

BRONX COMMUNITY COLLEGE
of the City University of New York

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

MATH 05
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Exam 2
October 7, 2010

Name: KEY

Directions: Write your answers in the provided space. To get full credit you *must* show all your work. Simplify your answers whenever possible. Be certain to indicate your final answer clearly. **Each problem is worth 5 points**

1. Evaluate: $7 - 5(6 - 8) - 2^4 \div 8 \cdot 2 = 7 - 5(-2) - 2^4 \div 8 \cdot 2$
 $= 7 - 5(-2) - 16 \div 8 \cdot 2$
 $= 7 + 10 - 2 \cdot 2$
 $= 7 + 10 - 4$
 $= 17 - 4 = \boxed{13}$

2. Evaluate $-b^2 - 4a$ if $a = -3$ and $b = -5$
 $-(-5)^2 - 4(-3) = -(25) + 12$
 $= \boxed{-13}$

3. Let $p(x) = x^4 + x^3 - 7x^2 - x + 6$. Find $p(-3)$.

$$\begin{aligned} p(-3) &= (-3)^4 + (-3)^3 - 7(-3)^2 - (-3) + 6 \\ &= 81 - 27 - 7 \cdot 9 + 3 + 6 \\ &= 81 - 27 - 63 + 9 \\ &= 90 - 90 \\ &= \boxed{0} \end{aligned}$$

4. Solve the equation: $2(x+5) = 3(x+8) - 6 \Leftrightarrow 2x + 10 = 3x + 24 - 6$

$$\Leftrightarrow 2x + 10 = 3x + 18$$

$$\Leftrightarrow \boxed{-8 = x}$$

5. Solve the equation: $\frac{5x+3}{9} - \frac{3-x}{3} = x-1$

$$LCD = 9$$

$$9 \frac{5x+3}{9} - 9 \frac{3-x}{3} = 9(x-1)$$

$$\Leftrightarrow 5x + 3 - 3(3-x) = 9(x-1)$$

$$\Leftrightarrow 5x + 3 - 9 + 3x = 9x - 9$$

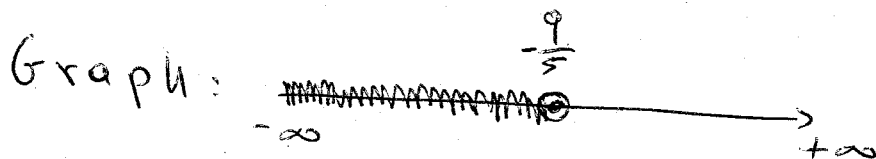
$$\Leftrightarrow 8x - 6 = 9x - 9$$

$$\Leftrightarrow \boxed{3 = x}$$

6. Solve the inequality: $-5x + 2 > 11$. Graph the solution set and give your answer in interval notation.

$$-5x + 2 > 11 \Leftrightarrow \frac{-5x}{-5} > \frac{9}{-5}$$

$$\Leftrightarrow x < -\frac{9}{5}$$



As an interval the solution is $(-\infty, -\frac{9}{5})$

7. Solve for y : $3x - 5y = 15 \iff -5y = -3x + 15$

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

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

8. Find the slope and the two intercepts of the line with equation $-7x + 3y = -42$.

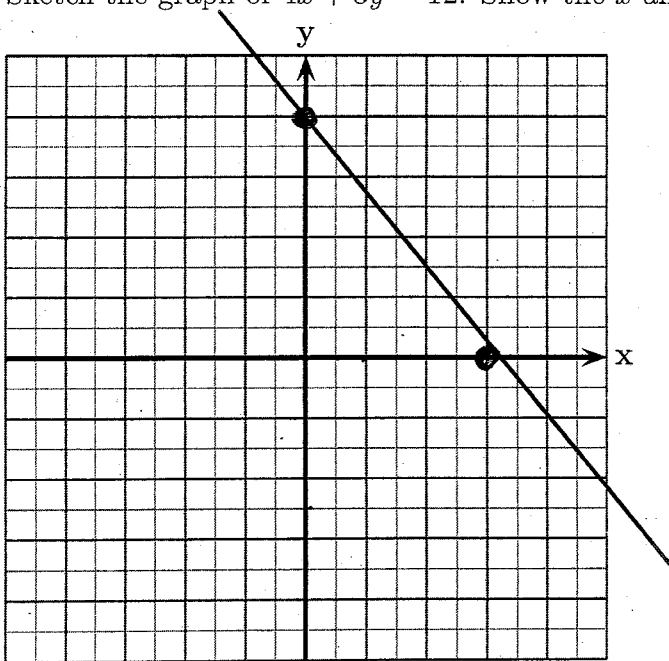
y -intercept: Put $x = 0$ $3y = -42 \Rightarrow y = -\frac{42}{3} \Rightarrow \boxed{y = -14}$

x -intercept: Put $y = 0$ $-7x = -42 \Rightarrow x = \frac{-42}{-7} \Rightarrow \boxed{x = 6}$

So line contains the points $(0, -14)$, $(6, 0)$.

Thus the slope is $m = \frac{0 - (-14)}{6 - 0} = \frac{14}{6} = \boxed{\frac{7}{3}}$

9. Sketch the graph of $4x + 3y = 12$. Show the x and y intercepts.



x	y
0	4
3	0

$$4x = 12 \Rightarrow x = 3$$

$$3y = 12 \Rightarrow y = 4$$

10. Find the equation of the line that passes through the points with coordinates $(-1, -7)$ and $(1, -1)$.

The slope is $m = \frac{-7 - (-1)}{-1 - 1} = \frac{-6}{-2} = 3$

Let b be the y -intercept of the line. Then the equation is $y = 3x + b$. Substituting $(1, -1)$

we get $-1 = 3 \cdot 1 + b \Leftrightarrow -1 = 3 + b \Leftrightarrow \boxed{-4 = b}$

So the equation of the line is

$$\boxed{y = 3x - 4}$$

11. Find the equation of the line that is parallel to the line with equation $3x - 2y = 11$ and passes through the point with coordinates $(2, -5)$.

The equation will be $3x - 2y = C$ for

some real number C . Substituting the

point $(2, -5)$ gives $3 \cdot 2 - 2(-5) = C$

$$\Rightarrow 6 + 10 = C \Rightarrow C = 16.$$

So the equation is

$$\boxed{3x - 2y = 16}$$

12. Find the point where the lines with equations $y = 5x - 3$ and $2x - 4y = 48$ intersect.

We'll substitute $y = 5x - 3$ into $2x - 4y = 48$:

$$2x - 4(5x - 3) = 48 \Leftrightarrow 2x - 20x + 12 = 48$$

$$\Leftrightarrow -18x + 12 = 48$$

$$\Leftrightarrow -18x = 36$$

$$\Leftrightarrow \boxed{x = -2}$$

Plug in to the first eq. $y = 5(-2) - 3 \Rightarrow \boxed{y = -13}$
 So the intersection point is $(-2, -13)$.

13. Solve the following system:

$$\begin{cases} 3x - 5y = 13 \\ 4x + 2y = -26 \end{cases}$$

$$\begin{array}{r} 12x - 20y = 52 \\ -12x - 6y = 78 \\ \hline -26y = 130 \end{array}$$

$$y = \frac{130}{-26}$$

$$\boxed{y = -5}$$

$$\begin{cases} 3x - 5y = 13 \\ \quad 5y = -25 \end{cases}$$

$$3x = -12$$

$$\boxed{x = -4}$$

Solution $(-4, -5)$.

14. Solve the following system:

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

$$\begin{array}{r} -4x - 6y = 6 \\ 4x + 6y = -6 \\ \hline 0 = 0 \end{array}$$

$$\begin{cases} 2x + 3y = -3 \\ \quad 0 = 0 \end{cases}$$

This is an indeterminate system.

All solutions to $2x + 3y = -3$ are solutions of the system.

15. Simplify: $(3x^4y^3z^5)^2(-2x^3y^4z^2)^3 = (9x^8y^6z^{10})(-8x^9y^{12}z^6)$
 $= -72x^{17}y^{18}z^{16}$

16. Simplify: $(-3x^2 + 4x - 7) - (8x^2 + 3x - 2)$ ~~$= 11x^2 + 4x - 7 - 8x^2 - 3x + 2$~~
 $-3x^2 + 4x - 7 - (11x - 2) = -3x^2 + 4x - 7 - 11x + 2$
 $= \boxed{-3x^2 - 7x - 5}$

17. Expand and simplify: $(2x - 5)(3x^2 - 5x + 7) = 6x^3 - 10x^2 + 14x - 15x^2 + 25x - 35$
 $= 6x^3 + 39x - 25x^2 - 35$

18. Expand and simplify: $(x - 3)^3 = (x - 3)^2(x - 3)$
 $= (x^2 - 6x + 9)(x - 3)$
 $= x^3 - 6x^2 + 9x - 3x^2 + 18x - 27$
 $= x^3 - 9x^2 + 27x - 27$

19. Simplify: $\frac{10a^5b^3 - 4a^3b^2 + 6a^4b^6 + 8ab^2}{2ab^2} = 5a^4b - 2a^2 + 3a^3b^4 + 4$

20. Simplify: $\frac{(2x - 3)^2 + 24x}{(2x + 3)^2} = \frac{4x^2 - 12x + 9 + 24x}{4x^2 + 12x + 9} = \frac{4x^2 + 12x + 9}{4x^2 + 12x + 9} = \boxed{1}$