Math 172–Assignment # 3 **Name:**_____

1. Write the following equations in standard form with integral coefficients and a positive coefficient for the x-term.

a) $-0.02x = 2.3 - 0.5y$

$-2x = 230 - 50y$

$-230 = 2x - 50y$

$2x - 50y = -230$

or $x - 25y = -115$

$2x - 50y = -230$

or $x - 25y = -115$

b) $y = -\frac{5}{3}x + \frac{3}{4}$

LCD = 12

$12y = \frac{-5(12)}{3}x + \frac{3}{4}(12)$

$12y = -20x + 9$

$20x + 12y = 9$

$20x + 12y = 9$

2. What is the equation of the line which runs through the points $(5, -2)$ and $(1, -5)$? Write your answer in both standard form (with integral coefficients) and in slope-intercept form.

$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-5-(-2)}{1-5} = \frac{-3}{-4} = \frac{3}{4}$ (1)

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

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

$y + 2 = \frac{3}{4}x - \frac{15}{4}$

$y = \frac{3}{4}x - \frac{15}{4} - 2$

$y = \frac{3}{4}x - \frac{15}{4} - \frac{8}{4}$

$y = \frac{3}{4}x - \frac{23}{4}$

$4(y+2) = 3(x-5)$

$4y + 8 = 3x - 15$

$23 = 3x - 4y$

$3x - 4y = 23$

$3x - 4y = 23$

$y = \frac{3}{4}x - \frac{23}{4}$ } (2)

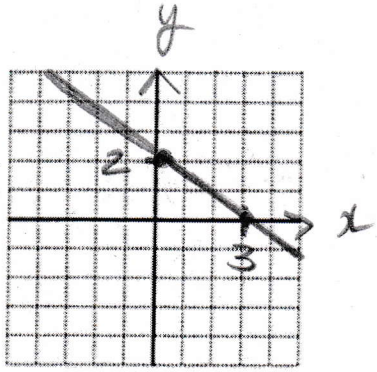
(-1) for no scale

3. Graph the following.

a) $6 - 3y - 2x = 0$

Set $x=0$: $6-3y=0$
$6=3y$
$y=2$ $(0,2)$

Set $y=0$: $6-2x=0$
$6=2x$
$3=x$ $(3,0)$

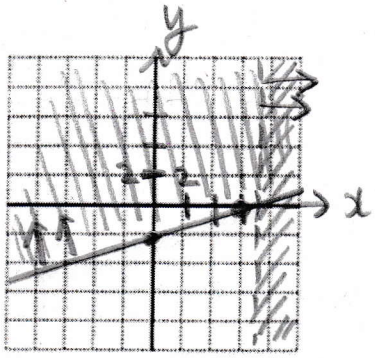


b) $x - 3y \leq 6$ or $x > 7$

$x-3y=6$ $x=7$

$(0,-2)$
$(6,0)$

Test $(0,0)$
$0 \leq 6$ TRUE

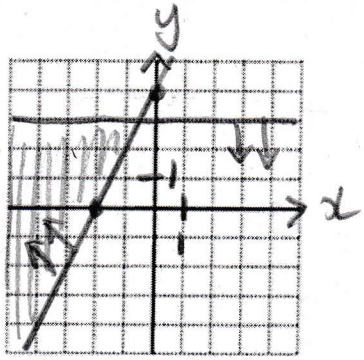


c) $4x - 2y \leq -8$ and $y \leq 3$

$4x-2y=-8$ $y=3$

$(0,4)$
$(-2,0)$

Test $(0,0)$
$0 \leq -8$ FALSE



4. Solve the following systems of equations. Indicate whether the system is independent, inconsistent, or dependent.

a) $y = -\frac{3}{5}x + 6$ ②
$x = -\frac{5}{3}y + 10$

$x = -\frac{5}{3}\left(-\frac{3}{5}x + 6\right) + 10$

$x = x - \frac{30}{3} + 10$

$x = x - 10 + 10$

$x = x$

$0 = 0$

$\{(x,y) \mid y = \frac{-3}{5}x + 6\}$
dependent

b) $3x - 2y = 19$ ①
$5x + 4y = 17$ ②

Eliminate y:

$6x - 4y = 38$ $2\times$①
$+ \quad 5x + 4y = 17$ ②

$11x = 55$

$x = 5$

$x = 5 \rightarrow$ ①: $3(5) - 2y = 19$

$-2y = 19 - 15$

$-2y = 4$

$y = -2$

$\{(5, -2)\}$
independent

5. Solve the following system of equations.

$x + 2y + 3z = 12$ ①
$x - 2y - z = -4$ ②
$3x - 3y + z = 2$ ③

$\{(2,2,2)\}$

Get 2 equations without z:

$x + 2y + 3z = 12$ ①
$+ \quad 3x - 6y - 3z = -12$ $3 \times$ ②
$\boxed{4x - 4y = 0}$ (1)

$x + 2y + 3z = 12$ ①
$+ \quad -9x + 9y - 3z = -6$ $-3 \times$ ③
$\boxed{-8x + 11y = 6}$ (1)

$\begin{cases} 4x - 4y = 0 & ④ \\ -8x + 11y = 6 & ⑤ \end{cases}$

$+ \begin{cases} 8x - 8y = 0 & 2 \times ④ \\ -8x + 11y = 6 & ⑤ \end{cases}$

$3y = 6$ (1)
$y = 2$

$y = 2 \to ④$: $4x - 4(2) = 0$ (1)
$4x = 8$
$x = 2$

$x = 2, y = 2 \to ①$: $2 + 2(2) + 3z = 12$ (1)
$3z = 6$
$z = 2$

6. Mack's Tee-Shirt Shack sold 36 shirts one day. All short-sleeved shirts cost \$12 and all long-sleeved shirts cost \$18. The total sales for the day were \$522. Solve a system of equations to find out how many of each kind of shirt were sold.

Let x = # short-sleeved shirts sold
y = # long-sleeved shirts sold

(2) $\begin{cases} x+y=36 & (1) \\ 12x+18y=522 & (2) \end{cases}$

$-12 \times (1)$: $-12x-12y=-432$
$+\ 12x+18y=522$
$6y=90$
$y=15$ (1)

$y=15 \to (1)$: $x+15=36$
$x=21$ (1)

21 short-sleeved and 15 long-sleeved shirts were sold.

7. Admission to Science World is \$5.50 more for an adult than for a child. Admission to the museum for Barbie and Ken and their five children costs \$39. Find the cost of admission for each adult and each child.

Let a = cost of admission for an adult (\$)
c = " child (\$)

(2) $\begin{cases} a=5.5+c & (1) \\ 2a+5c=39 & (2) \end{cases}$

Sub (1) → (2): $2(5.5+c)+5c=39$
$11+2c+5c=39$
$11+7c=39$
$7c=28$
$c=4$ (1)

$c=4 \to (1)$: $a=5.5+4$
$a=9.5$ (1)

An adult costs \$9.50 and a child costs \$4.

8. Every year the Times Colonist holds a book sale. All hardcover books sell for the same price, all paperbacks sell for another price and all magazines have a third price. Edgar buys three hardcovers, one paperback and four magazines for \$4.50. Cynthia buys four paperbacks and two magazines for \$2.50. Herbert buys one hardcover, two paperbacks and two magazines for \$2.50. How much must you pay in total if you want one hardcover, one paperback and one magazine?

Let h = price of a hardcover (\$)
p = " paperback (\$)
m = " magazine (\$)

(2) $\begin{cases} 3h+p+4m = 4.5 & (1) \\ 4p+2m = 2.5 & (2) \\ h+2p+2m = 2.5 & (3) \end{cases}$

Get 2 equation without h:

$3h+p+4m = 4.5$ (1)
$-3h-6p-6m = -7.5$ $-3\times(3)$
$-5p-2m = -3$

$\begin{cases} 4p+2m = 2.5 & (2) \\ -5p-2m = -3 & (4) \end{cases}$

$-p = -0.5$
$p = 0.5$ (1)

$p=0.5 \to (2)$: $2+2m = 2.5$
$2m = 0.5$
$m = 0.25$ (1)

$m=0.25,\ p=0.5 \to (3)$: $h+2(0.5)+2(0.25) = 2.5$
$h+1+0.5 = 2.5$
$h = 1$ (1)

To buy one of each will cost \$1.75 (1)