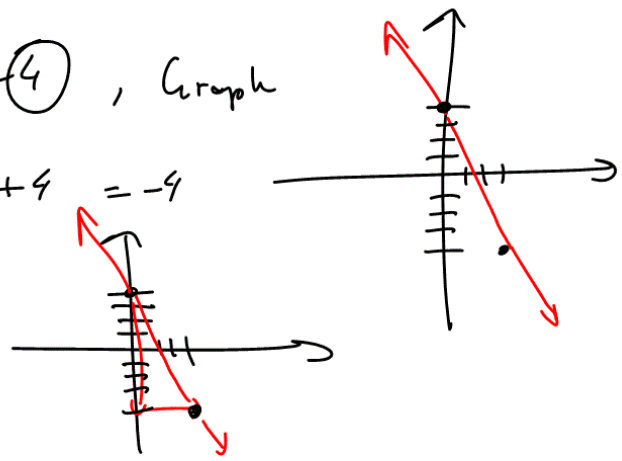
3/5/14

$y = -\frac{8}{3}x + 4$, Graph

x	y
0	4
3	-4

$-\frac{8}{3} \cdot 3 + 4 = -4$

$\frac{\text{rise}}{\text{run}} = \frac{-8}{3}$



6.5 #2 Write an equation in standard form of the line that contains the point $(-1, 5)$ and is perpendicular to the line $y = 6x + 12$

$m = 6$

$m = -\frac{1}{6}$

$Ax + By = C$

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

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

$6(y - 5) = 6\left(-\frac{1}{6}\right)(x + 1)$

$6y - 30 = -x - 1$

$+x \qquad +x$

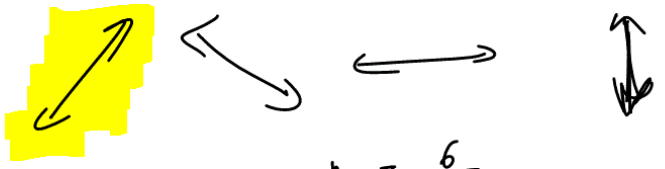
$x + 6y - 30 = -1$

$+30 \qquad +30$

$x + 6y = 29$

$Ax + By = C$

6.4 #6 Decide if line slants upward or downward or horizontal or vertical



$m = \frac{6}{1}$

6.6 Functions (continuing)

$y = 2x + 5$

$m = 2$

$y = f(x)$ "f of x"

$f(x)$ means y

$f(x)$ Not a multiplication

$f(x) = 2x+5$

$f(3)$ = value of y when $x = 3$

$f(3) = 2(3) + 5 = 6 + 5 = 11$

$f(3) = 11$

$y = 11$ when $x = 3$

$f(0) = 2(0) + 5 = 5$, $y = 5$ when $x = 0$

$f(x) = 2x + 5$

find x when $f(x) = 4$

find x when $y = 4$

$4 = 2x + 5$

$-5 \quad -5$

$-1 = 2x$

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

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

$f(x) = x^2 + 3x$

find $f(2) = (2)^2 + 3(2) = 4 + 6 = 10$

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

Write ordered pair corresponding to $f(7) = -8$ if $x = 7$, $y = -8$

x ← y

$(7, -8)$

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

(a) find $g(a) = -2a^2 - 2a$

(b) find $g(a+h) = -2(a+h)^2 - 2(a+h)$

$-2(a^2+2ah+h^2) - 2a - 2h$

$-2a^2 - 4ah - 2h^2 - 2a - 2h$

$(a+h)(a+h) = a^2 + 2ah + h^2$

(c) find $\dfrac{g(a+h) - g(a)}{h} =$

$$\frac{-2a^2 - 4ah - 2h^2 - 2a - 2h - (-2a^2 - 2a)}{h}$$

$$\frac{-2a^2 - 4ah - 2h^2 - 2a - 2h + 2a^2 + 2a}{h}$$

$$\frac{h(-4a - 2h - 2)}{h} = -4a - 2h - 2$$

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

(a) find $f(-2) = -(-2)^2 - 5(-2)$

$-4 + 10 = 6$

(b) find $f(x-1) = -(x-1)^2 - 5(x-1)$

$-(x^2 - 2x + 1) - 5x + 5$

$-x^2+2x-1 \quad -5x+5$

$-x^2-3x+4$

Find the domain $f(x)=\frac{2}{x-5}$

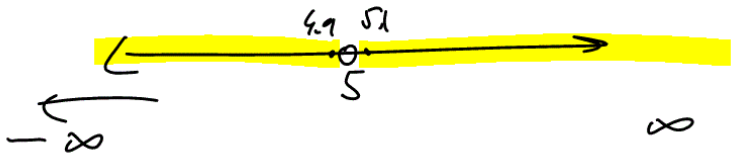
All good x's

denominator $=0$

$x-5=0$

$x=5$

All real numbers except 5



$(-\infty,5)\cup(5,\infty)$

---

find domain $f(x)=3x-5$

All real numbers

$(-\infty,\infty)$

#7 Solving Systems of Linear Equations by Substitution

Solve:

$$\begin{cases} x+y=3 & (1) \\ x=2y & (2) \end{cases}$$

(1): $2y+y=3$

$3y=3$

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

$x=2y=2(1)=2$

$(2,1)$

#8 Solve:

$$\begin{cases} y=5x-3 & (1) \\ y=8x+4 & (2) \end{cases}$$

(1): $8x+4=5x-3$

$-4 \quad -4$

$8x=5x-7$

$-5x \quad -5x$

$3x=-7$

$x=-\frac{7}{3}$

$y=5x-3=$

$\frac{5}{1}\left(-\frac{7}{3}\right)-3=-\frac{35}{3}-\frac{3\cdot 3}{1\cdot 3}=-\frac{35-9}{3}$

$-\frac{44}{3}$

$\left(-\frac{7}{3},-\frac{44}{3}\right)$

#24 Solve using substitution.

$$\begin{cases} 10x - 5y = -21 \\ x + 3y = 0 \Rightarrow x = -3y \end{cases}$$

(1): $10(-3y) - 5y = -21$

$-30y - 5y = -21$

$\frac{-35y}{-35} = \frac{-21}{-35}$

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

$x = -3y = -3 \cdot \frac{3}{5} = -\frac{9}{5}$

$\left(-\frac{9}{5}, \frac{3}{5}\right)$

1x Solve.

$$\begin{cases} y = 2x \\ -2x + y = 1 \end{cases}$$

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

$0 = 1$

No solution

$m = 2$

$y = 2x + 1$

2x Solve!

$$\begin{cases} 2x + y = 3 \\ 2y = -4x + 6 \end{cases}$$

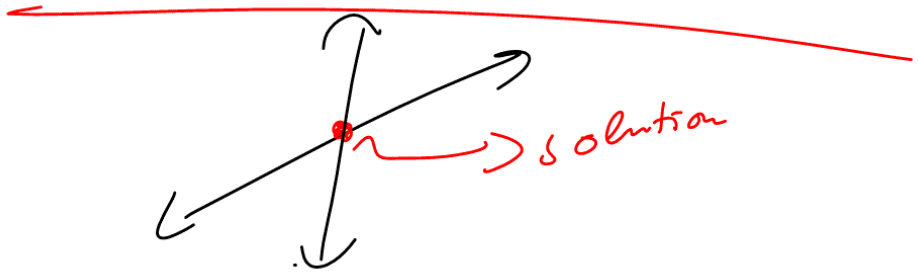
$\frac{2y}{2} = \frac{-4x+6}{2}$

$y = -2x + 3$

(1): $2x + (-2x + 3) = 3$

$3 = 3$

Infinitely many solutions



7.3 Solving Systems by Addition

#2 Solve: $\begin{cases} 4x+y=13 \\ 2x-y=5 \end{cases}$

$+$

$6x = 18$

$\frac{6x}{6} = \frac{18}{6}$

$x = 3$

(1): $4(3)+y=13$

$12+y=13$

$-12 \quad -12$

$y=1$

$(3, 1)$

#18 Solve: 3 $\begin{cases} 6x-5y=25 \\ 4x+15y=13 \end{cases}$

$+$

$18x-15y=75$

$4x+15y=13$

$22x = 88$

$\frac{22x}{22} = \frac{88}{22}$

$x = 4$

$4(4)+15y=13$

$16+15y=13$

$-16 \quad -16$

$15y=-3$

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

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

$\left(4, -\frac{1}{5}\right)$

7.4 Solving Systems of Linear Equations in 3 variables

#1 Solve: Cancel z

$$\begin{cases} x-y+z=-4 & (1) \\ 3x+2y-z=5 & (2) \\ -2x+3y-z=15 & (3) \end{cases}$$

(1) ← cancel z
(2) ←

$$+\begin{array}{l} x-y+z=-4 \quad (1) \\ 3x+2y-z=5 \quad (2) \end{array}$$

$$4x+y=1 \quad (4)$$

$$+\begin{array}{l} x-y+z=-4 \quad (1) \\ -2x+3y-z=15 \quad (3) \end{array}$$

$$-x+2y=11 \quad (5)$$

$$\begin{array}{l} -2(4x+y=1) \quad (4) \\ -x+2y=11 \quad (5) \end{array}$$

$$+\begin{array}{l} -8x-2y=-2 \quad (4) \\ -x+2y=11 \quad (5) \end{array}$$

$$-9x=9$$

$$x=\frac{9}{-9}=-1$$

(4): $4\cdot(-1)+y=1$

$$-4+y=1$$

$$+4 \quad +4$$

$$y=5$$

(1): $x-y+z=-4$

$$-1-5+z=-4$$

$$-6+z=-4$$

$$+6 \quad +6$$

$$z=2$$

$(x, y, z) = (-1, 5, 2)$

#2 cancel y

$$\begin{cases} x+y-z=-1 & (1) \\ -4x-y+2z=-7 & (2) \\ 2x-2y-5z=7 & (3) \end{cases}$$

(1) & (2) cancel y

$$\begin{array}{r} x+y-z=-1 \quad (1) \\ +\ -4x-y+2z=-7 \quad (2) \\ \hline -3x+z=-8 \quad (4) \end{array}$$

$$\begin{array}{r} 2x+2y-2z=2 \\ +\ 2x-2y-5z=7 \\ \hline 4x-7z=5 \quad (5) \end{array}$$

$$\begin{array}{r} 7(-3x+z=-8) \quad (4) \\ 4x-7z=5 \quad (5) \end{array}$$

$$\begin{array}{r} +\ -21x+7z=-56 \quad (4) \\ 4x-7z=5 \quad (5) \\ \hline -17x=-51 \end{array}$$

$$\frac{-17x}{-17}=\frac{-51}{-17}$$

$$x=3$$

(4): $-3x+z=-8$

$-3(3)+z=-8$

$-9+z=-8$

$+9 \qquad +9$

$$z=1$$

(1): $x+y-z=-1$

$3+z-1=-1$

$2+y=-1$
$-2 \quad -2$
$y=-3$

$(3,-3,1)$

7-5 Systems of linear Equations and Problem Solving

#11 Two numbers total 83 and have a difference of 17. Find the numbers.

2 numbers: x, y

$$+\begin{cases} x+y=83 \\ x-y=17 \end{cases}$$

$\frac{2x}{2} = \frac{100}{2}$

$x=50$

(1) $50+y=83$
$-50 \quad -50$

$y=33$

Numbers are 33, 50

#27 Puri rowed 18 miles down the river in 2 hours. The return trip took him $4\frac{1}{2}$ hours. Find the rate Puri can row in still water and the rate of the current.

his rate in still water = x
current's rate = y

	$d = r \cdot t$		
down	18	$x+y$	2
up	18	$x-y$	4.5

$$\begin{cases} \frac{18}{2} = \frac{2(x+y)}{2} \\ \frac{18}{4.5} = \frac{4.5(x-y)}{4.5} \end{cases} \quad + \begin{cases} 9 = x+y \\ 4 = x-y \end{cases}$$

$$\frac{13}{2} = \frac{2x}{2}$$

$$6.5 = x$$

$9 = x+y$

$9 = 6.5 + y$

$-6.5 \quad -6.5$

$2.5 = y$

In still water rate = 6.5 mph

Current's rate = 2.5 mph

#37 Two angles are complementary if their sum is 90°.

Find the measure of 2 complementary angles if one of them is twice the other.

angles: $x > y$

$$\begin{cases} x + y = 90 \\ x = 2y \end{cases}$$

$2y + y = 90$

$3y = 90$

$y = 30$

$x = 2(30) = 60$

30°, 60°