Math 125 Test 2 Name:_____

Show all necessary steps clearly, neatly, systematically to receive full credit.

1. Find the equation of the line passes through the point (-2 , 3) and (3 , -2). Write the result in slope-intercept form.

(x_1, y_1)

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

$$y - y_1 = m(x - x_1)$$
$$y - 3 = -1(x-(-2))$$
$$y - 3 = -1(x+2)$$
$$y - 3 = -x - 2$$
$$y = -x + 1 //$$

2. Solve the system by substitution method: $\begin{cases} 4x - 5y = -11 \\ x + 2y = 7 \end{cases}$.

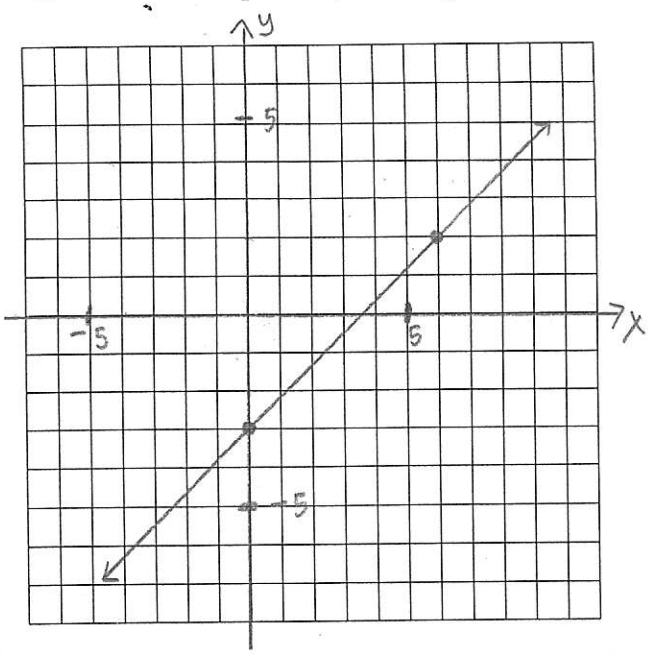
$$x + 2y = 7$$
$$x = -2y + 7$$

$$4x - 5y = -11$$
$$4(-2y+7) - 5y = -11$$
$$-8y + 28 - 5y = -11$$
$$28 - 13y = -11$$
$$-13y = -39$$
$$y = 3$$

$$x = -2y + 7$$
$$x = -2(3) + 7$$
$$x = 1$$

$(1, 3)$ //

3. Find the slope and y-intercept of the line: $5x-6y=18$. Then use them to graph.



$5x-6y=18$

$-6y=-5x+18$

$y=\frac{-5x}{-6}+\frac{18}{-6}$

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

$m=\frac{5}{6}$

y-int $=(0,-3)$

4. Find the domain of the given functions.

a. $f(x)=|x+2|+3$

Domain: $(-\infty,\infty)$

b. $g(x)=\sqrt{4x-5}+6$

radicant ≥ 0

$4x-5\geq 0$

$4x\geq 5$

$x\geq\frac{5}{4}$

Domain: $\{x\mid x\geq\frac{5}{4}\}$

c. $h(x)=\frac{x+4}{5-6x}$

denominator $\neq 0$

$5-6x\neq 0$

$-6x\neq -5$

$x\neq\frac{5}{6}$

Domain: $\{x\mid x=\mathbb{R},\ x\neq\frac{5}{6}\}$

d. $k(x)=x^3+4$

Domain: $(-\infty,\infty)$

5. Find the equation of the line passes through the point (7 , 8) and perpendicular to the line $y=\frac{7}{8}x+9$.

Write the result in standard form.

l_1 ⊥ l_2

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

$y = \frac{7}{8}x + 9$

$m = \frac{7}{8}$

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

$y - 8 = -\frac{8}{7}(x - 7)$

$y - 8 = -\frac{8}{7}x + 8$

$7y - 56 = -8x + 56$

$8x + 7y = 112$ //

6. Solve the system by elimination method: $\begin{cases} 4x+3y=1 \\ 3x+2y=2 \end{cases}$.

$2 \cdot \{ 4x + 3y = 1$

$-3 \cdot \{ 3x + 2y = 2$

$8x + 6y = 2$

$+ \quad -9x - 6y = -6$

$-x = -4$

$x = 4$

$3x + 2y = 2$

$3(4) + 2y = 2$

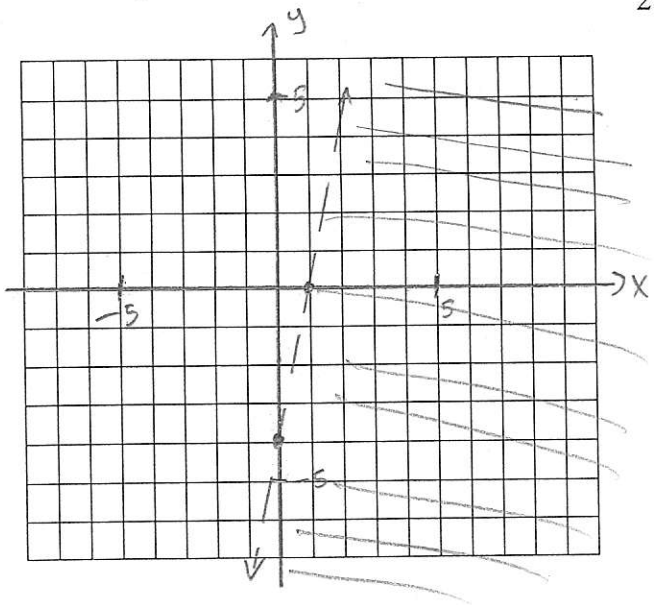
$12 + 2y = 2$

$2y = -10$

$y = -5$

$(4, -5)$ //

7. Graph the solution set of inequality: $2x-\frac{1}{2}y>2$.



$2x-\frac{1}{2}y>2$

$4x-y>4$

$-y>-4x+4$

$y<4x-4$

Test, pick (0,0)

$2x-\frac{1}{2}y>2$

$2(0)-\frac{1}{2}(0)>2$

$0>2$ ← false

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

a. $(f-g)(x)$

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

$= [x^2+2x]-[3x-4]$

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

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

b. $(f\cdot g)(-4)$

$= f(-4)\cdot g(-4)$

$= 8\cdot(-16)$

$= -128$ //

side

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

$= 16-8$

$= 8$

$g(-4) = 3(-4)-4$

$= -16$

c. $(f\circ g)(x)$

$= f(g(x))$

$= f(3x-4)$

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

$= 9x^2-24x+16+6x-8$

$= 9x^2-18x+8$ //

d. $(g\circ g)(-2)$

$= g(g(-2))$

$= g(-10)$

$= -34$ //

side

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

$= -10$

$g(-10) = 3(-10)-4$

$= -34$

9. Simplify: $\dfrac{\left(3x^{-2}y^{3}z^{-4}\right)^{-2}}{\left(x^{2}y^{-2}\right)\left(2y^{5}z^{-2}\right)^{-1}}$.

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

$$= \frac{2y^{5}z^{-2}}{x^{2}y^{-2}\cdot 9x^{-4}y^{6}z^{-8}}$$

$$= \frac{2y^{5}z^{-2}}{9x^{-2}y^{4}z^{-8}}$$

$$= \frac{2x^{2}y^{5-4}z^{-2-(-8)}}{9}$$

$$= \frac{2x^{2}yz^{6}}{9} //$$

10. Divide: $\left(5-2x^{3}+3x-4x^{4}\right)\div\left(x^{2}-2x\right)$.

$$\begin{array}{r|l} & -4x^{2}-10x-20 \\ \hline x^{2}-2x & -4x^{4}-2x^{3}+0x^{2}+3x+5 \\ & -(-4x^{4}+8x^{3}) \\ \hline & -10x^{3}+0x^{2}+3x+5 \\ & -(-10x^{3}+20x^{2}) \\ \hline & -20x^{2}+3x+5 \\ & -(-20x^{2}+40x) \\ \hline & -37x+5 \end{array}$$

$$-4x^{2}-10x-20+\frac{-37x+5}{x^{2}-2x}$$

11. Solve the system: $\begin{cases} 2x - y = 6 - 3z \\ x - z = 8 - 2y \\ 2y + z = 1 \end{cases}$.

$$\begin{cases} 2x - y + 3z = 6 \\ x + 2y - z = 8 \\ 2y + z = 1 \end{cases}$$

$-2 \cdot \begin{cases} 2x - y + 3z = 6 \\ x + 2y - z = 8 \end{cases}$

$$\begin{array}{r} 2x - y + 3z = 6 \\ +\ -2x - 4y + 2z = -16 \\ \hline -5y + 5z = -10 \end{array}$$

$-5 \cdot \begin{cases} 2y + z = 1 \\ -5y + 5z = -10 \end{cases}$

$$\begin{array}{r} -10y - 5z = -5 \\ +\ -5y + 5z = -10 \\ \hline -15y = -15 \\ y = 1 \end{array}$$

$$2y + z = 1$$
$$2(1) + z = 1$$
$$2 + z = 1$$
$$z = -1$$

$$x + 2y - z = 8$$
$$x + 2(1) - (-1) = 8$$
$$x + 2 + 1 = 8$$
$$x + 3 = 8$$
$$x = 5$$

$(5, 1, -1)$ //

12. 10 liter of a 4% acid solution must be mixed with a 10% acid solution to get a 6% acid solution. How many liters of the 10% acid solution are needed? (*show in 3-steps format*)

①

	Quantity	× Concentration	= Amount
Type A	10	0.04	10 (0.04)
Type B	x	0.10	0.10x
mix	$10+x$	0.06	0.06 $(10+x)$

-6 pts

② $0.04(10) + 0.10x = 0.06(10+x)$ -3 pts

$$0.4 + 0.10x = 0.6 + 0.06x$$
$$0.4 + 0.04x = 0.6$$
$$0.04x = 0.2$$
$$x = \frac{0.2}{0.04}$$
$$x = \frac{20}{4}$$
$$x = 5$$

③ needed 5 liters of 10% acid solution.