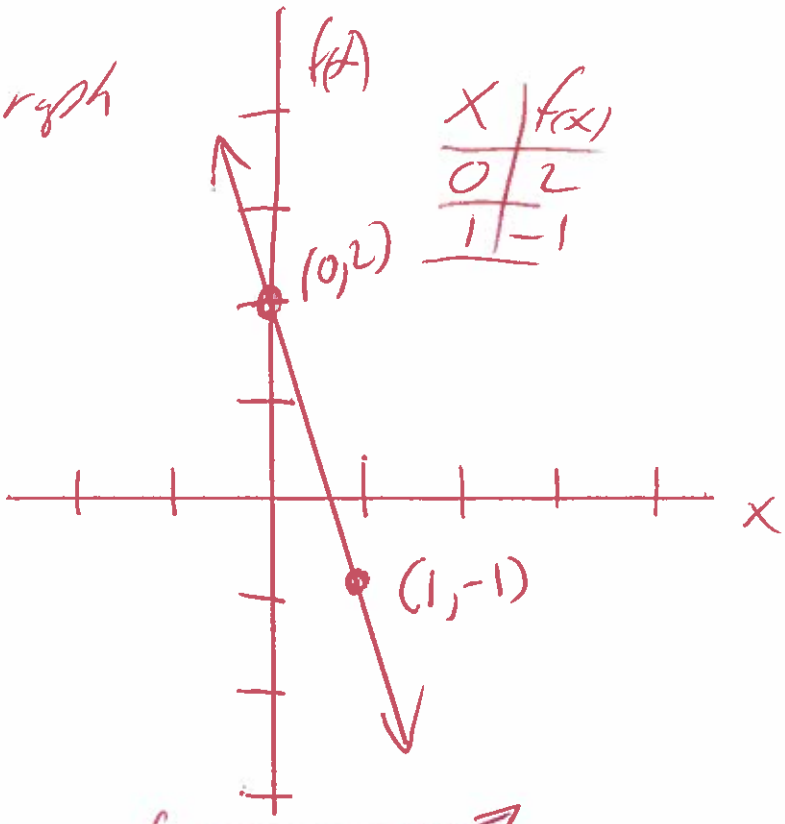
$f(0) = 0 + 2$

$f(0) = 2$

$f(1) = -3(1) + 2$

$f(1) = -3 + 2$

$f(1) = -1$



x	f(x)
0	2
1	-1

47. $f(x) = \frac{1}{2}x + 8$

$f(0) = \frac{1}{2}(0) + 8$

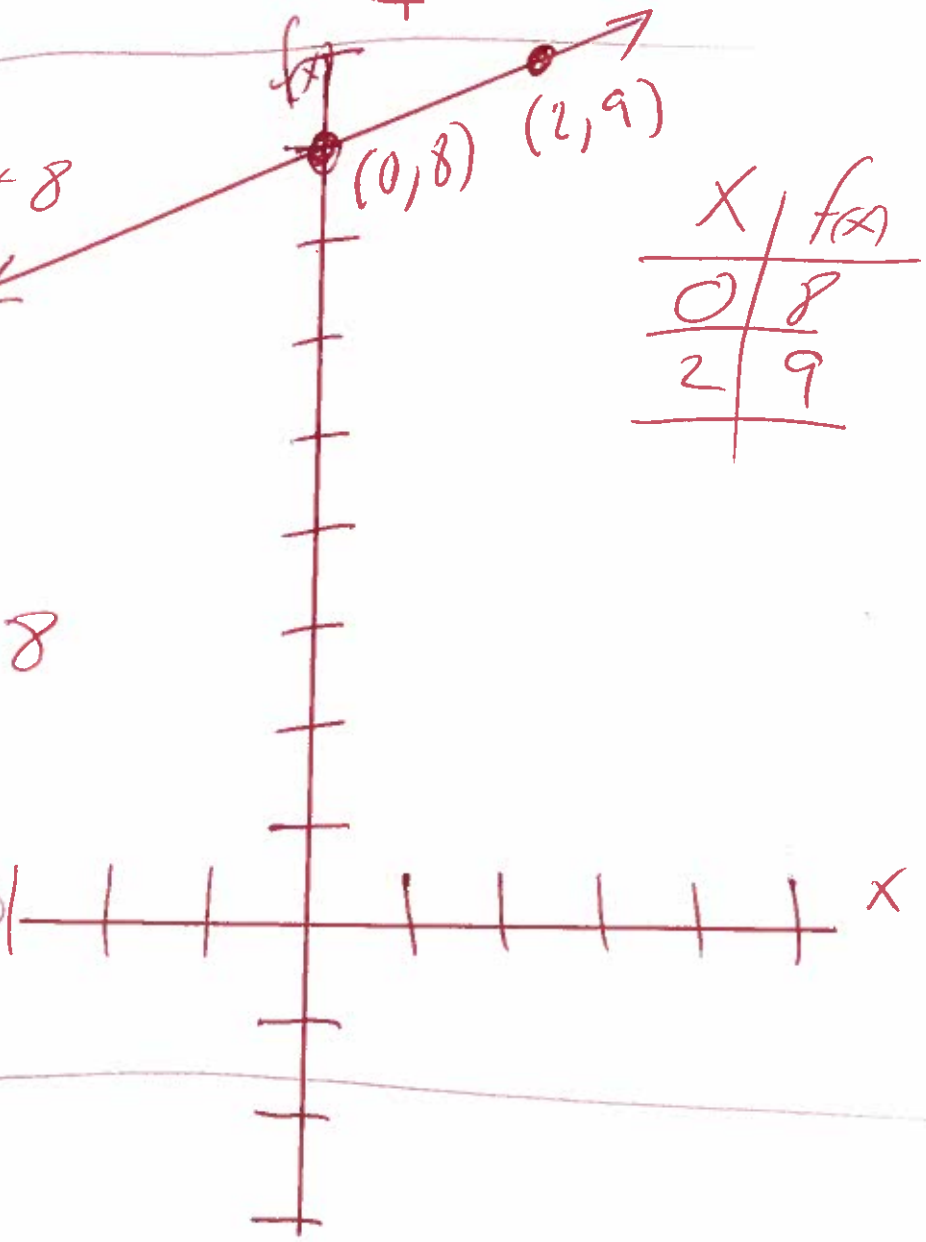
$f(0) = 0 + 8$

$f(0) = 8$

$f(2) = \frac{1}{2}(2) + 8$

$f(2) = 1 + 8$

$f(2) = 9$



x	f(x)
0	8
2	9

48 $f(x) = \sqrt{x+4}$

$f(-4) = \sqrt{-4+4}$

$f(-4) = \sqrt{0}$

$f(-4) = 0$

$f(-3) = \sqrt{-3+4}$

$f(-3) = \sqrt{1}$

$f(-3) = 1$

$f(0) = \sqrt{0+4}$

$f(0) = \sqrt{4}$

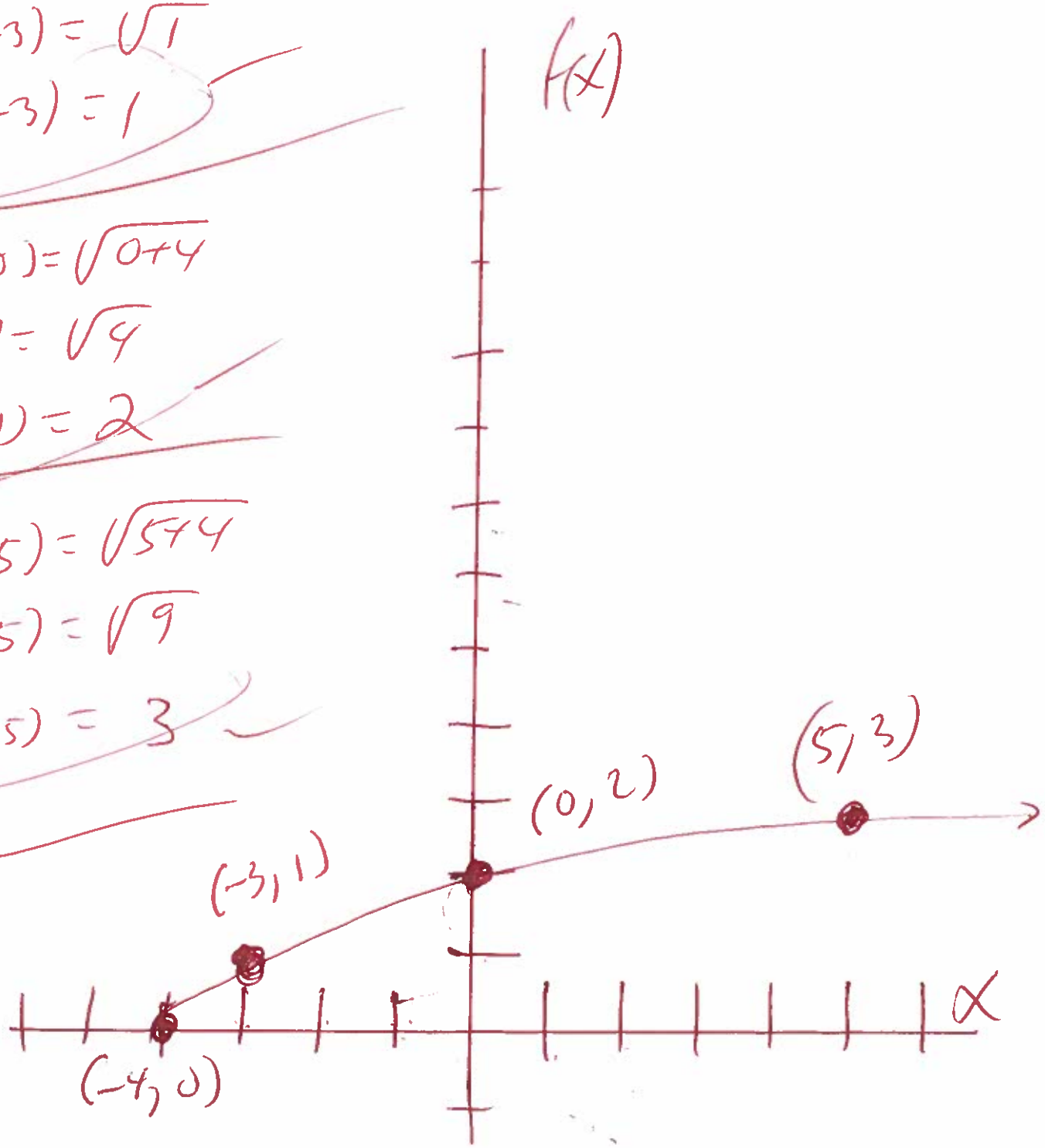
$f(0) = 2$

$f(5) = \sqrt{5+4}$

$f(5) = \sqrt{9}$

$f(5) = 3$

x	f(x)
-4	0
-3	1
0	2
5	3



49 $h(x) = \sqrt{x} - 6$

$h(0) = \sqrt{0} - 6$

$h(0) = 0 - 6$

$h(0) = -6$ ✓

$h(1) = \sqrt{1} - 6$

$h(1) = 1 - 6$

$h(1) = -5$ ✓

$h(4) = \sqrt{4} - 6$

$h(4) = 2 - 6$ ✓

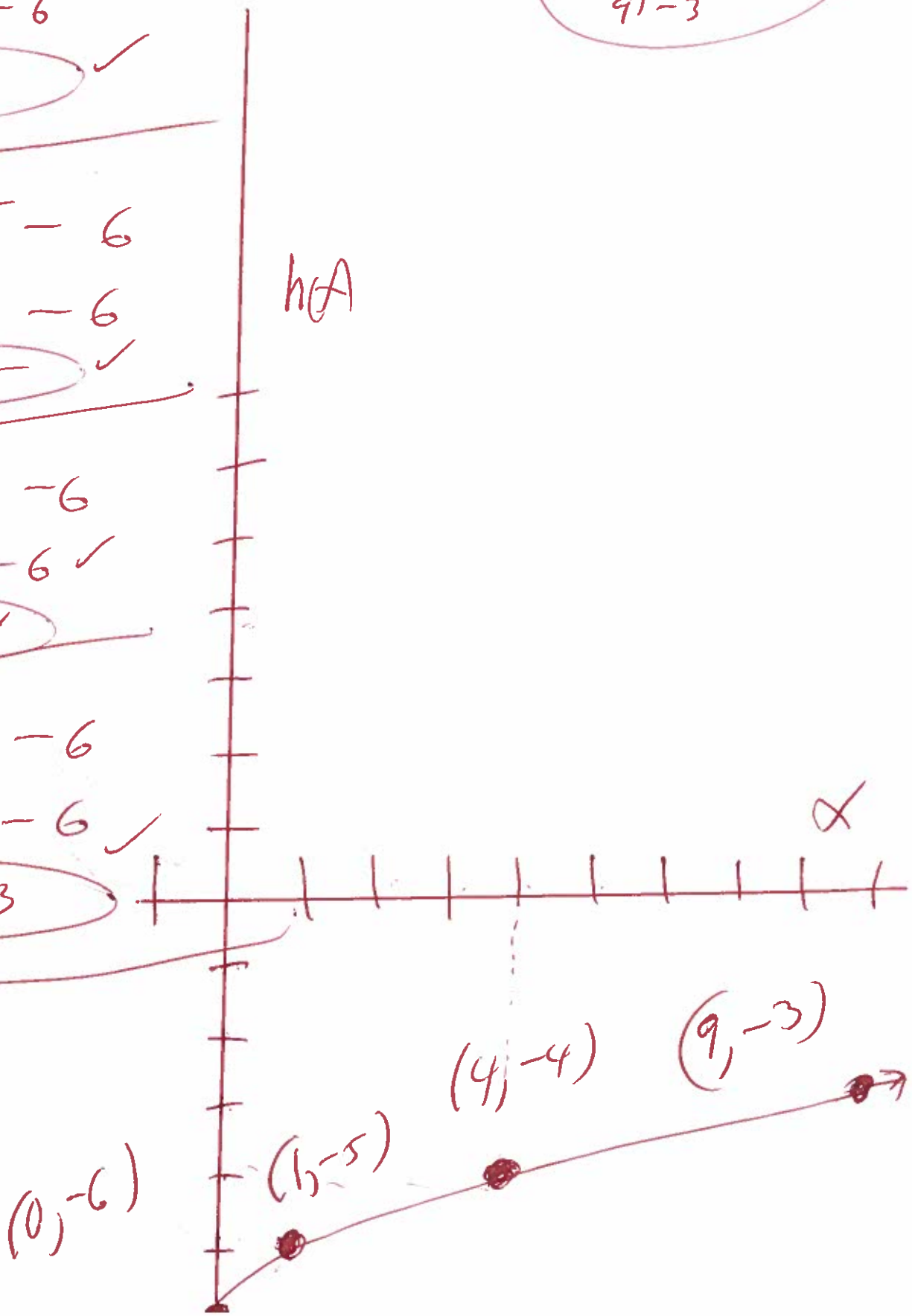
$h(4) = -4$

$h(9) = \sqrt{9} - 6$

$h(9) = 3 - 6$ ✓

$h(9) = -3$

x	h(x)
0	-6
1	-5
4	-4
9	-3



(50) $y = x^2 - 4x + 12$

$y = (0)^2 - 4(0) + 12$

$y = (0)(0) - 4(0) + 12$

$y = 0 + 0 + 12$

$y = 12$

$y = (1)^2 - 4(1) + 12$

$y = (1)(1) - 4(1) + 12$

$y = 1 - 4 + 12$

$y = 9$

$y = (2)^2 - 4(2) + 12$

$y = (2)(2) - 4(2) + 12$

$y = 4 - 8 + 12$

$y = 8$

$y = (3)^2 - 4(3) + 12$

$y = (3)(3) - 4(3) + 12$

$y = 9 - 12 + 12$

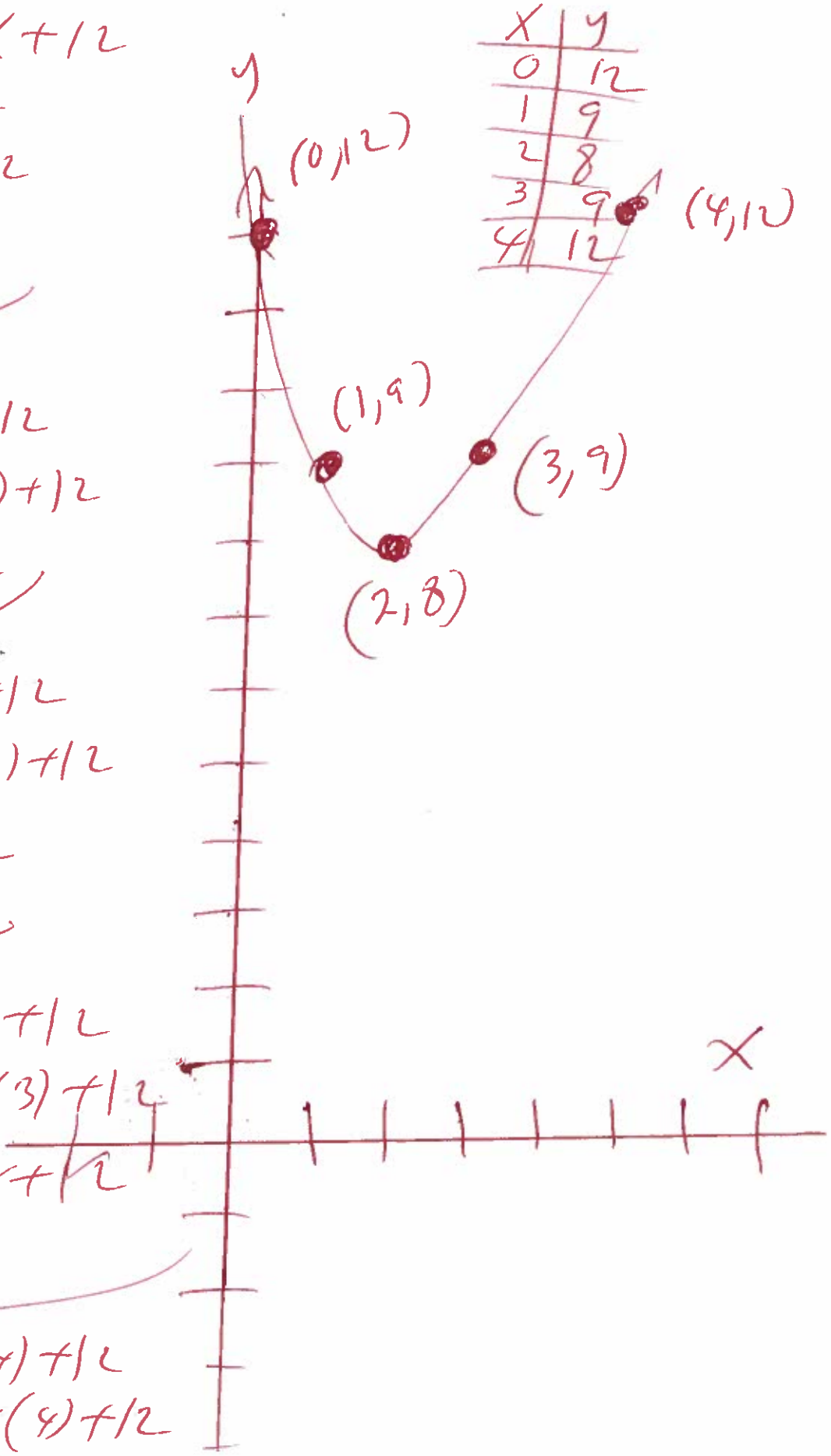
$y = 9$

$y = (4)^2 - 4(4) + 12$

$y = (4)(4) - 4(4) + 12$

$y = 16 - 16 + 12$, $y = 12$

x	y
0	12
1	9
2	8
3	9
4	12



51. $-12 \leq 2x-14 \leq 16$

$-12+14 \leq 2x-14+14 \leq 16+14$

$2 \leq 2x \leq 30$

$\frac{2}{2} \leq \frac{2x}{2} \leq \frac{30}{2}$

$1 \leq x \leq 15$

$[1, 15]$

52. $|2x-1|=5$

Formula
$|x|=a$
$x=-a$ or $x=a$

$2x-1=-5$ or $2x-1=5$

$2x-1+1=-5+1$ or $2x-1+1=5+1$

$2x=-4$ or $2x=6$

$\frac{2x}{2}=\frac{-4}{2}$ or $\frac{2x}{2}=\frac{6}{2}$

$x=-2$ or $x=3$

53. $|x-9|<9$

formula
$|x|<a$
$-a<x<a$

$-9<x-9<9$

$-9+9<x-9+9<9+9$

$0<x<18$

$(0, 18)$

54. $|x+7|\geq 12$

~~Formula~~
$|x|\geq a$
$x\leq -a$ or $x\geq a$

Let $x+7\leq -12$ or $x+7\geq 12$

$x+7-7\leq -12-7$ or $x+7-7\geq 12-7$

$x\leq -19$ or $x\geq 5$

$(-\infty, -19]\cup[5, \infty)$

55. $\sqrt{25a^4b^{26}} =$

$\sqrt{5^2a^4b^{26}} =$

$5^{\frac{2}{2}}a^{\frac{4}{2}}b^{\frac{26}{2}}$ = divide the powers

$5^1a^2b^{13} =$

$5a^2b^{13} =$

---

56. $\sqrt[3]{-8x^9y^{12}} =$

$\sqrt[3]{(-2)^3x^9y^{12}} =$

$(-2)^{\frac{3}{3}}x^{\frac{9}{3}}y^{\frac{12}{3}}$ = divide the powers

$(-2)^1x^3y^4 =$

$-2x^3y^4 =$

57) $f(x) = \sqrt{2x+1}$ find $f(2)$

$f(2) = \sqrt{2(2)+1}$

$f(2) = \sqrt{4+1}$

$f(2) = \sqrt{5}$

58.

$81^{\frac{5}{4}} =$

Primes 2, 3, 5, 7, ...

3 | 81
3 | 27
3 | 9
3 | 3
1

$(3^4)^{\frac{5}{4}} =$

$(3^{\frac{4}{1}})^{\frac{5}{4}} =$

$\frac{4}{1}(\frac{5}{4}) =$

$3^{\frac{20}{4}} =$

$3^5 =$

$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 =$

$243 =$

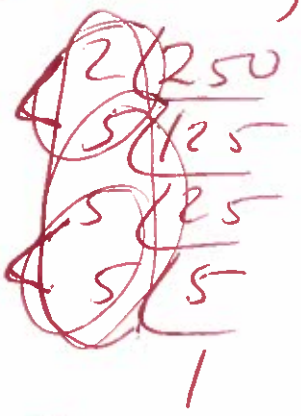
59. $\sqrt{250} =$

$\sqrt{25 \cdot 10} =$

$\sqrt{25}\sqrt{10} =$

$5\sqrt{10} =$

Primes 2, 3, 5, 7, ...



60. $\sqrt[3]{56} =$

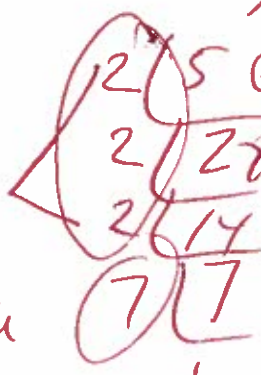
$\sqrt[3]{2^3 \cdot 7^1} =$

$2^{\frac{3}{3}}\sqrt[3]{7^1} =$ divide powers

$2^1\sqrt[3]{7^1} =$

$2\sqrt[3]{7} =$

Primes 2, 3, 5, 7, ...



61. $\sqrt{36x^5}$ = Primes 2, 3, 5, 7, ...

$\sqrt{2^2 3^2 x^5}$ =

$\sqrt{2^2 3^2 x^4 x^1}$ =

$2^{\frac{2}{2}} \cdot 3^{\frac{2}{2}} x^{\frac{4}{2}} \sqrt{x^1}$ = divide powers

$2^1 \cdot 3^1 x^2 \sqrt{x^1}$ =

$2 \cdot 3 x^2 \sqrt{x}$ =

$6x^2\sqrt{x}$ =

2	36
2	18
3	9
3	3
	1

62. $\sqrt[3]{108x^5}$ = Primes 2, 3, 5, 7, ...

$\sqrt[3]{3^3 \cdot 2^1 x^5}$ =

$\sqrt[3]{3^3 \cdot 2^1 x^3 x^2}$ =

$3^{\frac{3}{3}} x^{\frac{3}{3}} \sqrt[3]{2^1 x^2}$ =

$3^1 x^1 \sqrt[3]{2^1 x^2}$ =

$3x\sqrt[3]{4x^2}$ =

2	108
2	54
3	27
3	9
3	3
	1

63. $\sqrt{121a^4b^5}$ Primes 2, 3, 5, 7, 11, 13, ...

$=$

$\sqrt{11^2a^4b^5} =$

$\sqrt{11^2a^4b^4b^1} =$

$11^{2/2}a^{4/2}b^{4/2}\sqrt{b^1}$ = divide powers

$11^1a^2b^2\sqrt{b^1} =$

$11a^2b^2\sqrt{b} =$

11	121
11	11
	1

64. $\sqrt[3]{16x^{15}y^4}$ = Primes 2, 3, 5, 7, ...

$\sqrt[3]{2^4x^{15}y^4} =$

$\sqrt[3]{2^3 2^1 x^{15} y^3 y^1} =$

$2^{3/3}x^{15/3}y^{3/3}\sqrt[3]{2^1y^1}$ = divide powers

$2^1x^5y^1\sqrt[3]{2^1y^1} =$

$2x^5y\sqrt[3]{2y} =$

2	16
2	8
2	4
2	2
	1

65. $\sqrt{x-6} = 4$

$(\sqrt{x-6})^2 = (4)^2$

$x - 6 = 16$

$x - 6 + 6 = 16 + 6$

$x = 22$ Good

Ck

$\sqrt{22-6} = 4$?

$\sqrt{16} = 4$?

$4 = 4$ ✓ yes

66. $(6 - 9i) + (4 + 4i) =$

$6 - 9i + 4 + 4i =$

$10 - 5i =$

67. $(2 + 7i) - (6 - 4i) =$

$2 + 7i - 6 + 4i =$

$-4 + 11i =$

68. $(4 + 9i)(4 + i) =$

$16 + 4i + 36i + 9i^2 =$

$16 + 40i + 9i^2 =$

$16 + 40i + 9(-1) =$ Subst

$16 + 40i - 9 =$

$7 + 40i =$

formula

$i^2 = -1$

69. $\frac{6-5i}{6+i} =$

$\left(\frac{6-5i}{6+i}\right)\left(\frac{6-i}{6-i}\right) =$ mult

$\frac{36-6i-30i+5i^2}{36-6i+6i-i^2} =$

$\frac{36-36i+5i^2}{36-i^2} =$

$\frac{36-36i+5(-1)}{36-(-1)} =$

$\frac{36-36i-5}{36+1} =$

$\frac{31-36i}{37} =$

$\frac{31}{37} - \frac{36}{37}i =$

70) $(x+5)^2 = 16$

$\sqrt{(x+5)^2} = \pm\sqrt{16}$

$x+5 = \pm 4$

$x+5 = -4$ OR $x+5 = 4$

$x+5-5 = -4-5$ OR $x+5-5 = 4-5$

$x = -9$ OR $x = -1$

Good Good

Ck

$(x+5)^2 = 16$

$(-9+5)^2 = 16$?

$(-4)^2 = 16$?

$(-4)(-4) = 16$?

$16 = 16$ ✓ YES

$(x+5)^2 = 16$

$(-1+5)^2 = 16$?

$(4)^2 = 16$?

$(4)(4) = 16$?

$16 = 16$ ✓ YES

7) $m^2 - 7m + 12 = 0$

12.1, 6.2, 3.4 Possible

$(m-3)(m-4) = 0$

Let $m-3=0$ or $m-4=0$

$m-3+3=0+3$ or $m-4+4=0+4$

$m = 3$ or $m = 4$

Use Quadratic formula

$1m^2 - 7m + 12 = 0$

$a=1,\ b=-7,\ c=12$

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

$$m = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(1)(12)}}{2(1)}$$

$$m = \frac{7 \pm \sqrt{49 - 48}}{2}$$

$$m = \frac{7 \pm \sqrt{1}}{2}$$

$$m = \frac{7 \pm 1}{2}$$

$m = \frac{7-1}{2}$ or $m = \frac{7+1}{2}$

$m = \frac{6}{2}$ or $m = \frac{8}{2}$

$m = 3$ or $m = 4$

72. $-y = 3y^2 - 2$ (3.1) (2.1) Possible

$-y + y = 3y^2 - 2 + y$

$0 = 3y^2 + y - 2$

$0 = (3y - 2)(y + 1)$

Let $3y - 2 = 0$ OR $y + 1 = 0$

$3y - 2 + 2 = 0 + 2$ OR $y + 1 - 1 = 0 - 1$

$3y = 2$ OR $y = -1$

$\frac{3y}{3} = \frac{2}{3}$

$y = \frac{2}{3}$

use Quadratic Formula

$3y^2 + 1y - 2 = 0$

$a = 3, \; b = 1, \; c = -2$

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

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

$y = \frac{-1 \pm \sqrt{1 + 24}}{6}$

$y = \frac{-1 \pm \sqrt{25}}{6}$

$y = \frac{-1 \pm 5}{6}$

$y = \frac{-1 + 5}{6}$ OR $y = \frac{-1 - 5}{6}$

$y = \frac{4}{6}$ OR $y = \frac{-6}{6}$

$y = \frac{2(2)}{2(3)}$ OR $y = -1$

$y = \frac{2}{3}$

73. $x^2 + 5x - 2 = 0$

$1x^2 + 5x - 2 = 0$

$a = 1,\ b = 5,\ c = -2$

use Quadratic formula

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

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

$$x = \frac{-5 \pm \sqrt{25 + 8}}{2}$$

$$x = \frac{-5 \pm \sqrt{33}}{2}$$

Primes 2, 3, 5, 7, 11

3 | 33

11

$33 = 3 \cdot 11$

$$x = \frac{-5 - \sqrt{33}}{2} \quad \text{or} \quad x = \frac{-5 + \sqrt{33}}{2}$$

74. $7m^2 + 2m = 8$

$7m^2 + 2m - 8 = 8 - 8$

$7m^2 + 2m - 8 = 0$

$a = 7,\ b = 2,\ c = -8$

Use Quadratic formula

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

$$m = -\frac{(2) \pm \sqrt{(2)^2 - 4(7)(-8)}}{2(7)}$$

$$m = \frac{-2 \pm \sqrt{4 + 224}}{14}$$

$$m = \frac{-2 \pm \sqrt{228}}{14}$$

$$m = \frac{-2 \pm \sqrt{4 * 57}}{14}$$

$$m = \frac{-2 \pm \sqrt{4}\sqrt{57}}{14}$$

$$m = \frac{-2 \pm 2\sqrt{57}}{14}$$

$$m = \frac{2(-1 \pm 1\sqrt{57})}{2(7)}$$

$$m = \frac{-1 \pm 1\sqrt{57}}{7}$$

Primes

2, 3, 5, 7, 11, 13, 17, 19, ...

2	228
2	114
3	57
19	19
	1

$$m = \frac{-1 \pm \sqrt{57}}{7}$$

$$m = \frac{-1 - \sqrt{57}}{7} \quad \text{or} \quad m = \frac{-1 + \sqrt{57}}{7}$$

7. $f(x) = x^2 - 6$ Graph

$f(-1) = (-1)^2 - 6$

$f(-1) = (-1)(-1) - 6$

$f(-1) = 1 - 6$

$f(-1) = -5$

$f(0) = (0)^2 - 6$

$f(0) = (0)(0) - 6$

$f(0) = 0 - 6$

$f(0) = -6$

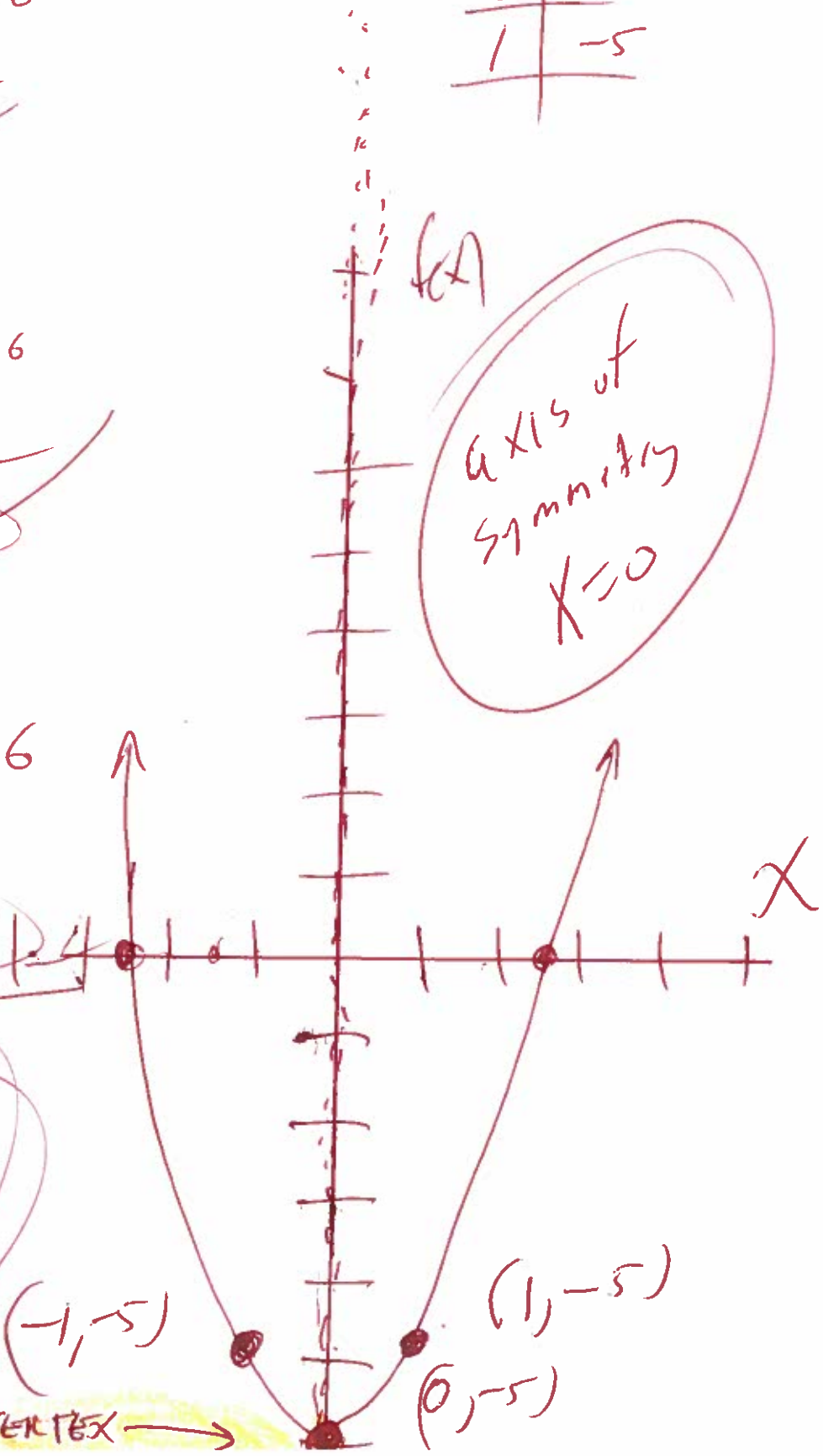
$f(1) = (1)^2 - 6$

$f(1) = (1)(1) - 6$

$f(1) = 1 - 6$

$f(1) = -5$

x	f(x)
-1	-5
0	-6
1	-5



axis of symmetry $x = 0$

min at vertex $(0, -6)$

16) $f(x) = -5x^2 - 10x - 7$ Find VERTEX

$a = -5,\ b = -10,\ c = -7$

$MAX = VERTEX = \left(\frac{-b}{2a},\ f\left(\frac{-b}{2a}\right)\right)$

$Vertex = \left(\frac{-(-10)}{2(-5)},\ f\left(\frac{-(-10)}{2(-5)}\right)\right)$

$VERTEX = \left(\frac{10}{-10},\ f\left(\frac{10}{-10}\right)\right)$

$VERTEX = (-1,\ f(-1))$

$VERTEX = (-1,\ -5(-1)^2 - 10(-1) - 7)$

$VERTEX = (-1,\ -5(-1)(-1) - 10(-1) - 7)$

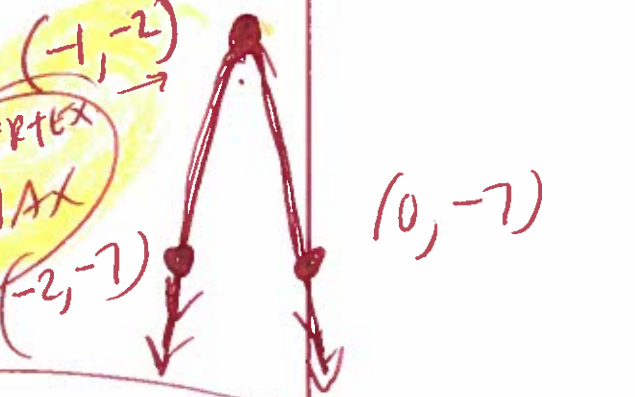
$VERTEX = (-1,\ -5(1) - 10(-1) - 7)$

$VERTEX = (-1,\ -5 + 10 - 7)$

$VERTEX = (-1,\ 5 - 7)$

$VERTEX = (-1, -2)$

Graph it if you want to on a graphing calculator



other points

$f(-2) = -5(-2)^2 - 10(-2) - 7$

$f(-2) = -5(-2)(-2) - 10(-2) - 7$

$f(-2) = -5(4) - 10(-2) - 7$

$f(-2) = -20 + 20 - 7$

$f(-2) = -7$

$f(0) = -5(0)^2 - 10(0) - 7$

$f(0) = -5(0)(0) - 10(0) - 7$

$f(0) = -5(0) - 10(0) - 7$

$f(0) = 0 + 0 - 7$

$f(0) = -7$

77. $A = P\left(1 + \frac{r}{n}\right)^{nt}$

$P = \$14000$

$r = 3\% = .03$

$n = 4$ = Quarterly

$t = 8$ = years

$A = \$14{,}000\left(1 + \frac{.03}{4}\right)^{4(8)}$

$A = \$14{,}000\,(1 + .0075)^{32}$

$A = \$14{,}000\,(1.0075)^{32}$

$A = \$14{,}000\,(1.0075)^{1(32)}$

$A = \$14{,}000\,(1.270111224)$

$A = \$17{,}781.55714$

$= \$17{,}781.56$

Round

Use Graphing Calculator