Math 1314 warmup 091 step

01-23-19
01-25-19

1. $(-7x^3+10x^2-4x+4)+(4x^3+7x^2-4x-6)=$

$-7x^3+10x^2-4x+4+4x^3+7x^2-4x-6=$

$-3x^3+17x^2-8x-2$

2. $(10x^3-9x^2+10x-4)-(7x^3-9x^2-10x+10)=$

$10x^3-9x^2+10x-4-7x^3+9x^2+10x+10=$

$3x^3+20x-14$

3. $(x+10)(x^2-10x+100) =$

$x^3 - 10x^2 + 100x + 10x^2 - 100x + 1000 =$

$x^3 + 1000 =$

4. $(8x+9)(x^2+5x+4) =$

$8x^3 + 40x^2 + 32x + 9x^2 + 45x + 36 =$

$8x^3 + 49x^2 + 77x + 36 =$

5. $(x+2)(x+1) =$

$x^2 + 1x + 2x + 2 =$

$x^2 + 3x + 2 =$

6. $(x-14)(x+5) =$

$x^2 + 5x - 14x - 70 =$

$x^2 - 9x - 70 =$

7. $(4x+1)(3x+5) =$

$12x^2 + 20x + 3x + 5 =$

$12x^2 + 23x + 5 =$

8. $(4x-5)(2x+7) =$

$8x^2 + 28x - 10x - 35 =$

$8x^2 + 18x - 35 =$

9. $(2x^2-3)(7x^2-6) =$

$14x^4 - 12x^2 - 21x^2 + 18 =$

$14x^4 - 33x^2 + 18 =$

10. $(x-7)(x+7) =$

$x^2 + 7x - 7x - 49 =$

$x^2 - 49 =$

11. $(4x+3)(4x-3) =$

$16x^2 - 12x + 12x - 9 =$

$16x^2 - 9 =$

12. $(x+10)^2 =$

$(x+10)(x+10) =$

$x^2 + 10x + 10x + 100 =$

$x^2 + 20x + 100 =$

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

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

$9x^2 + 15x + 15x + 25 =$

$9x^2 + 30x + 25 =$

14. $(x-2)^2 =$

$(x-2)(x-2) =$

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

$x^2 - 4x + 4 =$

15. $(x+2y)(5x+2y) =$

$5x^2 + 2xy + 10xy + 4y^2 =$

$5x^2 + 12xy + 4y^2 =$

16. $(x-4y)(6x+7y) =$

$6x^2 + 7xy - 24xy - 28y^2 =$

$6x^2 - 17xy - 28y^2 =$

17. $(4xy+1)(2xy-5) =$

$8x^2y^2 - 20xy + 2xy - 5 =$

$8x^2y^2 - 18xy - 5 =$

18. $(8x+5y)^2 =$

$(8x+5y)(8x+5y) =$

$64x^2 + 40xy + 40xy + 25y^2 =$

$64x^2 + 80xy + 25y^2 =$

(19) $(6x+5y)(6x-5y) =$

$36x^2 - 30xy + 30xy - 25y^2 =$

$36x^2 - 25y^2 =$

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(20) $16x + 40 =$ factor

$8(2x+5) =$

(21.) $30x^2 + 28x =$ factor

$2x(15x + 14) =$

(22.) $8x^2 - 48x =$ factor

$8x(x - 6) =$

(23) $3x^4 - 9x^3 + 33x^2 =$ factor

$3x^2(x^2 - 3x + 11) =$

(24.) $x(x+16) - 14(x+16) =$

$(x+16)(x-14) =$

25. $x^3 - 5x^2 + 6x - 30 =$ factor by grouping

$(x^3 - 5x^2) + (6x - 30) =$

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

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

26. $x^3 - 6x^2 + 5x - 30 =$ factor by grouping

$(x^3 - 6x^2) + (5x - 30) =$

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

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

27. $x^2+9x-3x-27=$ factor by grouping

$(x^2+9x)+(-3x-27)=$

$x(x+9)-3(x+9)=$

$(x+9)(x-3)=$

28. $x^2+18x+72=$ factor possible

$(x+7)(x+11)=$

7.1
7.11

29. $x^2 + 18x + 77 =$

$(x+7)(x+11) =$

Factor possible

77.1

11.7

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

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

Factor

32.1

16.2

8.4

31. $x^2 - 10x + 24 =$

$(x - 4)(x - 6) =$

Possible factor pairs: 24·1, 12·2, 6·4, 3·8

32. $7x^2 - 34x - 5 =$

$(7x + 1)(x - 5) =$

Possible factor pairs: 7·1, 5·1

33. $3a^2 - 4a - 20 =$

Possible factors

3 · 1

20 · 1
10 · 2
4 · 5

$(3a - 10)(a + 2) =$

34. $6x^2 - 13x + 6 =$

Possible factor

6 · 1
2 · 3

6 · 1
2 · 3

$(2x - 3)(3x - 2) =$

35. $4y^2+29y+7=$

factor: $4,1$ $2,2$

Possible: $7,1$

$(y+7)(4y+1)=$

36. $21x^2-82x+40=$

factor: $21,1$ $7,3$

Possible: $40,1$ $20,2$ $10,4$ $8,5$

$(7x-4)(3x-10)=$

37. $3a^2 + 5ab + 2b^2 =$

Possible factors: 3.1, 2.1

$(3a+2b)(a+b) =$

38. $5a^2 - 6ab - 32b^2 =$

Factors: 5.1, 32.-1, 16.2, 8.4

$(5a-16b)(a+2b) =$

39. $x^2 - 25 =$

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

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

factor formula

$a^2 - b^2$

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

40. $4x^2 - 9 =$

$(2x)^2 - (3)^2 =$

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

factor formula

$a^2 - b^2$

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

(41) $144x^2 - 169y^2 =$

$(12x)^2 - (13y)^2 =$

$(12x + 13y)(12x - 13y) =$

factor formula

$a^2 - b^2$

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

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(42) $y^2 + 30y + 225 =$

$(y + 15)(y + 15) =$

OR

$(y+15)^2 =$

factor $225 \cdot 1$

$15 \cdot 15$

(43.) $x^2 - 12x + 36 =$

$(x-6)(x-6) =$

OR

$(x-6)^2 =$

Possible factors

36, 1
18, 2
12, 3
9, 9
6, 6

(44.) $10x^2 + 10x + 1 =$

$(10x+1)(10x+1) =$

OR

$(10x+1)^2 =$

Possible factors

1, 1
10, 1
5, 2
2, 5

(45) $4x^2+20x+16 =$

$4(x^2+5x+4) =$

$4(x+1)(x+4) =$

Factor Possible

4.1

2.2

(46) $x^3-3x^2-4x+12 =$

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

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

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

$(x-3)((x)^2-(2)^2) =$

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

factor

Group

formula

a^2-b^2

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

(47.) $3x^2 - 3x - 90 =$ factor

$3(x^2 - x - 30) =$

$3(x+5)(x-6) =$

Possible
30 · 1
15 · 2
10 · 3
6 · 5

(48.) where undefined

$$\frac{x}{x+3} =$$

Set $x+3=0$

$x+3-3=0-3$

$x = -3$

undefined

(49) where undefined

$$\frac{y-1}{y^2-1}$$

set $y^2-1=0$

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

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

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

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

$y=-1$ OR $y=1$

undefined at

(50.) Find all numbers that must be excluded from the domain

$$\frac{x-4}{x^2+5x+4} =$$

Let $x^2+5x+4=0$

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

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

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

$x=-1$ or $x=-4$

↑ excluded from the domain

↑ excluded from the domain

51. Simplify. find all numbers that must be excluded from the domain of the simplified expression

$$\frac{3x-15}{x^2-10x+25} =$$

$$\frac{3(x-5)}{(x-5)(x-5)} =$$

$$\frac{3(x-5)}{(x-5)(x-5)} =$$

$$\frac{3}{x-5} =$$

Let $x-5=0$

$x-5+5=0+5$

$x=5$

excluded from domain

(52) $y = x^2 - 4$

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

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

$y = 9 - 4$

$y = 5$

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

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

$y = 4 - 4$

$y = 0$

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

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

$y = 1 - 4$

$y = -3$

$y = (0)^2 - 4$

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

$y = 0 - 4$

$y = -4$

$y = (1)^2 - 4$

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

$y = 1 - 4$

$y = -3$

$y = (2)^2 - 4$

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

$y = 4 - 4$

$y = 0$

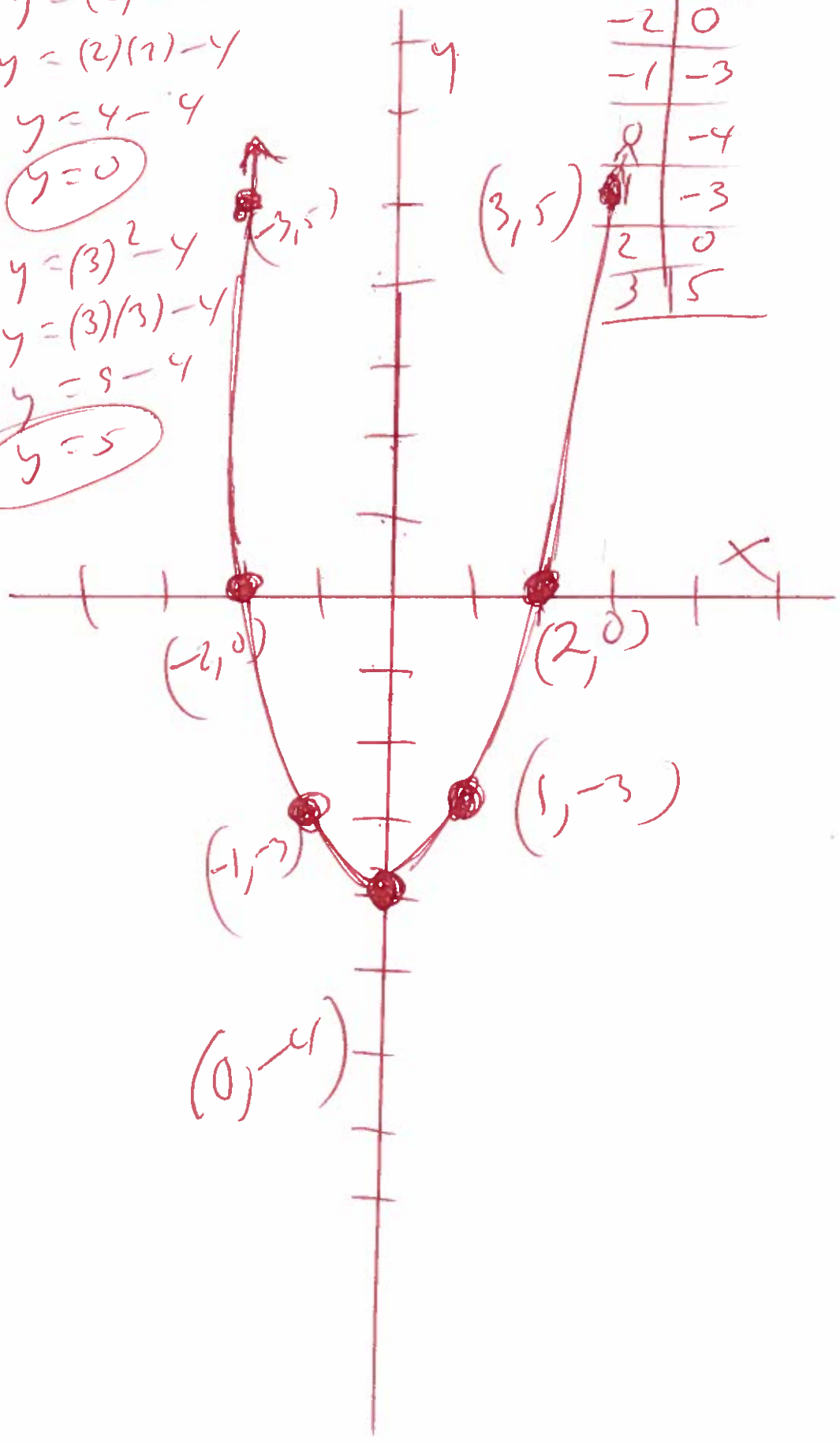
$y = (3)^2 - 4$

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

$y = 9 - 4$

$y = 5$

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



(53) $y = x - 2$

$y = (-3) - 2$

$y = -3 - 2$

$y = -5$

$y = (-2) - 2$

$y = -2 - 2$

$y = -4$

$y = (-1) - 2$

$y = -1 - 2$

$y = -3$

$y = (0) - 2$

$y = 0 - 2$

$y = -2$

$y = (1) - 2$

$y = 1 - 2$

$y = -1$

$y = (2) - 2$

$y = 2 - 2$

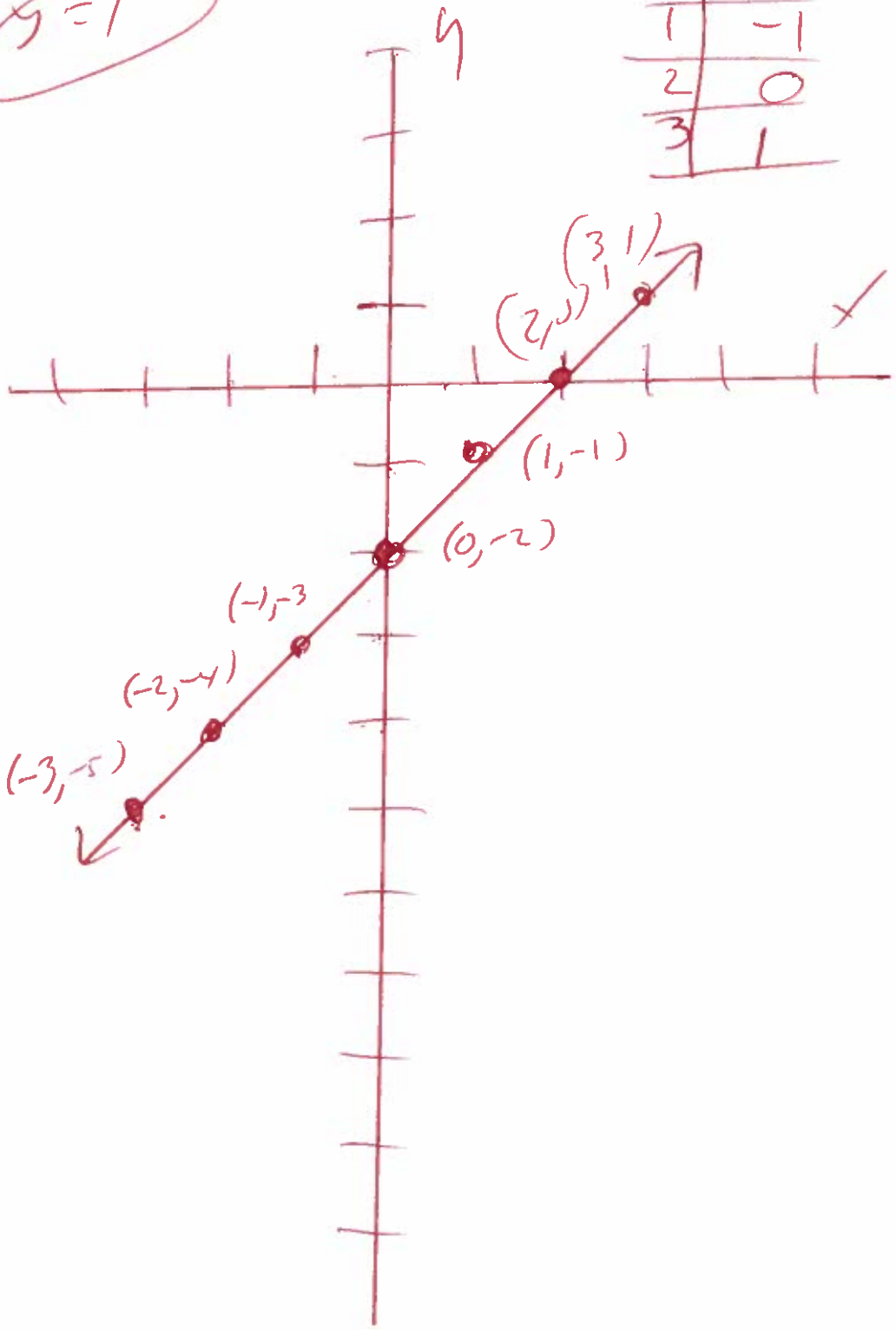
$y = 0$

$y = (3) - 2$

$y = 3 - 2$

$y = 1$

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



54) $y = 3x - 4$

$y = 3(-3) - 4$

$y = -9 - 4$

$y = -13$

$y = 3(-2) - 4$

$y = -6 - 4$

$y = -10$

$y = 3(-1) - 4$

$y = -3 - 4$

$y = -7$

$y = 3(0) - 4$

$y = 0 - 4$

$y = -4$

$y = 3(1) - 4$

$y = 3 - 4$

$y = -1$

$y = 3(2) - 4$

$y = 6 - 4$

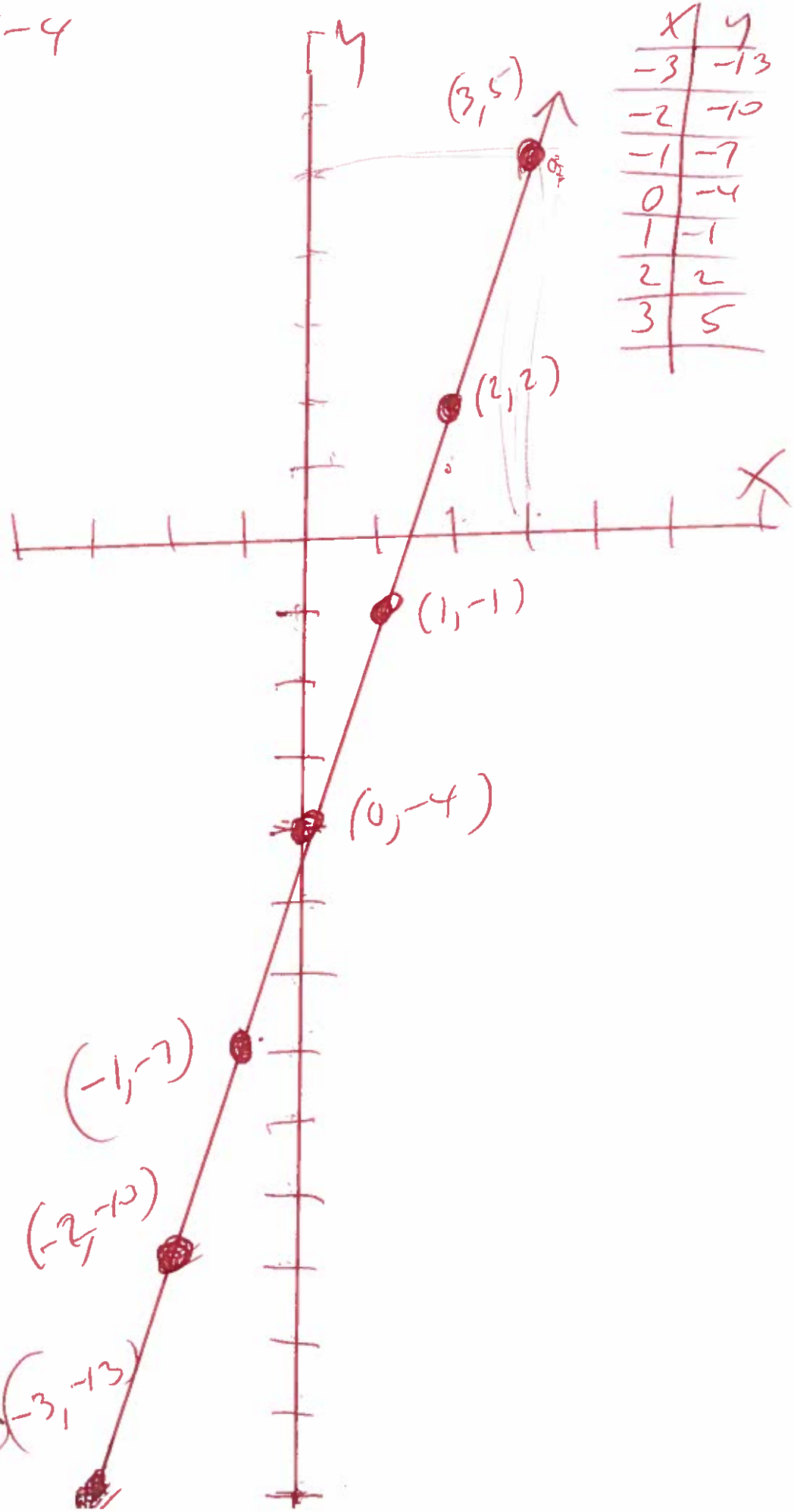
$y = 2$

$y = 3(3) - 4$

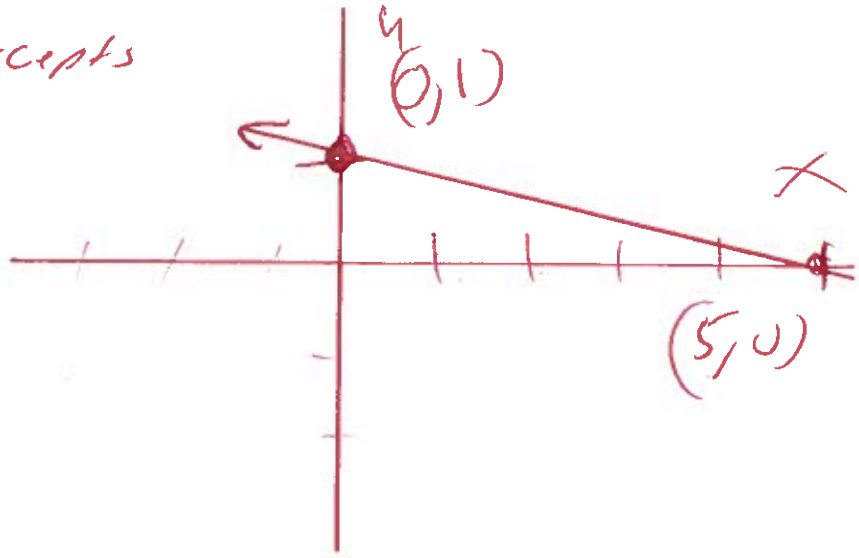
$y = 9 - 4$

$y = 5$

x	y
-3	-13
-2	-10
-1	-7
0	-4
1	-1
2	2
3	5



(55.) find the intercepts



x-intercept = 5
OR (5,0)

y-intercept = 1
OR (0,1)

(56.) $x^2 - 2x - 48 = 0$

Solve

$(x+6)(x-8) = 0$

Possible
48.1
24.2
12.4
6.8
3.16

set $x+6=0$ OR $x-8=0$

$x+6-6=0-6$ OR $x-8+8=0+8$

$x = -6$ OR $x = 8$

57. $x^2 = 3x + 40$ Solve

$x^2 - 3x - 40 = 0$ rewrite

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

Possible: 40·1, 20·2, 10·4, 8·5

set $x+5=0$ OR $x-8=0$

$x+5-5 = 0-5$ OR $x-8+8 = 0+8$

$x = -5$ or $x = 8$

58. $8x^2 + 10x - 7 = 0$ Solve

Possible: 8·1, 4·2, 7·1

$(2x-1)(4x+7) = 0$

set $2x-1=0$ OR $4x+7=0$

$2x-1+1 = 0+1$ OR $4x+7-7 = 0-7$

$2x = 1$ OR $4x = -7$

$\frac{2x}{2} = \frac{1}{2}$ OR $\frac{4x}{4} = \frac{-7}{4}$

$x = \frac{1}{2}$ OR $x = \frac{-7}{4}$

59. $2x^2 = 5x + 42$ Solve

(2.1)

42.1
21.2
6.7
3.14

$2x^2 - 5x - 42 = 0$ rewrite

$(2x + 7)(x - 6) = 0$

Let $2x + 7 = 0$ OR $x - 6 = 0$

$2x + 7 - 7 = 0 - 7$ OR $x - 6 + 6 = 0 + 6$

$2x = -7$

$\frac{2x}{2} = \frac{-7}{2}$ OR $x = 6$

$x = -7/2$

60. $3x^2 + 15x = 0$

$3x(x + 5) = 0$

Let $3x = 0$ OR $x + 5 = 0$

$\frac{3x}{3} = \frac{0}{3}$ OR $x + 5 - 5 = 0 - 5$

$x = 0$ OR $x = -5$

61. $(x-5)^2 = 25$

$\sqrt{(x-5)^2} = \pm\sqrt{25}$

$x-5 = \pm 5$

so

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

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

$x = 0$ OR $x = 10$

Check

$(x-5)^2 = 25$

$(0-5)^2 = 25$

$(-5)^2 = 25$

$(-5)(-5) = 25$

$25 = 25$

Good

$(x-5)^2 = 25$

$(10-5)^2 = 25$

$(5)^2 = 25$

$(5)(5) = 25$

$25 = 25$

Good

(62)

Solve by completing the square

$x^2+4x=77$

$x^2+4x+\left(\frac{1}{2}(4)\right)^2=77+\left(\frac{1}{2}(4)\right)^2$

$x^2+4x+(2)^2=77+(2)^2$

$x^2+4x+4=77+4$

$(x+2)(x+2)=81$

$(x+2)^2=81$

$\sqrt{(x+2)^2}=\pm\sqrt{81}$

$x+2=\pm 9$

$x+2=-9$ OR $x+2=9$

$x+2-2=-9-2$ OR $x+2-2=9-2$

$x=-11$ OR $x=7$

Completed square
Add to Both sides
$\left(\frac{1}{2}(4)\right)^2$

63. $x^2 - 4x = 2$ Solve by completing the square

$x^2 - 4x + \left(\frac{1}{2}(-4)\right)^2 = 2 + \left(\frac{1}{2}(-4)\right)^2$

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

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

$x^2 - 4x + 4 = 6$

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

$(x-2)^2 = 6$ rewrite

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

$x - 2 = \pm\sqrt{6}$

$x - 2 + 2 = \pm\sqrt{6} + 2$

$x = \pm\sqrt{6} + 2$

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

$x = 2 + \sqrt{6}$ OR $x = 2 - \sqrt{6}$

Complete the square: add to both sides $\left(\frac{1}{2}(-4)\right)^2$

(64) $x^2+5x+6=0$

Solve using Quadratic formula

$1x^2+5x+6=0$

$a=1,\ b=5,\ c=6$

$$x=\frac{-b\pm\sqrt{6^2-4ac}}{2a}$$

$$x=\frac{-(5)\pm\sqrt{(5)^2-4(1)(6)}}{2(1)}$$

$$x=\frac{-5\pm\sqrt{25-24}}{2}$$

$$x=\frac{-5\pm\sqrt{1}}{2}$$

$$x=\frac{-5\pm1}{2}$$

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

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

$x=-3$ OR $x=-2$

(65) $x^2 + 13x + 8 = 0$

Solve using the Quadratic formula

$1x^2 + 13x + 8 = 0$

$a = 1,\ b = 13,\ c = 8$

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

$$x = \frac{-(13) \pm \sqrt{(13)^2 - 4(1)(8)}}{2(1)}$$

$$x = \frac{-13 \pm \sqrt{169 - 32}}{2}$$

$$x = \frac{-13 \pm \sqrt{137}}{2}$$

$$x = \frac{-13 + \sqrt{137}}{2} \quad \text{or} \quad x = \frac{-13 - \sqrt{137}}{2}$$

(66) $2x^2 - 9x - 2 = 0$

Solve using Quadratic formula

$a = 2,\ b = -9,\ c = -2$

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

$$x = \frac{-(-9) \pm \sqrt{(-9)^2 - 4(2)(-2)}}{2(2)}$$

$$x = \frac{9 \pm \sqrt{81 + 16}}{4}$$

$$x = \frac{9 \pm \sqrt{97}}{4}$$

$$x = \frac{9 + \sqrt{97}}{4} \quad \text{or} \quad x = \frac{9 - \sqrt{97}}{4}$$

(67) $1x^2 - 10x + 50 = 0$

Solve using Quadratic formula

$a = 1,\ b = -10,\ c = 50$

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

$$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(50)}}{2(1)}$$

$$x = \frac{10 \pm \sqrt{100 - 200}}{2}$$

$$x = \frac{10 \pm \sqrt{-100}}{2}$$

$$x = \frac{10 \pm 10i}{2}$$

$$x = 5 \pm 5i$$

$x = 5 + 5i$ or $x = 5 - 5i$

(68) $3x^2 - 7x = 6$

$3x^2 - 7x - 6 = 0$

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

Let $3x + 2 = 0$ OR $x - 3 = 0$

$3x + 2 - 2 = 0 - 2$ OR $x - 3 + 3 = 0 + 3$

$3x = -2$ OR $x = 3$

$\frac{3x}{3} = \frac{-2}{3}$

$x = -\frac{2}{3}$

Use Quadratic formula

$3x^2 - 7x - 6 = 0$

$a = 3,\ b = -7,\ c = -6$

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

$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(3)(-6)}}{2(3)}$

$x = \frac{7 \pm \sqrt{49 + 72}}{6}$

$x = \frac{7 \pm \sqrt{121}}{6}$

$x = \frac{7 \pm 11}{6}$

$x = \frac{7 - 11}{6}$ OR $x = \frac{7 + 11}{6}$

$x = \frac{-4}{6}$ OR $x = \frac{18}{6}$

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

$x = -\frac{2}{3}$ OR

(69) $3x^2+7=22x$

$3x^2+7-22x=0$

$3x^2-22x+7=0$

$(3x-1)(x-7)=0$

Let $3x-1=0$ OR $x-7=0$

$3x-1+1=0+1$ OR $x-7+7=0+7$

$3x=1$ OR $x=7$

$\frac{3x}{3}=\frac{1}{3}$

$x=\frac{1}{3}$

OR use Quad formula

$3x^2-22x+7=0$

$a=3,\ b=-22,\ c=7$

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

$x=\frac{-(-22)\pm\sqrt{(-22)^2-4(3)(7)}}{2(3)}$

$x=\frac{22\pm\sqrt{484-84}}{6}$

$x=\frac{22\pm\sqrt{400}}{6}$

$x=\frac{22\pm20}{6}$

$x=\frac{22-20}{6}$ OR $x=\frac{22+20}{6}$

$x=\frac{2}{6}$ OR $x=\frac{42}{6}$

$x=\frac{1}{3}$ OR $x=7$

(10.) $x^2+6x=5$

Use Quadratic formula

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

$1x^2+6x-5=0$

$a=1,\ b=6,\ c=-5$

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

$$x=\frac{-(6)\pm\sqrt{(6)^2-4(1)(-5)}}{2(1)}$$

$$x=\frac{-6\pm\sqrt{36+20}}{2}$$

$$x=\frac{-6\pm\sqrt{56}}{2}$$

$$x=\frac{-6\pm\sqrt{4\cdot14}}{2}$$

$$x=\frac{-6\pm\sqrt{4}\sqrt{14}}{2}$$

$$x=\frac{-6\pm2\sqrt{14}}{2}$$

$$x=-3\pm1\sqrt{14}$$

$$x=-3\pm\sqrt{14}$$

Primes 2, 3, 5, 7.

2	56
2	28
2	14
7	7
	1

$x=-3+\sqrt{14}$ or $x=-3-\sqrt{14}$

(71.) $3x^2 - 30x + 75 = 0$

$3(x^2 - 10x + 25) = 0$

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

Set $3 = 0$ OR $x-5=0$ OR $x-5=0$

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

$x = 5$ OR $x = 5$

OR

Just same thing repeat

$\{5\}$

(12) $\sqrt{2x+19} = x+8$

$(\sqrt{2x+19})^2 = (x+8)^2$

$2x+19 = (x+8)(x+8)$

$2x+19 = x^2+8x+8x+64$

$2x+19 = x^2+16x+64$

$0 = x^2+16x+64-2x-19$

$0 = x^2+14x+45$

$0 = (x+5)(x+9)$

$x+5=0$ OR $x+9=0$

$x+5-5=0-5$ OR $x+9-9=0-9$

$x=-5$ OR ~~$x=-9$~~

Possible
45, 1
15, 3
5, 9

answer
$x=-5$

Check

$\sqrt{2x+19} = x+8$

$\sqrt{2(-5)+19} = (-5)+8$

$\sqrt{-10+19} = -5+8$

$\sqrt{9} = 3$

$3 = 3$

Good

Check

$\sqrt{2x+19} = x+8$

$\sqrt{2(-9)+19} = (-9)+8$

$\sqrt{-18+19} = -9+8$

$\sqrt{1} = -1$

$1 \neq -1$

BAD

(73) $-4x \geq 20$

Negative

divide by -4 and turn the alligator around

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

$x \leq -5$

$(-\infty, -5]$

(74) $3 < 2x - 1 \leq 9$

$3 + 1 < 2x - 1 + 1 \leq 9 + 1$

$4 < 2x \leq 10$

$\frac{4}{2} < \frac{2x}{2} \leq \frac{10}{2}$

$2 < x \leq 5$

divide by 2 positive leave the alligator alone

$(2, 5]$

7.5 $f(x) = \begin{cases} x+3 & \text{if } x < -1 \\ x-3 & \text{if } x \geq -1 \end{cases}$

$f(x) = x+3$

x	f(x)
-2	1
-1	2 OPEN

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

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

$f(-2) = 1$

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

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

$f(-1) = 2$

$f(x) = x-3$

x	f(x)
-1	-4 close
0	-3

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

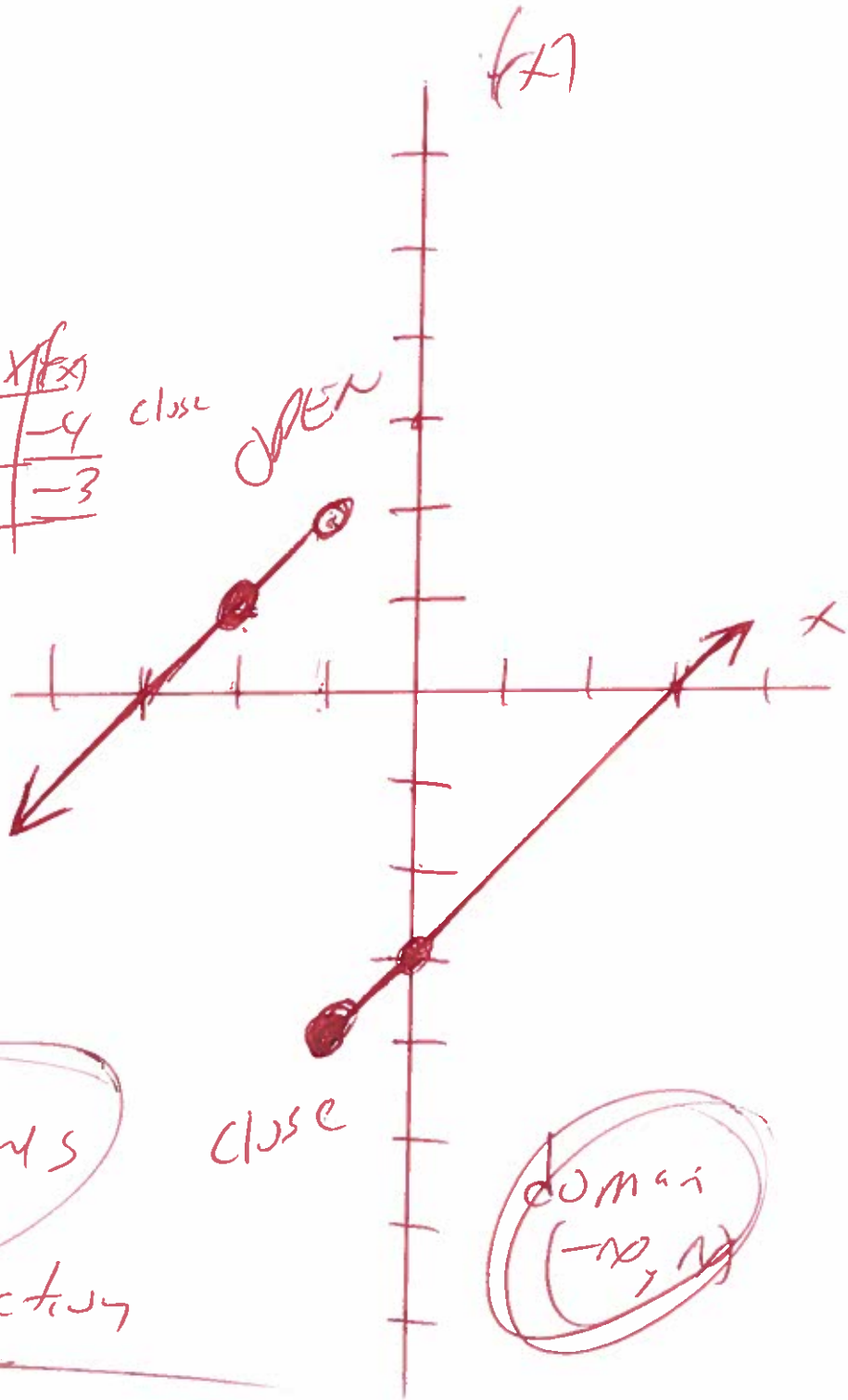
$f(-1) = -1-3$

$f(-1) = -4$

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

$f(0) = 0-3$

$f(0) = -3$



Parallel Lines

No intersection

close

domain $(-\infty, \infty)$

(76) Find the domain

$f(x) = \sqrt{12 - 3x}$

Let

$12 - 3x \geq 0$

$12 - 3x - 12 \geq 0 - 12$

$-3x \geq -12$

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

divide by -3 and turn all signs around

$x \leq 4$

4

$(-\infty, 4]$

Formula domain

$f(x) = \sqrt{Ax + B}$

Let $Ax + B \geq 0$

77

Part I

$f(x) = 3x^2 + 28x + 32$, $g(x) = x + 8$

$(f+g)(x) =$

$f(x) + g(x) =$

$(3x^2 + 28x + 32) + (x + 8) =$

$3x^2 + 28x + 32 + x + 8 =$

$3x^2 + 29x + 40 =$ domain $(-\infty, \infty)$

$(f-g)(x) =$

$f(x) - g(x) =$

$(3x^2 + 28x + 32) - (x + 8) =$

$3x^2 + 28x + 32 - x - 8 =$

$3x^2 + 27x + 24 =$ domain $(-\infty, \infty)$

77. Part 2

$f(x) = 3x^2 + 28x + 32$, $g(x) = x + 8$

$(f \cdot g)(x) =$

$f(x) \cdot g(x) =$

$(3x^2 + 28x + 32)(x + 8) =$

$3x^3 + 24x^2 + 28x^2 + 224x + 32x + 256 =$

$3x^3 + 52x^2 + 256x + 256 =$

domain $(-\infty, \infty)$

$\left(\frac{f}{g}\right)(x) =$

$\frac{f(x)}{g(x)} =$

$\frac{3x^2 + 28x + 32}{x + 8} =$

$\frac{(3x+4)(x+8)}{(x+8)} =$

$3x + 4$

domain

$x + 8 = 0$

$x + 8 - 8 = 0 - 8$

$x = -8$

$(-\infty, -8) \cup (-8, \infty)$

Domain

(28) Unit 1

$f(x) = 2 - x$ and $g(x) = 4x^2 + x + 4$

$(f \circ g)(x) =$

$f(g(x)) =$

$f(4x^2 + x + 4) =$

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

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

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

$(f \circ g)(x) = -4x^2 - x - 2$

$(g \circ f)(x) =$

$g(f(x)) =$

$g(2 - x) =$

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

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

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

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

$16 - 16x + 4x^2 + 2 - x + 4 =$

$4x^2 - 17x + 22$ $(g \circ f)(x) = 4x^2 - 17x + 22$

78 Part 2 $f(x) = 2 - x$ and $g(x) = 4x^2 + x + 4$

$(fog)(x) = -4x^2 - x - 2$ from Part 1

$(fog)(3) = -4(3)^2 - (3) - 2$

$(fog)(3) = -4(3)(3) - (3) - 2$

$(fog)(3) = -4(9) - (3) - 2$

$(fog)(3) = -36 - 3 - 2$

$(fog)(3) = -39 - 2$

$(fog)(3) = -41$ ✓

$(gof)(x) = 4x^2 - 17x + 22$

$(gof)(3) = 4(3)^2 - 17(3) + 22$

$(gof)(3) = 4(3)(3) - 17(3) + 22$

$(gof)(3) = 4(9) - 17(3) + 22$

$(gof)(3) = 36 - 51 + 22$

$(gof)(3) = -15 + 22$

$(gof)(3) = 7$ ✓ 2

(79) Find distance

(8, 2) and (20, 11)

x_1 y_1 x_2 y_2

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$d = \sqrt{((8) - (20))^2 + ((2) - (11))^2}$$

$$d = \sqrt{(8 - 20)^2 + (2 - 11)^2}$$

$$d = \sqrt{(-12)^2 + (-9)^2}$$

$$d = \sqrt{144 + 81}$$

$$d = \sqrt{225}$$

$$d = 15$$

(80) Find mid point

$(4, 2)$ & $(10, 6)$

$x_1\ y_1$ $\quad$ $x_2\ y_2$

$$\text{Midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$\text{Midpoint} = \left(\frac{(4) + (10)}{2}, \frac{(2) + (6)}{2} \right)$$

$$\text{Midpoint} = \left(\frac{4+10}{2}, \frac{2+6}{2} \right)$$

$$\text{Midpoint} = \left(\frac{14}{2}, \frac{8}{2} \right)$$

$$\text{Mid point} = (7, 4)$$

(8.) $f(x) = (x-4)^2 + 4$

graph

x	f(x)
3	5
4	4
5	5

$f(3) = (3-4)^2 + 4$

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

$f(3) = (-1)(-1) + 4$

$f(3) = 1 + 4$

$f(3) = 5$

$f(4) = (4-4)^2 + 4$

$f(4) = (0)^2 + 4$

$f(4) = (0)(0) + 4$

$f(4) = 0 + 4$

$f(4) = 4$

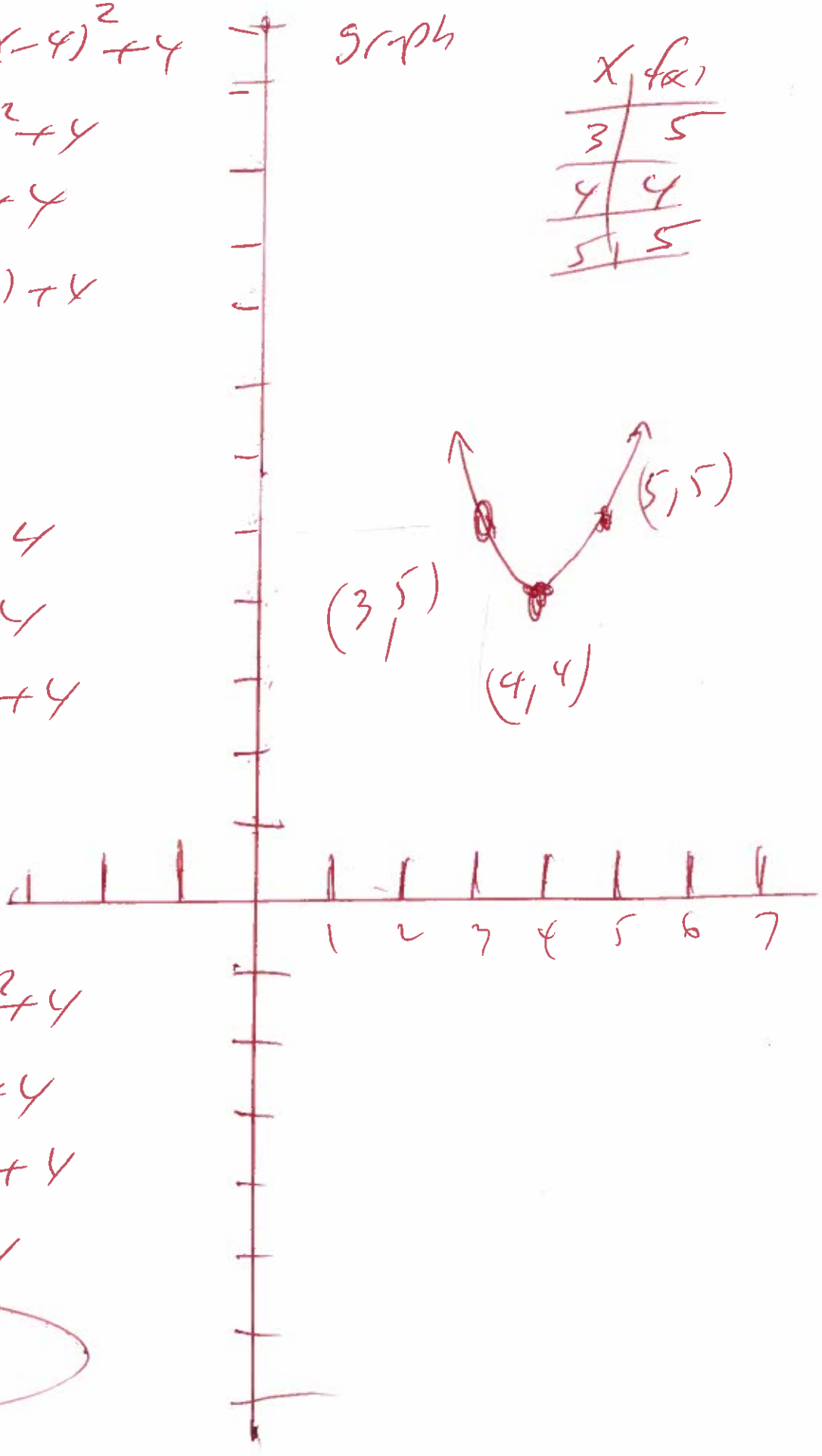
$f(5) = (5-4)^2 + 4$

$f(5) = (1)^2 + 4$

$f(5) = (1)(1) + 4$

$f(5) = 1 + 4$

$f(5) = 5$



(82) $f(x) = x^2 - 2x + 1$

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

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

Vertex $= \left(-\frac{-(-2)}{2(1)}, f\left(\frac{+(-2)}{2(1)}\right)\right)$

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

Vertex $= (1, f(1))$

Vertex $= (1, (1)^2 - 2(1) + 1)$

Vertex $= (1, (1)(1) - 2(1) + 1)$

Vertex $= (1, 1 - 2 + 1)$

Vertex $= (1, -1 + 1)$

Vertex $= (1, 0)$

Find y-intercept let $x = 0$

$f(x) = x^2 - 2x + 1$

$f(0) = (0)^2 - 2(0) + 1$

$f(0) = (0)(0) - 2(0) + 1$ $(0, 1)$

$f(0) = 0 - 0 + 1$ y-intercept

$f(0) = 1$

Graph

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

Find x-intercept let $y = 0$

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

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

Set $x - 1 = 0$ or $x - 1 = 0$

$x - 1 + 1 = 0 + 1$ or $x - 1 + 1 = 0 + 1$

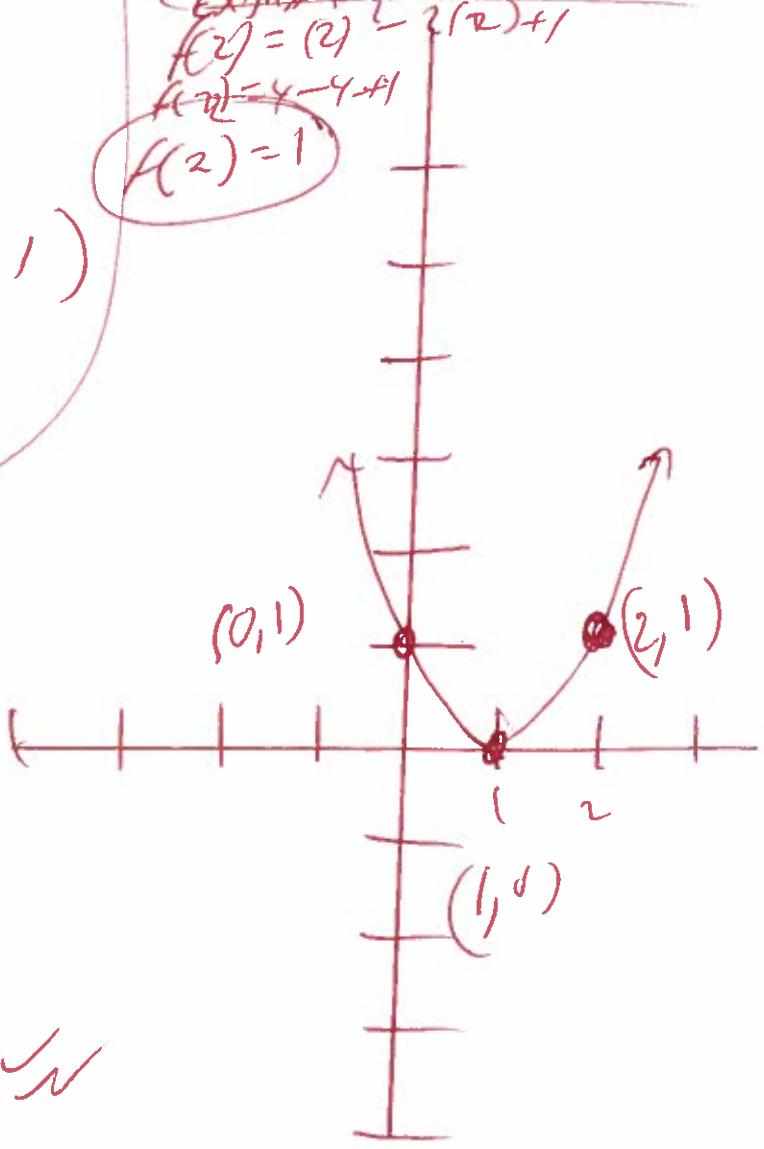
$x = 1$ or $x = 1$

$(1, 0)$ x-intercept

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

$f(2) = 4 - 4 + 1$

$f(2) = 1$



(83.) $f(x) = 3x^2 + 18x + 8$ find vertex

$a=3,\ b=18,\ c=8$

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

$Vertex = \left(-\frac{(18)}{2(3)},\ f\left(\frac{(18)}{2(3)}\right)\right)$

$Vertex = \left(\frac{-18}{6},\ f\left(\frac{-18}{6}\right)\right)$

$Vertex = (-3,\ f(-3))$

$Vertex = (-3,\ 3(-3)^2 + 18(-3) + 8)$

$Vertex = (-3,\ 3(-3)(-3) + 18(-3) + 8)$

$Vertex = (-3,\ 3(9) + 18(-3) + 8)$

$Vertex = (-3,\ 27 - 54 + 8)$

$Vertex = (-3,\ -27 + 8)$

$Vertex = (-3,\ -19)$

(84) $f(x) = 2x^2 + 12x + 9$

$a = 2,\ b = 12,\ c = 9$

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

$Vertex = \left(\frac{-(12)}{2(2)},\ f\left(\frac{(12)}{2(2)}\right)\right)$

$Vertex = \left(\frac{-12}{4},\ f\left(\frac{12}{4}\right)\right)$

$Vertex = (-3,\ f(-3))$

$Vertex = (-3,\ 2(-3)^2 + 12(-3) + 9)$

$Vertex = (-3,\ 2(-3)(-3) + 12(-3) + 9)$

$Vertex = (-3,\ 2(9) + 12(-3) + 9)$

$Vertex = (-3,\ 18 - 36 + 9)$

$Vertex = (-3,\ -18 + 9)$

$Vertex = (-3, -9)$

(85) $f(x) = -x^2 + 2x + 10$ find vertex

$a = -1,\ b = 2,\ c = 10$

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

$\text{Vertex} = \left(-\frac{(2)}{2(-1)},\ f\left(\frac{(2)}{2(-1)}\right)\right)$

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

$\text{Vertex} = (1,\ f(1))$

$\text{Vertex} = (1,\ -(1)^2 + 2(1) + 10)$

$\text{Vertex} = (1,\ -(1)(1) + 2(1) + 10)$

$\text{Vertex} = (1,\ -1 + 2 + 10)$

$\text{Vertex} = (1,\ 1 + 10)$

$\text{Vertex} = (1, 11)$

(8c) $f(x) = -x^2 - 10x + 7$

$a = -1, \quad b = -10, \quad c = 7$

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

$Vertex = \left(-\frac{(-10)}{2(-1)}, \; f\left(\frac{(-10)}{2(-1)}\right)\right)$

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

$Vertex = (-5, \; f(-5))$

$Vertex = (-5, \; -(-5)^2 - 10(-5) + 7)$

$Vertex = (-5, \; -(-5)(-5) - 10(-5) + 7)$

$Vertex = (-5, \; -(25) - 10(-5) + 7)$

$Vertex = (-5, \; -25 + 50 + 7)$

$Vertex = (-5, \; 25 + 7)$

$Vertex = (-5, \; 32)$

#7

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

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

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

$f(0) = (-1)(-1) - 4$

$f(0) = 1 - 4$

$f(0) = -3$

$f(1) = (1-1)^2 - 4$

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

$f(1) = (0)(0) - 4$

$f(1) = 0 - 4$

$f(1) = -4$

$f(2) = (2-1)^2 - 4$

$f(2) = (1)^2 - 4$

$f(2) = (1)(1) - 4$

$f(2) = 1 - 4$

$f(2) = -3$

$f(3) = (3-1)^2 - 4$

$f(3) = (2)^2 - 4$

$f(3) = (2)(2) - 4$

$f(3) = 4 - 4$

$f(3) = 0$

EXTRA DOT

$f(-1) = (-1-1)^2 - 4$

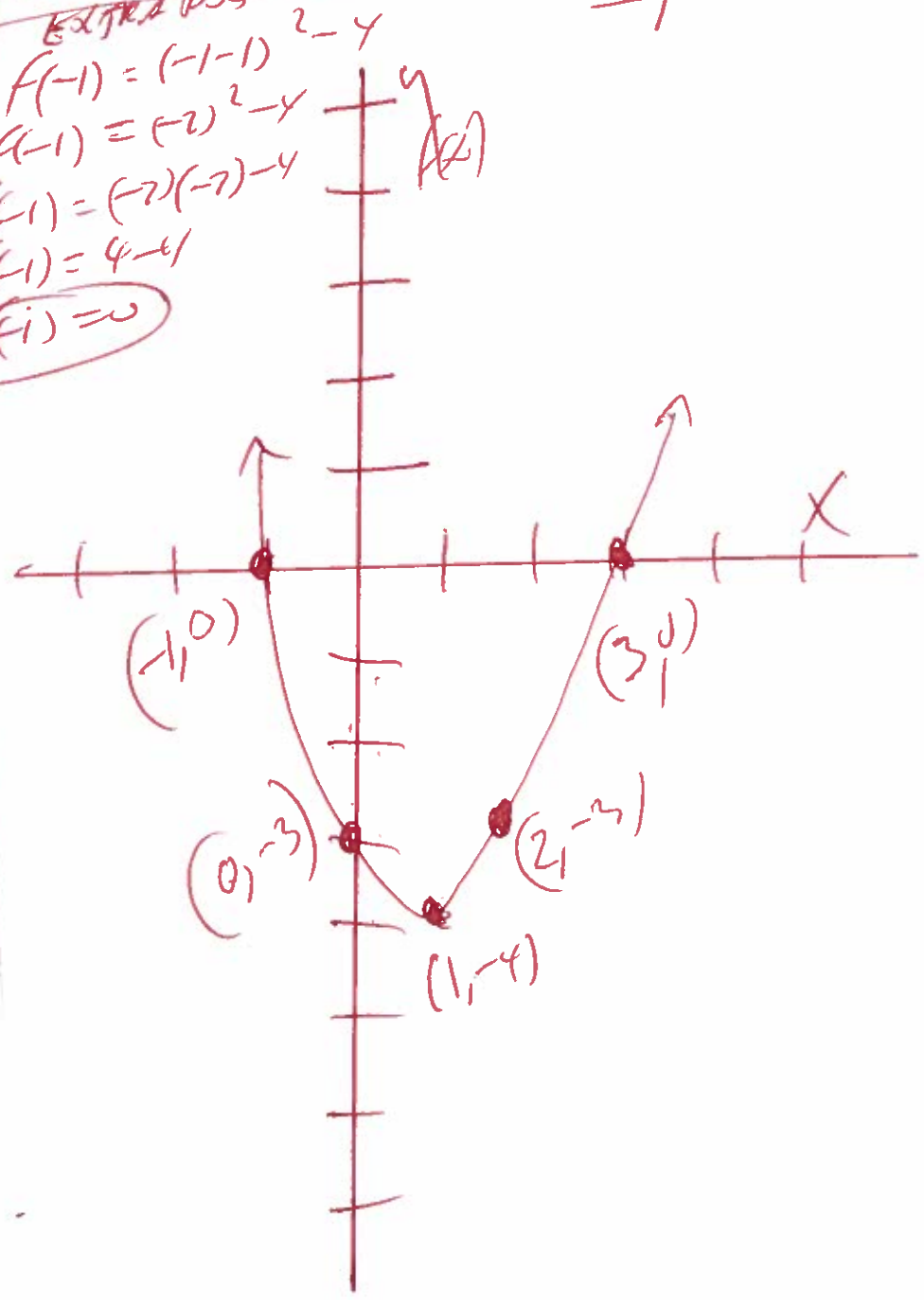
$f(-1) = (-2)^2 - 4$

$f(-1) = (-2)(-2) - 4$

$f(-1) = 4 - 4$

$f(-1) = 0$

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



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

$f(-4) = (-4+3)^2 - 4$

$f(-4) = (-1)^2 - 4$

$f(-4) = (-1)(-1) - 4$

$f(-4) = 1 - 4$

$f(-4) = -3$

$f(-3) = (-3+3)^2 - 4$

$f(-3) = (0)^2 - 4$

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

$f(-3) = 0 - 4$

$f(-3) = -4$

$f(-2) = (-2+3)^2 - 4$

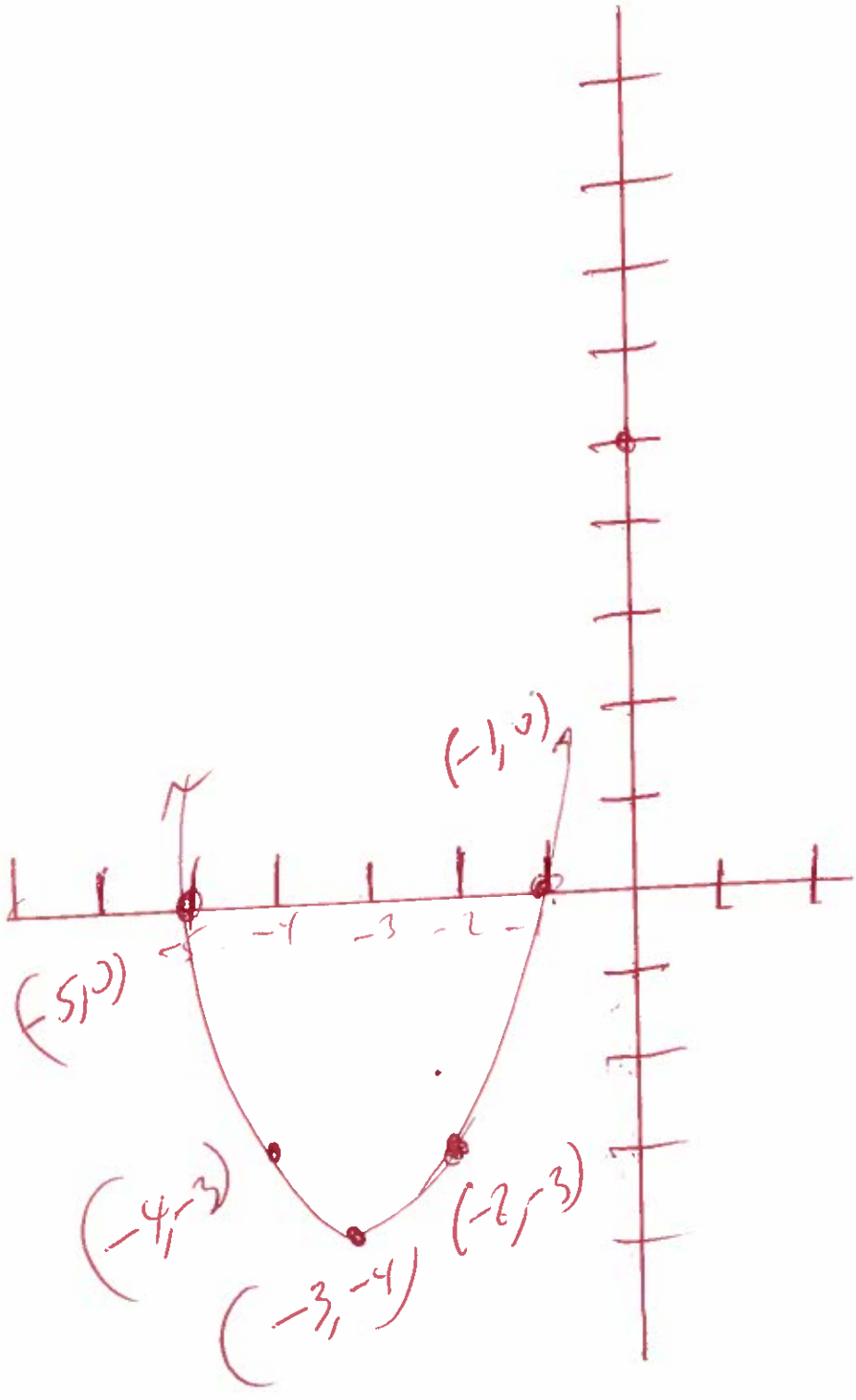
$f(-2) = (1)^2 - 4$

$f(-2) = (1)(1) - 4$

$f(-2) = 1 - 4$

$f(-2) = -3$

x	f(x)
-4	-3
-3	-4
-2	-3



(89) $f(x) = (x-3)^2 + 1$

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

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

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

$f(2) = 1 + 1$

$f(2) = 2$

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

$f(3) = (0)^2 + 1$

$f(3) = (0)(0) + 1$

$f(3) = 0 + 1$

$f(3) = 1$

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

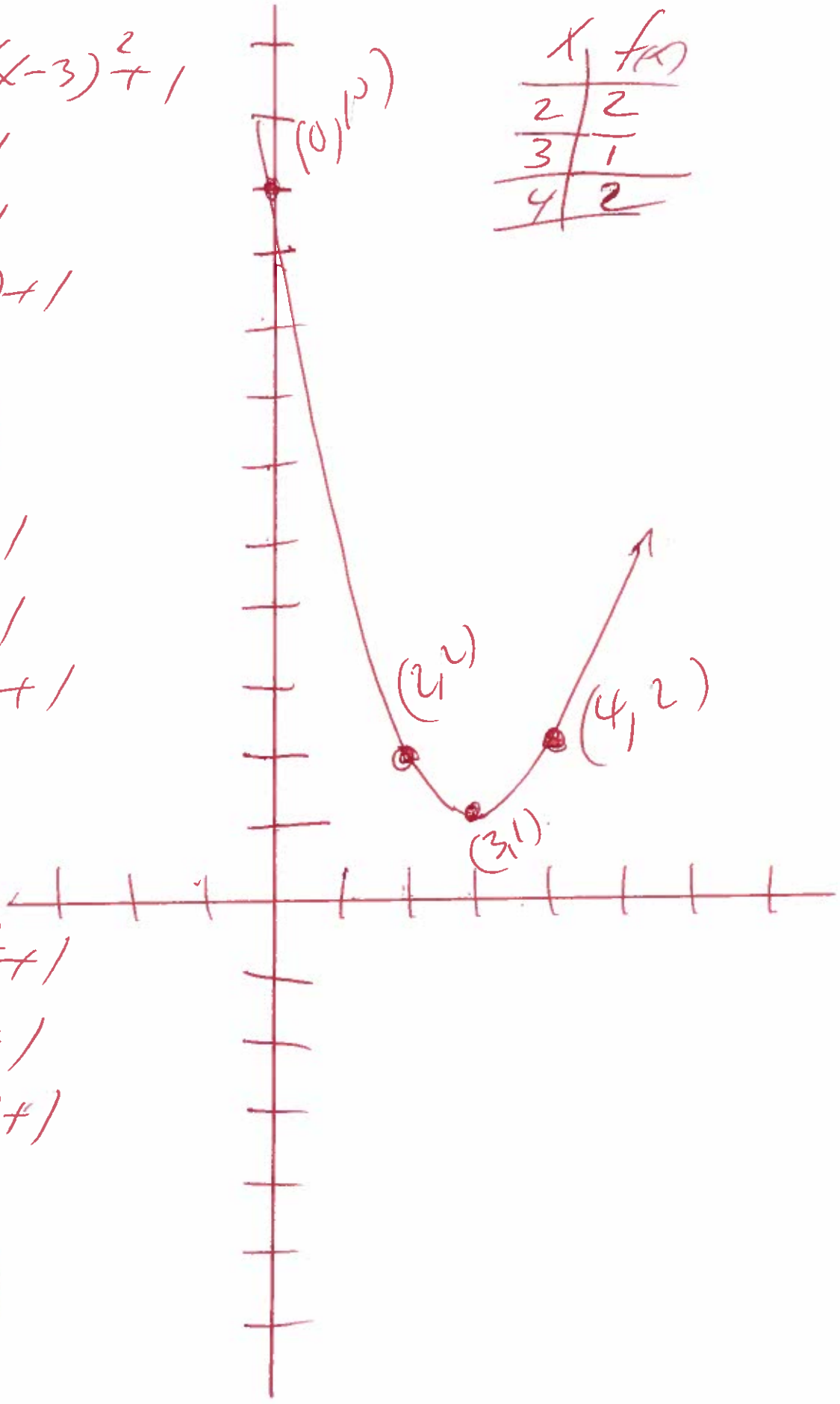
$f(4) = (1)^2 + 1$

$f(4) = (1)(1) + 1$

$f(4) = 1 + 1$

$f(4) = 2$

x	f(x)
2	2
3	1
4	2



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

$a = 1,\ b = 4,\ c = -5$

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

$\text{Vertex} = \left(-\frac{(4)}{2(1)},\ f\left(\frac{-(4)}{2(1)}\right)\right)$

$\text{Vertex} = \left(\frac{-4}{2},\ f\left(\frac{-4}{2}\right)\right)$

$\text{Vertex} = (-2,\ f(-2))$

$\text{Vertex} = (-2,\ (-2)^2 + 4(-2) - 5)$

$\text{Vertex} = (-2,\ (-2)(-2) + 4(-2) - 5)$

$\text{Vertex} = (-2,\ 4 - 8 - 5)$

$\text{Vertex} = (-2,\ -4 - 5)$

$\text{Vertex} = (-2,\ -9)$

find y-intercept let $x = 0$

$f(x) = x^2 + 4x - 5$

$f(0) = (0)^2 + 4(0) - 5$

$f(0) = (0)(0) + 4(0) - 5$

$f(0) = 0 + 0 - 5$

$f(0) = -5$

$(0, -5)$

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

find x-intercept let $y = 0$

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

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

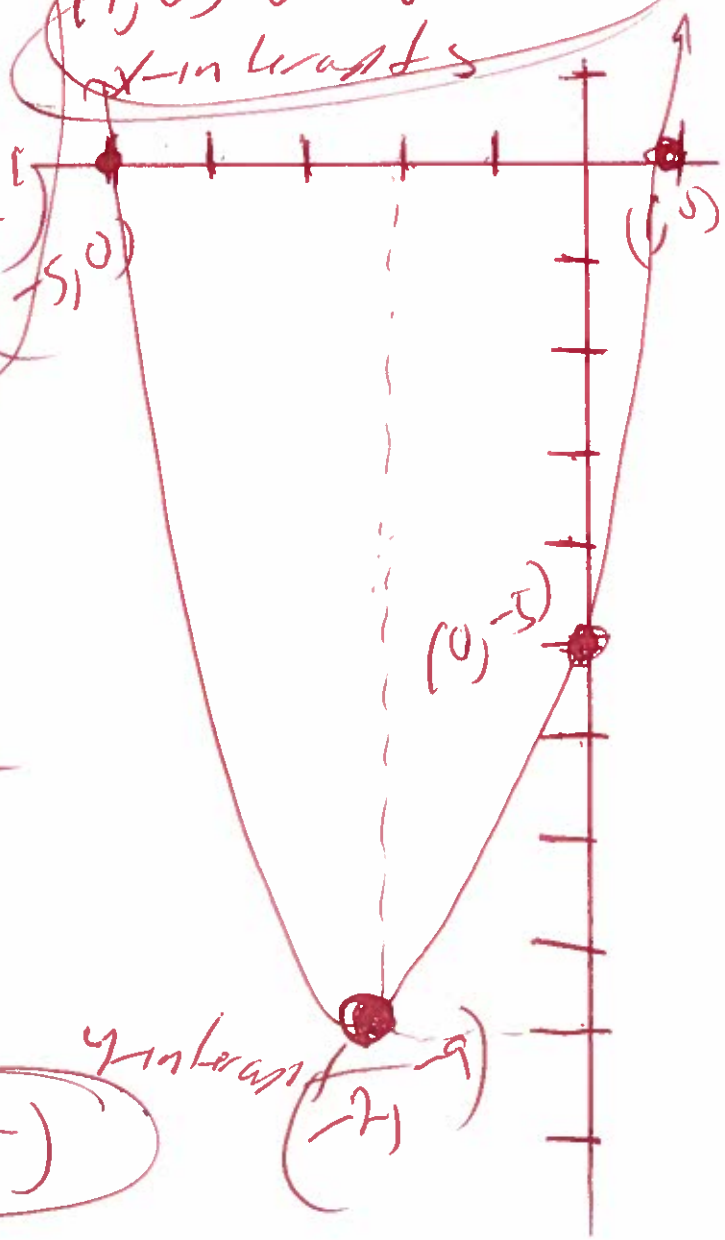
let $x - 1 = 0$ or $x + 5 = 0$

$x - 1 + 1 = 0 + 1$ or $x + 5 - 5 = 0 - 5$

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

$(1, 0)$ or $(-5, 0)$

x-intercepts



(9) $f(x) = 4x - x^2 + 5$

$f(x) = -x^2 + 4x + 5$

$a = -1,\ b = 4,\ c = 5$

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

Vertex $= \left(\frac{-(4)}{2(-1)}, f\left(\frac{-(4)}{2(-1)}\right)\right)$

Vertex $= \left(\frac{-4}{-2}, f\left(\frac{4}{-2}\right)\right)$

Vertex $= (2, f(2))$

Vertex $= (2, -(2)^2 + 4(2) + 5)$

Vertex $= (2, -(2)(2) + 4(2) + 5)$

Vertex $= (2, -4 + 8 + 5)$

Vertex $= (2, 4 + 5)$

Vertex $= (2, 9)$

Find y-intercept let $x = 0$

$f(x) = -x^2 + 4x + 5$

$f(0) = -(0)^2 + 4(0) + 5$

$f(0) = -(0)(0) + 4(0) + 5$

$f(0) = 0 + 0 + 5$

$f(0) = 5$

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

Find x-intercept let $y = 0$

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

$0 = -1(x^2 - 4x - 5)$

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

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

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

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

$(-1, 0)$ OR $(5, 0)$