Slope Intercept form equations

Solve each of these equations for y (e.g. $y = \frac{2}{3}x + 5$, or y = 7x - 5)

1. $4x + 2y = 12$ → $2y = -4x + 12$, $y = -2x + 6$ — 1. $y = -2x + 6$

2. $9x + 27y = 81$ → $\frac{27y}{27} = \frac{-9x}{27} + \frac{81}{27}$, $y = -\frac{1}{3}x + 3$ — 2. $y = -1/3x + 3$

3. $6 + 11x - 5y = 9x - 3y + 4$, $-5y + 3y = 9x - 11x + 4 - 6$, $-2y = -2x - 2$ → $y = x + 1$ — 3. $y = x + 1$

4. $30 - 6y = 12x$, $-6y = 12x - 30$ → $y = -2x + 5$ — 4. $y = -2x + 5$

5. $(y + 3) = -\frac{2}{5}(x - 10)$ → $y + 3 = -\frac{2}{5}x + 4$, $y = -\frac{2}{5}x + 1$ — 5. $y = -2/5x + 1$

Standard Form Equation

Put each equation in the $Ax + By = C$

6. $y = \frac{2}{5}x - 3$ $-5\left[-\frac{2}{5}x + y = -3\right]$, $2x - 5y = 15$ — 6. $2x - 5y = 15$

7. $y = -\frac{1}{2}x - 7$ $2\left[\frac{1}{2}x + y = -7\right]$, $x + 2y = -14$ — 7. $x + 2y = -14$

8. $(y + 3) = -\frac{2}{5}(x - 10)$ — 8. $2x + 5y = 5$

$m = -2/5$ $(10, -3)$ $2x + 5y = C$, $2(10) + 5(-3) =$ } $2x + 5y = 5$

Write the equation in both standard and slope intercept form.

9. $5 < (5,-2), (10,-3) > -1$ $m = \frac{-1}{5}$, $x + 5y = -5$, $y = -1/5x - 1$ — Slope Int $y = -1/5x - 1$

10. $-3 < (-3,3), (-6,5) > 2$ $m = \frac{-2}{3}$, $y = -2/3x + 1$, $2x + 3y = 3$ — Slope Int $y = -2/3x + 1$

11. $(-1,3)$ $m = \frac{-3}{4}$

$3x+4y=C$

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

$-3+12=C$

Standard $3x+4y=9$

12. $(2,5)$ $m = \frac{1}{4}$

$x-4y=C$

$2-4(5)=C$

Standard $x-4y=-18$

13. $(3,-7)$ $m = \frac{2}{3}$

$(y-k)=m(x-h)$

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

Point Slope $(y+7)=2/3(x-3)$

Write each equation in standard form

14. $y = \frac{3}{4}x - 2$

$3x-4y=8$

Standard $3x-4y=8$

15. $y = \frac{-2}{7}x + 3$

$2x+7y=21$

Standard $2x+7y=21$

16. $y = -\frac{3}{4}x - 2\frac{1}{4}$

$3x+4y=-9$

Standard $3x+4y=-9$

Write each equation in slope intercept form

17. $2x - 5y = 10$

$\frac{10}{-5}$

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

Slope Int $y=\frac{2}{5}x-2$

18. $7x + 4y = 12$

$\frac{12}{4}$

$y=\frac{-7}{4}x+3$

Slope Int $y=-\frac{7}{4}x+3$

19. $5x - 3y = 19$

$\frac{19}{-3}$

$y=\frac{5}{3}x-6\frac{1}{3}$

Slope Int $y=\frac{5}{3}x-6\frac{1}{3}$

Write the slope, y intercept as an ordered pair, and x intercept as an ordered pair

20. $2x + 3y = -6$ m = $-2/3$ y - int = $(0, -2)$ x - int = $(-3, 0)$

21. $x - 5y = 15$ m = $1/5$ y - int = $(0, -3)$ x - int = $(15, 0)$

22. $y = \frac{2}{3}x - 7$ m = $2/3$ y - int = $(0, -7)$ x - int = $(10\frac{1}{2}, 0)$

$2x - 3y = 21$

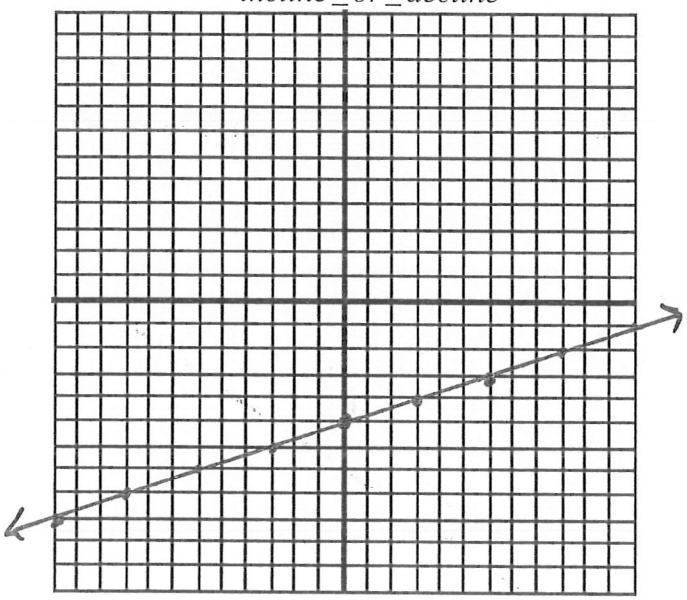
23. $y = \frac{-3}{4}x + 2$ m = $-3/4$ y - int = $(0, 2)$ x - int = $(2\frac{2}{3}, 0)$

$3x + 4y = 8$

Graph Each of the following

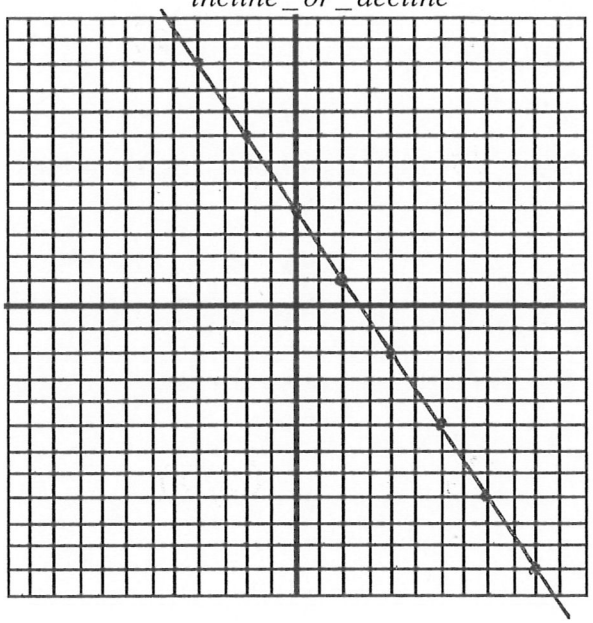
24. $y = \frac{1}{3}x - 5$ m = $1/3$ *steep_or_shallow* / *incline_or_decline* SHALLOW INCLINE y - int = $0, -5$

x	y
-6	-7
-3	-6
0	-5
3	-4
6	-3



25. $y = \frac{-3}{2}x + 4$ m = $\frac{-3}{2}$ *steep_or_shallow* STEEP DECLINE *incline_or_decline* y - int = 0, 4

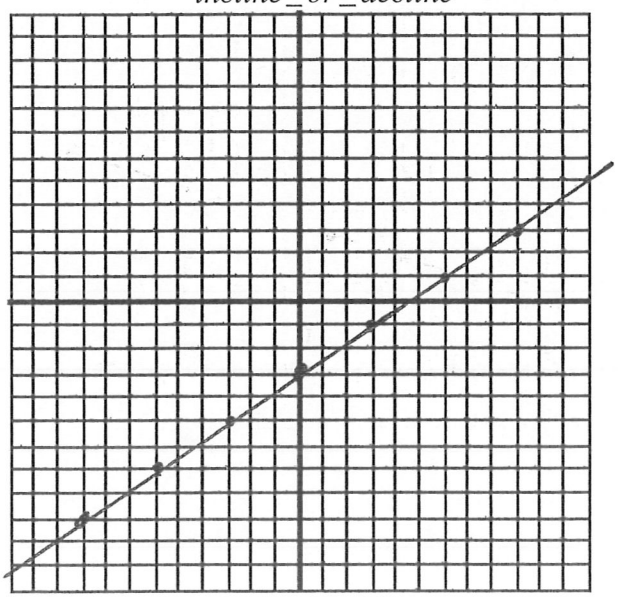
x	y
-4	10
-2	7
0	4
2	1
4	-2



26. $2x - 3y = 9$ m = $\frac{2}{3}$ *steep_or_shallow* SHALLOW INCLINE *incline_or_decline* y - int = 0, -3

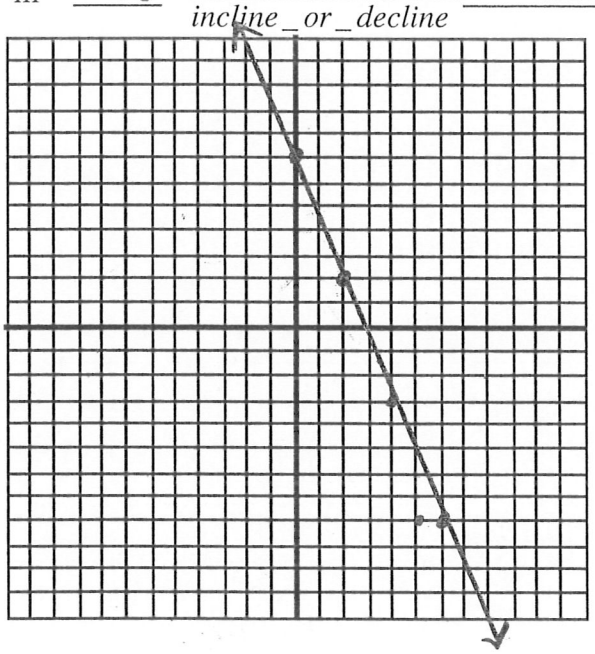
$y = \frac{2}{3}x - 3$

x	y
-6	-7
-3	-5
0	-3
3	-1
6	1



27. $5x + 2y = 14$ m = $-5/2$ *steep_or_shallow* STEEP *incline_or_decline* DECLINE y - int = 0, 7

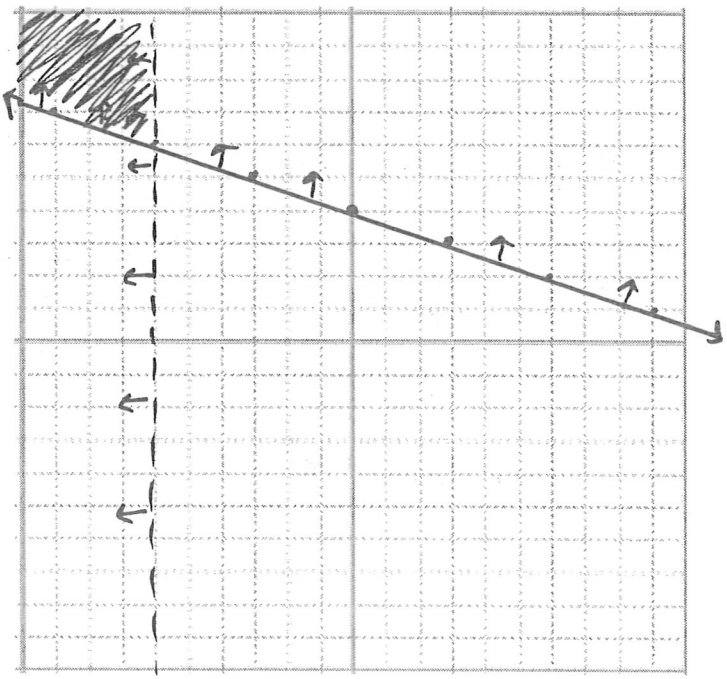
x	y
-4	18
-2	13
0	7
2	2
4	-3



Graph The System of Inequalities

28. $y \geq \frac{-1}{3}x + 4$

$x < -6$

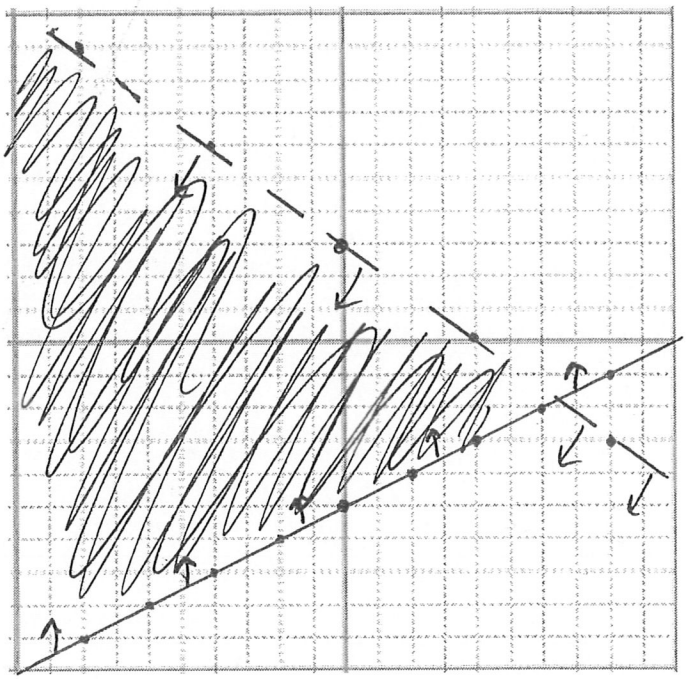


29. $y \geq \frac{1}{2}x - 5$

$3x + 4y < 12$

$y = \frac{-3}{4}x + 3$

$y < -\frac{3}{4}x + 3$



30. $2x + 3y \geq 8$

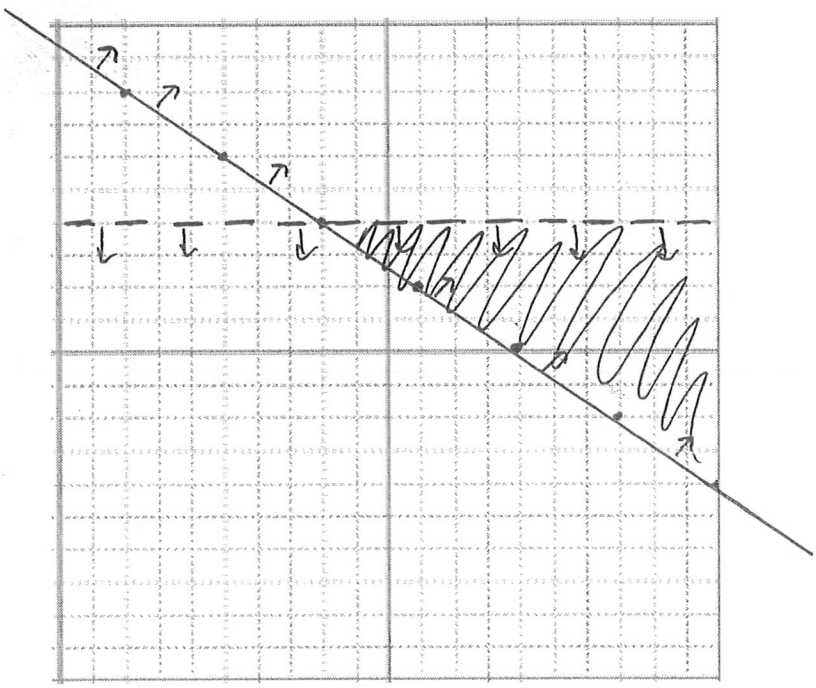
$y < 4$

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

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

$(1, 2)$

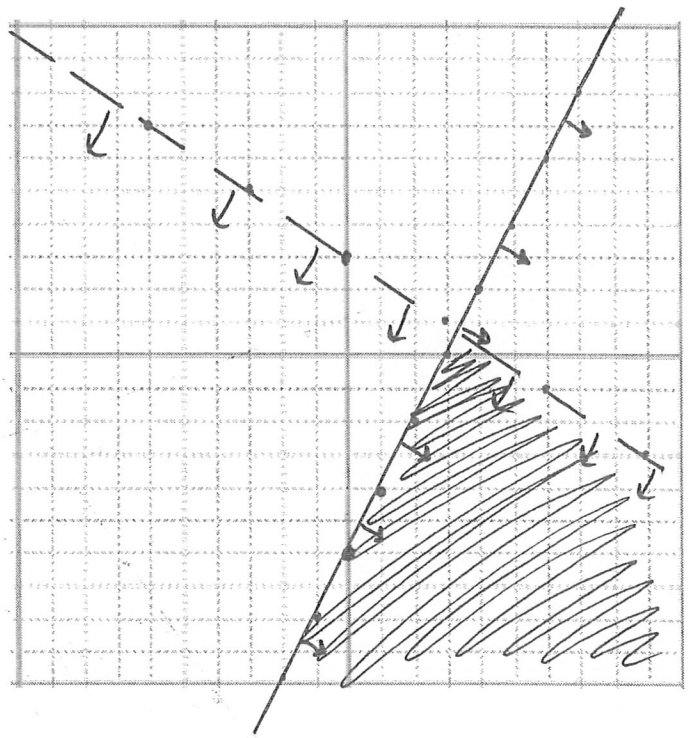
$2(1) + 3(2) \geq 8$



31. $y \leq \frac{2}{1}x - 6$

$2x + 3y < 9$

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



32.

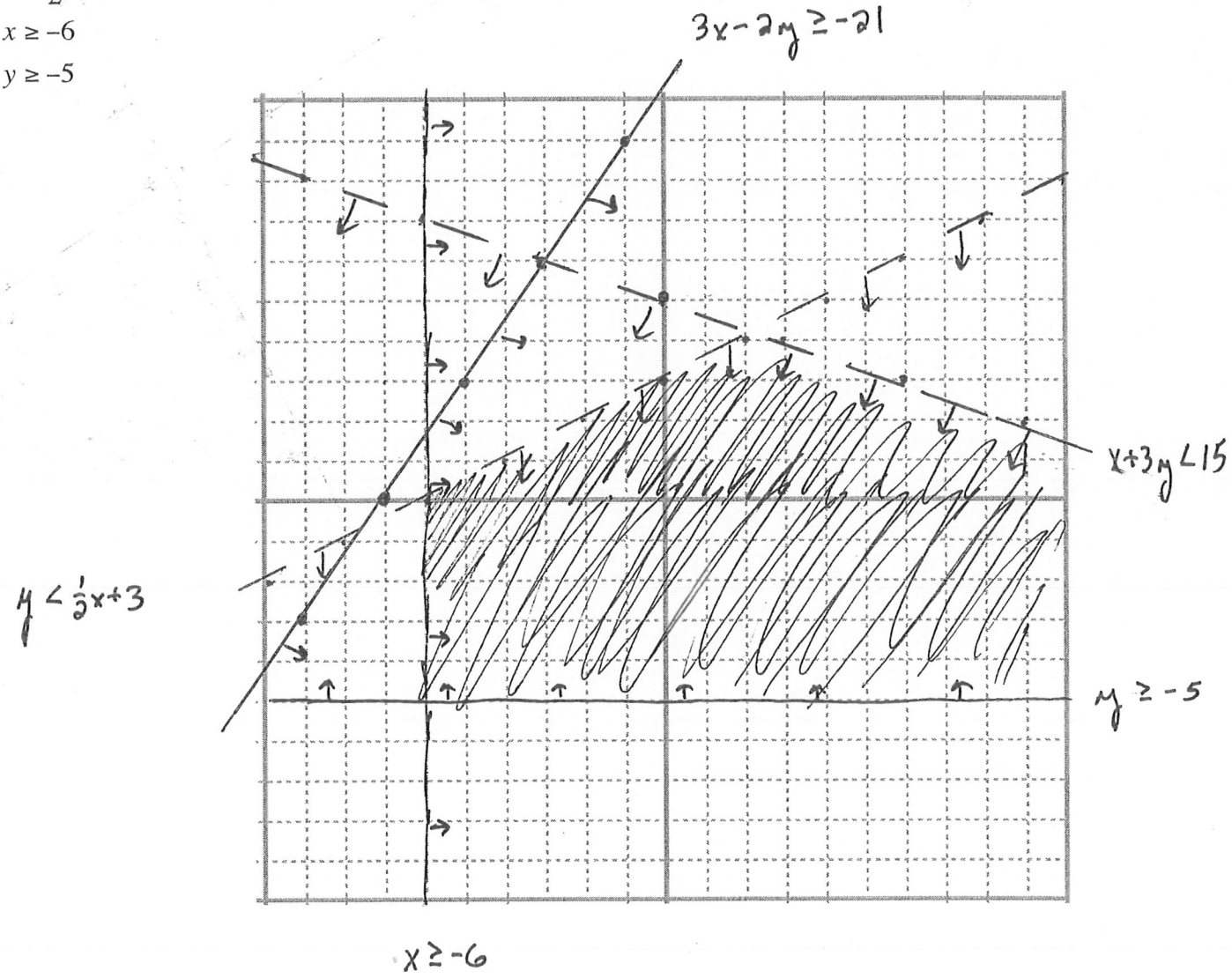
$3x - 2y \geq -21$ → $y \leq \frac{3}{2}x + 10\frac{1}{2}$ ⇒ $m = \frac{3}{2}$ $(-7, 0)$

$x + 3y < 15$ → $y < -\frac{1}{3}x + 5$

$y < \frac{1}{2}x + 3$

$x \geq -6$

$y \geq -5$



Write the following equations.

33. Parallel to $y = \frac{3}{4}x - 7$ through (5 , 7) in standard form.

$m = \frac{3}{4}$ $\quad m_{\parallel} = \frac{3}{4}$, $(5,7)$ $\quad 3x - 4y = C$, $3(5) - 4(7) = C$, $15 - 28 = C$, $-13 = C$

33. $3x - 4y = -13$

34. Perpendicular to $y = \frac{2}{3}x - 5$ through (2 , 3) in standard form.

$m = \frac{2}{3}$ $\quad m_{\perp} = -\frac{3}{2}$, $(2,3)$ $\quad 3x + 2y = C$, $3(2) + 2(3) = C$, $12 = C$

34. $3x + 2y = 12$

35. Parallel to $y = \frac{-1}{3}x - \frac{4}{7}$ through (–2 , 5) in slope intercept form.

$m = -\frac{1}{3}$ $\quad m_{\parallel} = -\frac{1}{3}$, $(-2,5)$ $\quad x + 3y = 13$, $y = -\frac{1}{3}x + 4\frac{1}{3}$

35. $y = -\frac{1}{3}x + 4\frac{1}{3}$

36. Perpendicular to $y = \frac{-4}{3}x = 8$ through (8 , 1) in slope intercept form..

$m = -\frac{4}{3}$ $\quad m_{\perp} = \frac{3}{4}$, $(8,1)$ $\quad 3x - 4y = 20$, $y = \frac{3}{4}x - 5$

36. $y = \frac{3}{4}x - 5$

37. Parallel to $5x - 3y = 17$ through (1 , –2) in standard form.

$m = \frac{5}{3}$ $\quad m_{\parallel} = \frac{5}{3}$, $(1,-2)$ $\quad 5x - 3y = 11$

37. $5x - 3y = 11$

38. Perpendicular to $x + 5y = -3$ through (2 , 3) in standard form.

$m = -\frac{1}{5}$ $\quad m_{\perp} = \frac{5}{1}$, $(2,3)$ $\quad 5x - y = 7$

38. $5x - y = 7$

39. Parallel to $3x - 5y = 145$ through (–6 , 5) in slope intercept form.

$m = 3/5$ $\quad m_{\parallel} = \frac{3}{5}$, $(-6,5)$ $\quad 3x - 5y = -43$, $y = 3/5x + 8\frac{3}{5}$

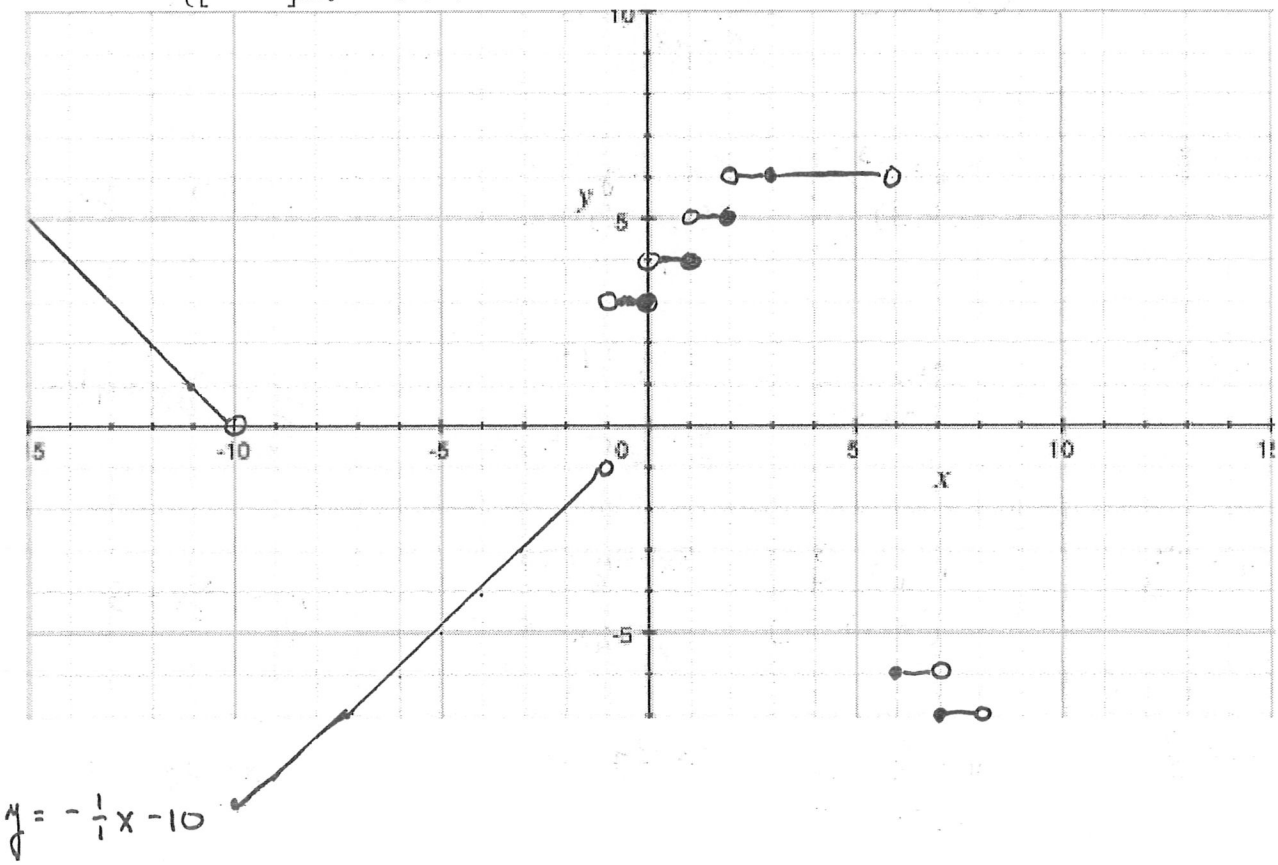
39. $y = 3/5x + 8\frac{3}{5}$

40. Perpendicular to $5x + 2y = 67$ through (15 , –2) in slope intercept form..

$m = \frac{-5}{2}$ $\quad m_{\perp} = \frac{2}{5}$, $(15,-2)$ $\quad 2x - 5y = 40$, $y = \frac{2}{5}x - 8$

40. $y = \frac{2}{5}x - 8$

41. $h(x) = \begin{cases} -x-10\_for...(-\infty < x < -10) \\ x,\_for...[-10,-1) \\ \lceil x+3 \rceil,\_for...[-1,3] \\ 6,\_for...(3,6) \\ \lfloor -x+1 \rfloor,\_for...[6,\infty) \end{cases}$



$y = -\frac{1}{1}x - 10$

42. $f(x) = \begin{cases} \frac{1}{2}x+5, \text{ for } -\infty < x < -2 \\ 5, \text{ for } x = -2 \\ -\frac{3}{2}x+2, \text{ for } -2 < x \le 2 \\ |x-3|+2, \text{ for } 2 < x < 5 \\ -x+9, \text{ for } 5 \le x < 8 \\ [[x-9]]+2, \text{ for } 8 \le x < \infty \end{cases}$

$f(x) = \frac{1}{2}x+5$, $f(-4) = \frac{1}{2}(-4)+5 = -2+5 = 3$, $m = \frac{1}{2}$, $(-4, 3)$

$f(x) = -\frac{3}{2}x+2$, $f(0) = 2$, $m = -\frac{3}{2}$, $(0, 2)$

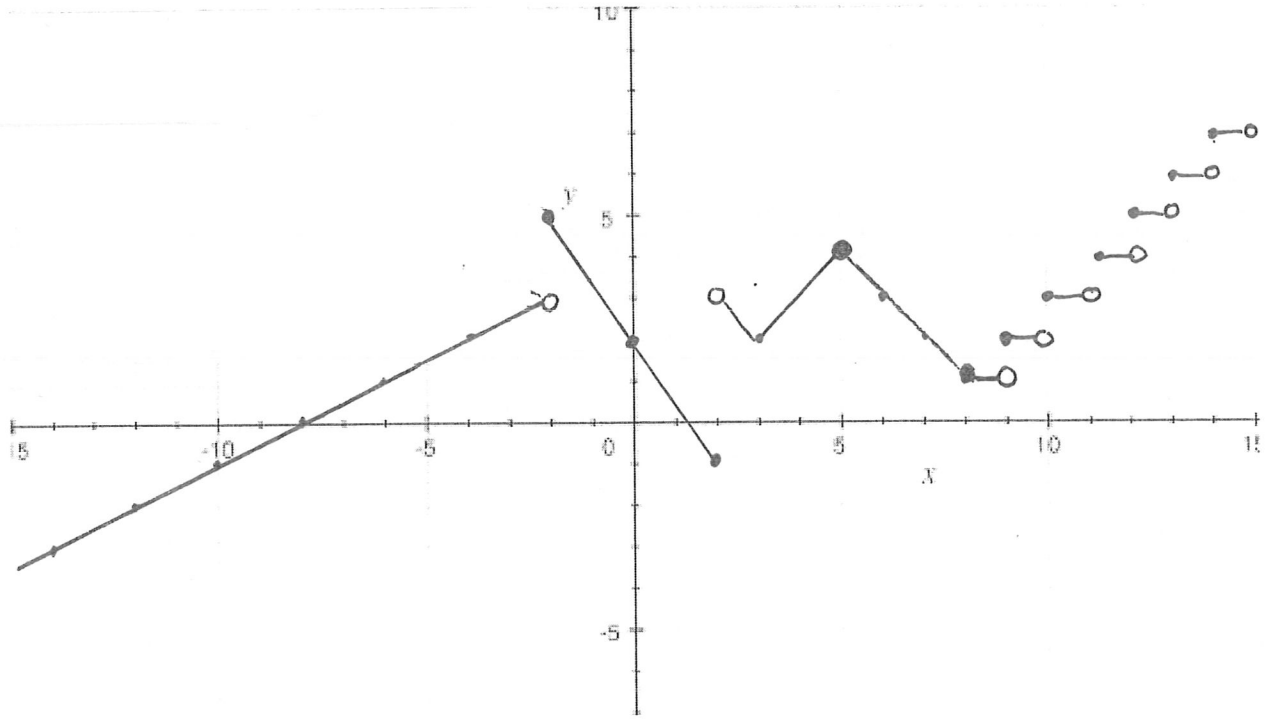
VERTEX $3, 2$, $m = \pm 1$

$f(x) = -\frac{1}{1}x+9$, $f(6) = 3$, $m = -\frac{1}{1}$, $(6, 3)$

$f(x) = \lfloor x-9 \rfloor + 2$

$f(8.5) = 1$

$f(9.5) = 2$



$f(x) = 2x^2 - 5x + 3$ $\quad g(x) = 4x - 1$ $\quad p(x) = 5x + 15$ $\quad h(x) = x^2 + 3x + 2$

43. f (p (3))

$p(3) = 5[3] + 15$
$= 30$

$f(30) = 2[30]^2 - 5[30] + 3$
$= 1653$

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44. p (f (h (0)))

$h(0) = 0^2 + 3[0] + 2$
$= 2$

$f(2) = 2[2]^2 - 5[2] + 3$
$= 1$

$p(1) = 5[1] + 15$
$= 20$

---

45. h (m – 3)

$h(m-3) = [m-3]^2 + 3[m-3] + 2$
$m^2 - 6m + 9 + 3m - 9 + 2$
$= m^2 - 3m + 2$

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46. Solve $4[g(3y+5)] - p(y) = \frac{3}{5}[p(2y)]$

$g(3y+5) = 4[3y+5] - 1$
$= 12y + 20 - 1$
$= 12y + 19$
L.H.S.

$p(2y) = 5[2y] + 15$
$= 10y + 15$
R.H.S.

$4[12y+19] - (5y+15) = \frac{3}{5}[10y+15]$

$48y + 76 - 5y - 15 = 6y + 9$
$43y + 61 = 6y + 9$
$43y - 6y = 9 - 61$
$37y = -52$
$y = -1\frac{15}{37}$

47. Solve to four decimal places $\quad f(g(x)) = h(g(x+1))$

L.H.S. $f(4x-1)$
$2[4x-1]^2 - 5[4x-1] + 3$
$2(16x^2 - 8x + 1) - 20x + 5 + 3$
$32x^2 - 16x + 2 - 20x + 5 + 3$
$32x^2 - 36x + 10$

R.H.S. $g(x+1)$
$= 4[x+1] - 1$
$4x + 4 - 1$
$4x + 3$
$h(4x+3)$
$= [4x+3]^2 + 3[4x+3] + 2$
$= 16x^2 + 24x + 9 + 12x + 9 + 2$
$= 16x^2 + 36x + 20$

So $32x^2 - 36x + 10 = 16x^2 + 36x + 20$

$16x^2 - 72x - 10 = 0$

QUADRATIC FORMULA

$A = 16$
$B = -72$
$C = -10$

$x = -.1348$
$x = 4.6348$

48. Solve to four decimal places $\quad h\left(p\left(\frac{2}{5}z - 2\right)\right) = 3[f(z)] + 5[g(z)] - 6$

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$$h\left(p\left(\tfrac{2}{5}z-2\right)\right) = 3\left[f(z)\right] + 5\left[g(z)\right] - 6$$

L.H.S.

$$p\left(\tfrac{2}{5}z-2\right) = 5\left[\tfrac{2}{5}z-2\right]+15$$
$$= 2z-10+15$$
$$= 2z+5$$

$$h(2z+5) = \left[2z+5\right]^2 + 3\left[2z+5\right]+2$$
$$= 4z^2+20z+25+6z+15+2$$
$$= 4z^2+26z+42$$

R.H.S.

$$3\left[f(z)\right] = 3\left[2z^2-5z+3\right]$$
$$= 6z^2-15z+9$$
$$5\left[g(z)\right] = 5\left[4z-1\right]$$
$$= 20z-5$$

$$6z^2-15z+9$$
$$20z-5$$
$$-6$$
$$\overline{6z^2+5z-2}$$

So $4z^2+26z+42 = 6z^2+5z-2$

$$0 = 2z^2-21z-44$$

USE QUADRATIC FORMULA

$A=2$
$B=-21$
$C=-44$

$x = -1.7901$
$x = 12.2901$