Math 041/077 Step

Pre Requisite math course 041218 04-1416

1. $(-12 - 4\ 8) \div 15 - 27 =$

$-60 \div 15 - 27 =$

$-4 - 27 =$

$-31 =$

2. $5(y - 2) = 3y - 10$

$5y - 10 = 3y - 10$

$5y - 10 + 10 = 3y - 10 + 10$

$5y = 3y$

$5y - 3y = 3y - 3y$

$2y = 0$

$\frac{2y}{2} = \frac{0}{2}$

$y = 0$

3. $4(3x-2) = 13x$

$12x - 8 = 13x$

$12x - 8 + 8 = 13x + 8$

$12x = 13x + 8$

$12x - 13x = 13x + 8 - 13x$

$-1x = 8$

$\frac{-1x}{-1} = \frac{8}{-1}$

$x = -8$

4. $\frac{1}{6} - \frac{5}{8} =$

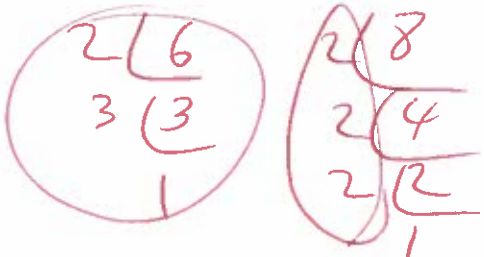
$\frac{1}{6}\left(\frac{4}{4}\right) - \frac{5}{8}\left(\frac{3}{3}\right) =$

$\frac{4}{24} - \frac{15}{24} =$

$\frac{4-15}{24} =$

$\frac{-11}{24} =$

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



$6 = 2 \cdot 3$

$8 = 2 \cdot 2 \cdot 2$

$LCD = 2 \cdot 2 \cdot 2 \cdot 3$

$= 24$

5. $\frac{z}{3} = \frac{z}{5} + 3$ LCD = 15 Mult

$\frac{z}{3}(15) = \frac{z}{5}(15) + \frac{3}{1}(15)$

$z(5) = z(3) + 3(15)$

$5z = 3z + 45$

$5z - 3z = 3z + 45 - 3z$

$2z = 45$

$\frac{2z}{2} = \frac{45}{2}$

$z = \frac{45}{2}$

6. $3.9x - 17 = 2.3x + 7$

$3.9x - 17 + 17 = 2.3x + 7 + 17$

$3.9x = 2.3x + 24$

$3.9x - 2.3x = 2.3x + 24 - 2.3x$

$1.6x = 24$

$\frac{1.6x}{1.6} = \frac{24}{1.6}$

$x = 15$

7. $A = P - PD$

$P = \$349$

$D = 5\% = .05$

discount

$A = \$349 - 349(.05)$

$A = \$349 - \$17.45$

$A = \$331.55$ ← Sale price

discount

8. $A = P + PRT$

$P = \$76000$

$R = 5.5\% = .055$

$T = 2$ years

$A = \$76,000 + \$76000(.055)(2)$

$A = \$76,00 + \$7600(.11)$

$A = \$76,000 + \$8360$ ← Interest

$A = \$84,360$ ← Total amount paid

9. $7(x-5)-8=-43$

$7x-35-8=-43$

$7x-43=-43$

$7x-43+43=-43+43$

$7x=0$

$\frac{7x}{7}=\frac{0}{7}$

$x=0$

10. $5(5x-2)=25x-10$

$25x-10=25x-10$

$25x-10+10=25x-10+10$

$25x=25x$

$25x-25x=25x-25x$

$0=0$

The solution is all real numbers

11. $\frac{x}{4} + 4 = \frac{x}{4}$ LCD = 4 Must

$\frac{x}{4}(4) + \frac{4}{1}(4) = \frac{x}{4}(4)$

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

$1x + 16 = 1x$

$1x + 16 - 16 = 1x - 16$

$1x = 1x - 16$

$1x - 1x = 1x - 16 - 1x$

$0 \neq -16$

There is no solution

12. $3x + 1 = 3(x - 3)$

$3x + 1 = 3x - 9$

$3x + 1 - 1 = 3x - 9 - 1$

$3x = 3x - 10$

$3x - 3x = 3x - 10 - 3x$

$0 \neq -10$

There is no solution

13. $x+y=9$ Solve for y

$x+y-x=9-x$

$y=9-x$

or

$y=-x+9$

14. $5x<-30$

$\frac{5x}{5}<\frac{-30}{5}$

$x<-6$

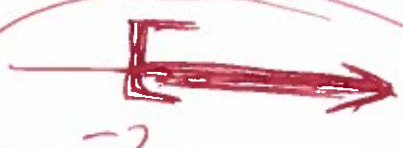
$(-\infty,-6)$

15. $-6x\leq 12$

$\frac{-6x}{-6}\geq\frac{12}{-6}$

Divide by a negative and turn alligator around

$x\geq -2$



$[-2,\infty)$

16. $-4x+2 \geq 2(3-x)$

$-4x+2 \geq 6-2x$

$-4x+2-2 \geq 6-2x-2$

$-4x \geq -2x+4$

$-4x+2x \geq -2x+4+2x$

$-2x \geq 4$

$\frac{-2x}{-2} \leq \frac{4}{-2}$

$x \leq -2$

divide by a negative and turn the alligator around

$(-\infty, -2]$

17. $y = -4x+4$ graph

$y = -4(0)+4$

$y = 0+4$

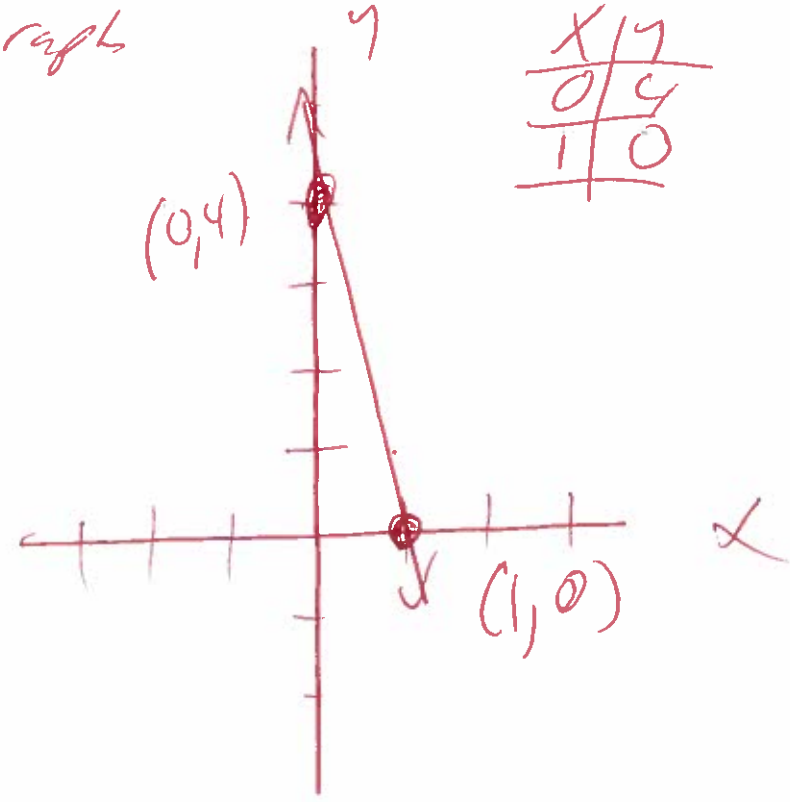
$y = 4$

$y = -4(1)+4$

$y = -4+4$

$y = 0$

x	y
0	4
1	0



18. $y = \frac{1}{2}x - 1$ graph

x	y
0	-1
2	0

$y = \frac{1}{2}(0) - 1$

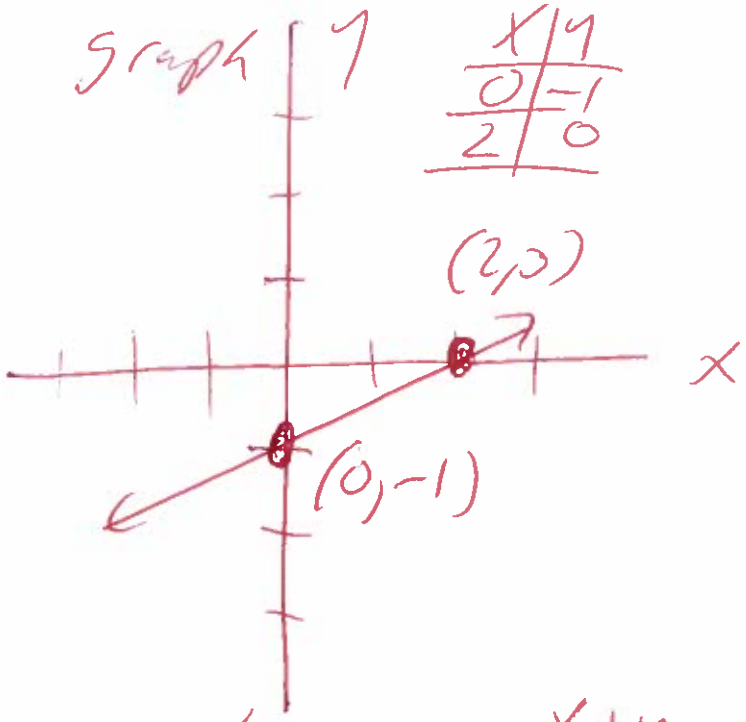
$y = 0 - 1$

$y = -1$

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

$y = 1 - 1$

$y = 0$



19. $8x - 4y = 8$ graph

$8x - 4y - 8x = 8 - 8x$

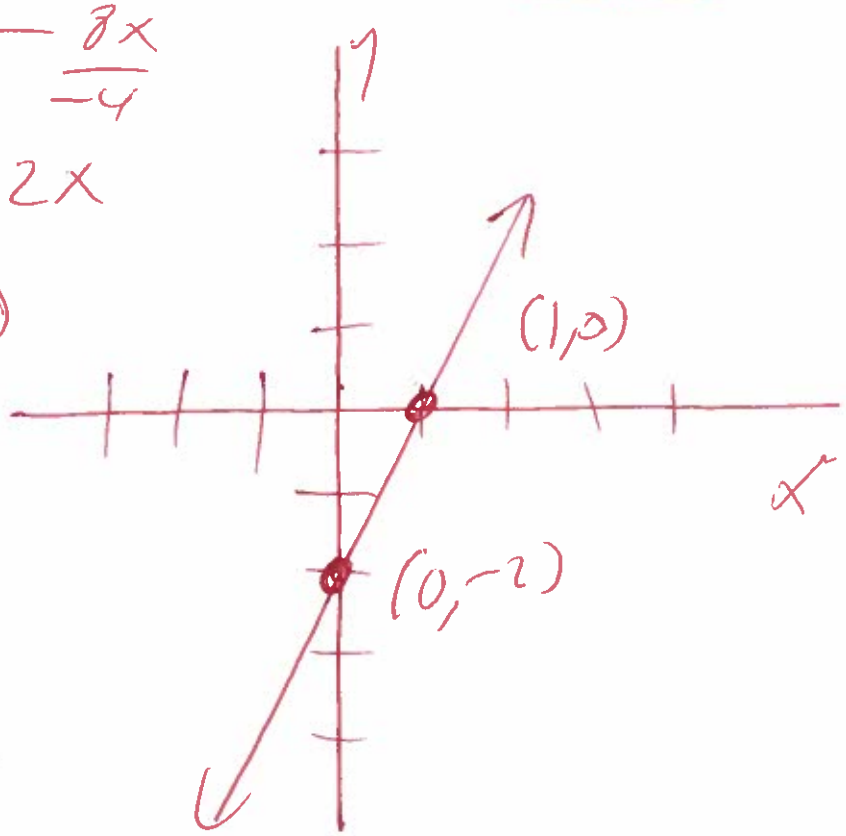
$-4y = 8 - 8x$

$\frac{-4y}{-4} = \frac{8}{-4} - \frac{8x}{-4}$

$y = -2 + 2x$

$y = 2x - 2$

x	y
0	-2
1	0



$y = 2(0) - 2$

$y = 0 - 2$

$y = -2$

$y = 2(1) - 2$

$y = 2 - 2$

$y = 0$

20. $(4, -2)$ and $(6, -4)$ find slope

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

$$m = \frac{y_1 - y_2}{x_1 - x_2}$$

$$m = \frac{(-2) - (-4)}{(4) - (6)}$$

$$m = \frac{-2 + 4}{4 - 6}$$

$$m = \frac{2}{-2}$$

$$m = -1$$

21. $(-3, -7)$ and $(-3, -8)$ find slope

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

$$m = \frac{y_1 - y_2}{x_1 - x_2}$$

$$m = \frac{(-7) - (-8)}{(-3) - (-3)}$$

$$m = \frac{-7 + 8}{-3 + 3}$$

$$m = \frac{1}{0}$$

slope is undefined

22. $(5,-1)$ and $(3,-2)$ find slope

$x_1\ y_1 \qquad x_2\ y_2$

$$m = \frac{y_1 - y_2}{x_1 - x_2}$$

$$m = \frac{(-1)-(-2)}{(5)-(3)}$$

$$m = \frac{-1+2}{5-3}$$

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

23. $(1,4)$ and $(-7,4)$ find slope

$x_1\ y_1 \qquad x_2\ y_2$

$$m = \frac{y_1 - y_2}{x_1 - x_2}$$

$$m = \frac{(4)-(4)}{(1)-(-7)}$$

$$m = \frac{4-4}{1+7}$$

$$m = \frac{0}{8}$$

$$m = 0$$

(24) $8x+y=6$ Find Slope

$8x+y-8x=6-8x$

$y=6-8x$

$y=-8x+6$

formula $y=mx+b$

m = slope, b = y-intercept

$m=-8=$ slope

(25) $2x-3y=6$ Find Slope

$2x-3y-2x=6-2x$

$-3y=6-2x$

$\frac{-3y}{-3}=\frac{6}{-3}-\frac{2x}{-3}$

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

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

formula $y=mx+b$

m = slope, b = y-intercept

$m=\frac{2}{3}=$ slope

(26) $y_1 = \frac{3}{2}x + 5$ $\quad m_1 = \frac{3}{2}$

$y_2 = -\frac{3}{2}x$ $\quad m_2 = -\frac{3}{2}$ Slopes

$m_1 \neq m_2 \quad \frac{3}{2} \neq -\frac{3}{2}$ NOT Parallel

$m_1 \cdot m_2 = \left(\frac{3}{2}\right)\left(-\frac{3}{2}\right) = -\frac{9}{4} \neq -1$ NOT Perpendicular

NEITHER

(27) $4x = 7y + 2$

$-8x + 14y = 2$

$4x = 7y + 2$

$4x - 2 = 7y + 2 - 2$

$4x - 2 = 7y$

$\frac{4x}{7} - \frac{2}{7} = \frac{7y}{7}$

$\frac{4x}{7} - \frac{2}{7} = y$

$y = \frac{4}{7}x - \frac{2}{7}$ $\quad m_1 = \frac{4}{7}$

$-8x + 14y = 2$

$-8x + 14y + 8x = 2 + 8x$

$14y = 2 + 8x$

$\frac{14y}{14} = \frac{2}{14} + \frac{8x}{14}$

$y = \frac{2(1)}{2(7)} + \frac{2(4x)}{2(7)}$

$y = \frac{1}{7} + \frac{4x}{7}$

$y = \frac{4x}{7} + \frac{1}{7}$

$m_2 = \frac{4}{7}$

$m_1 = m_2 = \frac{4}{7}$

Parallel Lines

28. $2+8x=2y$
$2x+8y=3$ Parallel, perpendicular or neither

$2+8x=2y$

$\frac{2}{2}+\frac{8x}{2}=\frac{2y}{2}$

$1+4x=y$ or $y=4x+1$ Slope $m_1=4$

$2x+8y=3$

$2x+8y-2x=3-2x$

$8y=3-2x$

$\frac{8y}{8}=\frac{3}{8}-\frac{2x}{8}$

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

$y=\frac{3}{8}-\frac{1}{4}x$

$y=-\frac{1}{4}x+\frac{3}{8}$ Slope $m_2=-\frac{1}{4}$

$m_1 \cdot m_2=(4)(-\frac{1}{4})=(\frac{4}{1})(\frac{-1}{4})=\frac{-4}{4}=-1$

Lines are perpendicular

29 $3x - 5y = 15$ graph

$-3x - 5y - 3x = 15 - 3x$

$-5y = 15 - 3x$

$\frac{-5y}{-5} = \frac{15}{-5} - \frac{3x}{-5}$

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

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

x	y
0	-3
5	0

$y = \frac{3}{5}(0) - 3$

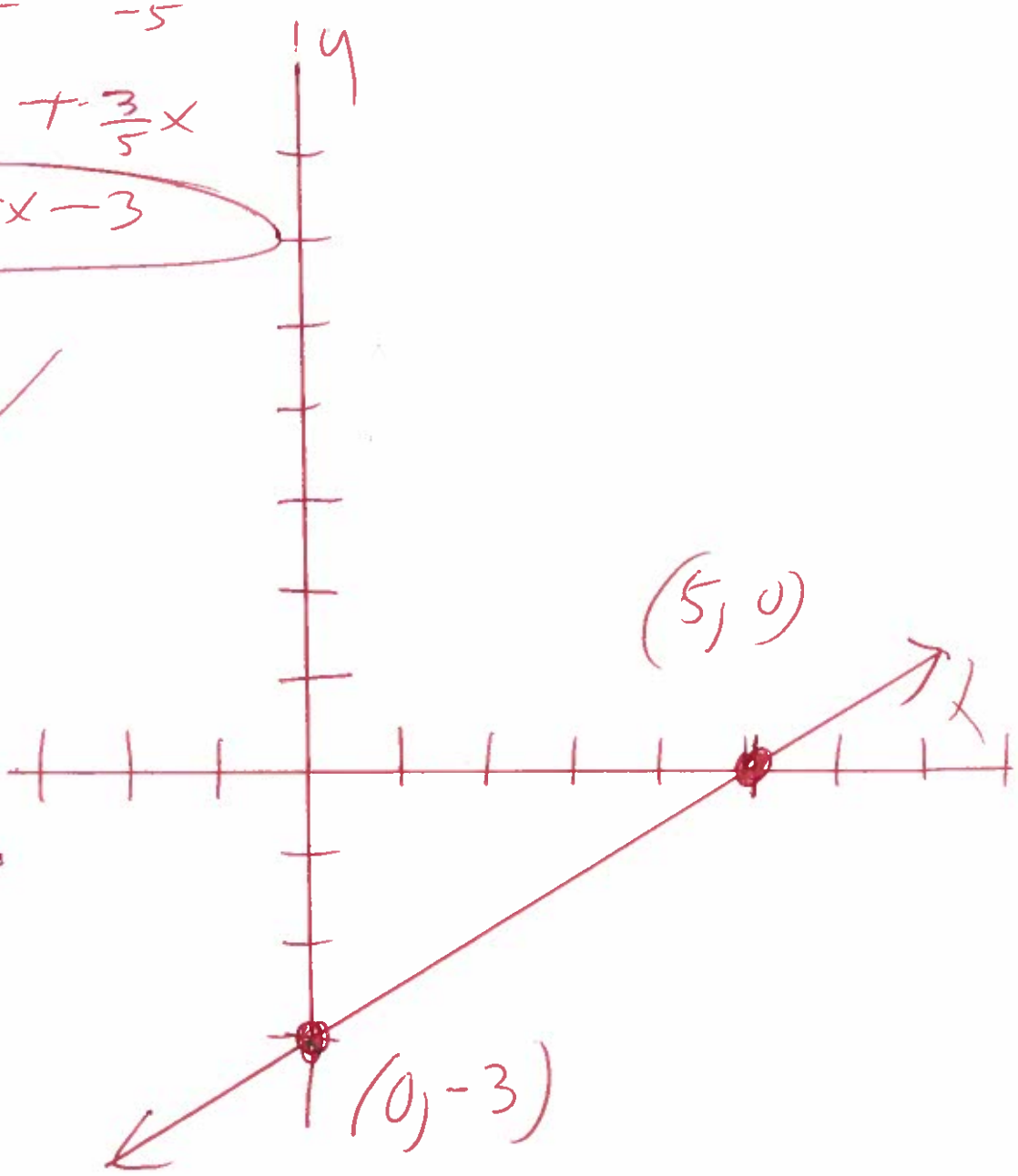
$y = 0 - 3$

$y = -3$

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

$y = 3 - 3$

$y = 0$



(30) find equation of the line with

$m = 5$ = slope point = $(-7, 11)$ (x_1, y_1)

$y - y_1 = m(x - x_1)$ formula

$y - (11) = 5(x - (-7))$

$y - 11 = 5(x + 7)$

$y - 11 = 5x + 35$

$y - 11 + 11 = 5x + 35 + 11$

$y = 5x + 46$

(31.) find equation of the line with

$m = -5$ = slope at y-intercept $(0, 7)$. (x_1, y_1)

$y - y_1 = m(x - x_1)$ formula

$y - (7) = -5(x - (0))$

$y - 7 = -5(x - 0)$

$y - 7 = -5(x)$

$y - 7 = -5x$

$y - 7 + 7 = -5x + 7$

$y = -5x + 7$

32

Find the value of $x^2 - 5x + 3$

for the given value $x = -3$

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

$$(-3)^2 - 5(-3) + 3 =$$

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

$$(9) - 5(-3) + 3 =$$

$$9 + 15 + 3 =$$

$$24 + 3 =$$

$$27 =$$

33. Is $(3,4)$ (x,y) a solution

$3x-y=5$

$x+4y=19$

$3(3)-(4)=5$ sub it

$9-4=5$

$5=5$ ✓ yes

$(3)+4(4)=19$ sub

$3+16=19$

$19=19$ ✓ yes

YES $(3,4)$ is a solution

Is $(4,7)$ (x,y) a solution

$3x-y=5$

$x+4y=19$

$3(4)-(7)=5$

$12-7=5$

$5=5$ ✓ yes

$(4)+4(7)=19$

$4+28=19$

$32 \neq 19$

NO

NO $(4,7)$ is not a solution

34

$3x+y=17$
$4x-y=18$

$7x+0=35$
$7x=35$
$\frac{7x}{7}=\frac{35}{7}$
$x=5$

Subst
$3x+y=17$
$3(5)+y=17$
$15+y=17$
$15+y-15=17-15$
$y=2$

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

35.

$4x-y=-3$
$6x+3y=-27$

$4x-1y=-3$ (3)
$6x+3y=-27$ (1)

$12x-3y=-9$
$6x+3y=-27$

$18x+0=-36$
$18x=-36$
$\frac{18x}{18}=\frac{-36}{18}$
$x=-2$

mult

Subst
$4x-y=-3$
$4(-2)-y=-3$
$-8-y=-3$
$-8-y+8=-3+8$
$-y=5$
$\frac{-y}{-1}=\frac{5}{-1}$
$y=-5$

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

36. $4x+2y=0$

$8x+4y=6$

$\begin{pmatrix} 4x+2y=0 \\ 8x+4y=6 \end{pmatrix}\begin{matrix}(-4)\\(2)\end{matrix}$ mult

$-16x-8y=0$

$16x+8y=12$

$0+0=12$

$0 \neq 12$

There is no solution, $\emptyset$, $\{\}$

37. $3x+y=8$

$-6x-2y=-16$

$\begin{pmatrix} 3x+4y=8 \\ -6x-2y=-16 \end{pmatrix}\begin{matrix}(2)\\(1)\end{matrix}$

$6x+2y=16$

$-6x-2y=-16$

$0+0=0$

$0=0$

There are infinitely many solutions

$\{(x,y) \mid 3x+y=8\}$ OR $\{(x,y) \mid -6x-2y=-16\}$

38 $P(x) = x^2 + x + 2$ find $P(8)$

$P(8) = (8)^2 + (8) + 2$

$P(8) = (8)(8) + (8) + 2$

$P(8) = 64 + 8 + 2$

$P(8) = 72 + 2$

$P(8) = 74$

39 $Q(x) = 3x^2 - 1$ find $Q(-8)$

$Q(-8) = 3(-8)^2 - 1$

$Q(-8) = 3(-8)(-8) - 1$

$Q(-8) = 3(64) - 1$

$Q(-8) = 192 - 1$

$Q(-8) = 191$

40. $(11x-8)+(x^2-11x-4)=$

$11x-8+x^2-11x-4=$

$x^2-12=$

41. $(9y^2+3y-2)-(-5y+6)=$

$9y^2+3y-2+5y-6=$

$9y^2+8y-8=$

42. $(-3y^2-6y)+(2y^2+y-6)=$

$-3y^2-6y+2y^2+1y-6=$

$-1y^2-5y-6=$

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

43. $(8x^4-x)+(11x^4+4x-3)=$

$8x^4-1x+11x^4+4x-3=$

$19x^4+3x-3=$

44. $(x+5)(x+6) =$

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

$x^2 + 11x + 30 =$

45. $(a+9)(a-5) =$

$a^2 - 5a + 9a - 45 =$

$a^2 + 4a - 45 =$

46. $(8y-6)^2 =$

$(8y-6)(8y-6) =$ rewrite

$64y^2 - 48y - 48y + 36 =$

$64y^2 - 96y + 36 =$

47. $(2x-4)(5x-7) =$

$10x^2 - 14x - 20x + 28 =$

$10x^2 - 34x + 28 =$

48. $(x-2)(x^2-3x+6) =$

$x^3-3x^2+6x-2x^2+6x-12 =$

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

49. $(x+4)(x^3-3x+5) =$

$x^4-3x^2+5x+4x^3-12x+20 =$

$x^4+4x^3-3x^2-7x+20 =$

50. $(3a-7)(5a^2+5a+4) =$

$15a^3+15a^2+12a-35a^2-35a-28 =$

$15a^3-20a^2-23a-28 =$

51. $(7x-11)(5x+1) =$

$35x^2+7x-55x-11 =$

$35x^2-48x-11 =$

52. $(4x+1)(2x^2+3x-1) =$

$8x^3+12x^2-4x+2x^2+3x-1 =$

$8x^3+14x^2-1x-1 =$

$8x^3+14x^2-x-1 =$

53. $(z+14)(3z+1) =$

$3z^2+1z+42z+14 =$

$3z^2+43z+14 =$

54. $(8x-4)^2 =$

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

$64x^2-32x-32x+16 =$

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

55. $(a+3)(a^2-6a+6) =$

$a^3 - 6a^2 + 6a + 3a^2 - 18a + 18 =$

$a^3 - 3a^2 - 12a + 18 =$

56. $(9x-7)(6x^2-6x-2) =$

$54x^3 - 54x^2 - 18x - 42x^2 + 42x + 14 =$

$54x^3 - 96x^2 + 24x + 14 =$

57. $(5x+2)(4x+4) =$

$20x^2 + 20x + 8x + 8 =$

$20x^2 + 28x + 8 =$

58. $(y+2)(y+9) =$

$y^2 + 9y + 2y + 18 =$

$y^2 + 11y + 18 =$

59 $(x-1)(x+4) =$

$x^2+4x-1x-4 =$

$x^2+3x-4 =$

60 $(3x-4)(x+3) =$

$3x^2+9x-4x-12 =$

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

61. $4(y-6)(3y-1) =$

$4(3y^2-1y-18y+6) =$

$4(3y^2-19y+6) =$

$12y^2-76y+24 =$

62. $(4x-5)^2 =$

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

$16x^2-20x-20x+25 =$

$16x^2-40x+25 =$

63. $(a-9)(a+9) =$

$a^2 + 9a - 9a - 81 =$

$a^2 - 81 =$

64. $(9c+d)(9c-d) =$

$81c^2 - 9cd + 9cd - d^2 =$

$81c^2 - d^2 =$

65. $(6x-5)(5x+8) =$

$30x^2 + 48x - 25x - 40 =$

$30x^2 + 23x - 40 =$

66. $(b-4c)^2 =$

$(b-4c)(b-4c) =$

$b^2 - 4bc - 4bc + 16c^2 =$

$b^2 - 8bc + 16c^2 =$

67) $4^{-4} =$

$\frac{1}{4^4} =$

$\frac{1}{4 \cdot 4 \cdot 4 \cdot 4} =$

$\frac{1}{256} =$

68) $\left(\frac{x^{-4} y^3}{x^2 y^5}\right)^3 =$

$\left(\frac{y^3}{x^2 x^4 y^5}\right)^3 =$ Rewrite

$\left(\frac{1}{x^{2+4} y^{5-3}}\right)^3 =$

$\left(\frac{1^1}{x^6 y^2}\right)^3 =$

$\frac{1^{1(3)}}{x^{6(3)} y^{2(3)}} =$

$\frac{1^3}{x^{18} y^6} =$

$\frac{1 \cdot 1 \cdot 1}{x^{18} y^6} =$

$\frac{1}{x^{18} y^6} =$

69

$$\frac{(-3xy^{-2})^{-3}}{(xy^{-3})^{-1}} =$$

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

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

$$\frac{(-3)^{-3} x^{-3} y^6}{x^{-1} y^3} =$$

$$\frac{x^1 y^6}{(-3)^3 x^3 y^3} =$$

$$\frac{y^{6-3}}{(-3)(-3)(-3)\, x^{3-1}} =$$

$$\frac{y^3}{-27 x^2} = \text{OR} \quad \frac{-1 y^3}{27 x^2}$$

70\. $(7x^2+12x+10) \div (x+1)$

use synthetic division

$$\frac{7x^2+12x+10}{x+1}$$

opp

```
-1 | 7   12   10
         -7   -5
   ---------------
     7    5    5  rem
```

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

71\. $7x+14 =$ factor

GCF → $7(x+2) =$

72\. $-12x^2y^5 - 28x^5y^4 =$ factor

$4x^2y^4(-3y-7x^3) =$

GCF →

73\. $x^2-x-20 =$ factor

20·1
10·2
4·5
Possible

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

ck $(x+4)(x-5) =$

$x^2-5x+4x-20 =$

$x^2-1x-20 =$ → x^2-x-20

Good

74. $100x^2 - 169y^2 =$ factor

$(10x)^2 - (13y)^2 =$

$(10x+13y)(10x-13y) =$

formula

$a^2 - b^2 =$

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

75. $x(x+9) = 0$ Solve

Let $x = 0$ OR $x+9 = 0$

$x+9-9 = 0-9$

$x = -9$

76. $(7x+8)(6x-7) = 0$ Solve

Let $7x+8 = 0$ OR $6x-7 = 0$

$7x+8-8 = 0-8$ OR $6x-7+7 = 0+7$

$7x = -8$ OR $6x = 7$

$\frac{7x}{7} = \frac{-8}{7}$ OR $\frac{6x}{6} = \frac{7}{6}$

$x = \frac{-8}{7}$ OR $x = \frac{7}{6}$

7. SOLVE $x^2 - 10x + 21 = 0$

21.1 Impossible

3.7

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

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

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

$x = 3$ OR $x = 7$