

**BRONX COMMUNITY COLLEGE**  
of the City University of New York

**DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE**

MATH 05  
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Exam 4  
August 1, 2016

Name: Answers

**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 4 points**

1. Given  $a = -4$  and  $b = 2$ , evaluate the expression given below.

$$a^2 + 2ab - ab^2 = (-4)^2 + 2(-4)(2) - (-4)(2)^2$$

$$= 16 + 2(-4)(2) - (-4) \cdot 4$$

$$= 16 - 16 + 16 = \boxed{16}$$

A. -48    B. -16    **C. 16**    D. 48

2. Solve for  $x$ :  $LCD=6$

$$\frac{3}{6} \frac{(x+4)}{2} = \frac{(x+9)}{3} \frac{2}{6} \Leftrightarrow 3x+12 = 2x+18$$

$$\Leftrightarrow 3x = 2x + 6$$

$$\Leftrightarrow x = 6$$

A.  $x = 1$     B.  $x = 5$     **C.  $x = 6$**     D.  $x = 14$

3. Find all solutions to the equation:

$$4a^2 - 12 = 0$$

$$+12 \quad +12$$

$$\frac{4}{4} a^2 = \frac{12}{4} \Leftrightarrow a^2 = 3 \Leftrightarrow a = \pm \sqrt{3}$$

A.  $a = 2$ , or  $a = -2$   
 B.  $a = 3$ , or  $a = -3$   
**C.  $a = \sqrt{3}$ , or  $a = -\sqrt{3}$**   
 D. There are no real solutions.

4. Find all solutions to the equation:

$$3y^2 + 12 = 0 \Leftrightarrow \frac{3y^2}{3} = \frac{-12}{3}$$

$$\Leftrightarrow y^2 = -4$$

A.  $y = 2$ , or  $y = -2$   
 B.  $y = 3$ , or  $y = -3$   
 C.  $y = \sqrt{3}$ , or  $y = -\sqrt{3}$   
**D. There are no real solutions.**

5. Simplify:  $x^{-6}x^3 = x^{-6+3} = x^{-3} = \frac{1}{x^3}$

A.  $x^3$     B.  $-x^3$     **C.  $\frac{1}{x^3}$**     D.  $-\frac{1}{x^3}$

6. Simplify  $\frac{24x^6y^3}{-6x^3y} = -4 \times^{6-3} y^{3-1} = -6 \times^3 y^2$

A.  $-4x^2y^3$     **B.  $-4x^3y^2$**     C.  $-4x^3y^3$     D.  $-4x^9y^4$

7. Simplify  $(a-b)^2 = (a-b)(a-b) = a^2 - ab - ba + b^2 = a^2 - 2ab + b^2$

A.  $a^2 + b^2$     B.  $a^2 - b^2$     **C.  $a^2 - 2ab + b^2$**     D.  $a^2 + 2ab - b^2$

8. Simplify:  $(5x^2 - 7x + 9) - (-2x^2 - 3x + 2) = \underline{5}x^2 - \underline{7}x + \underline{9} + \underline{2}x^2 + \underline{3}x - \underline{2}$   
 $= \underline{7x^2 - 4x + 7}$

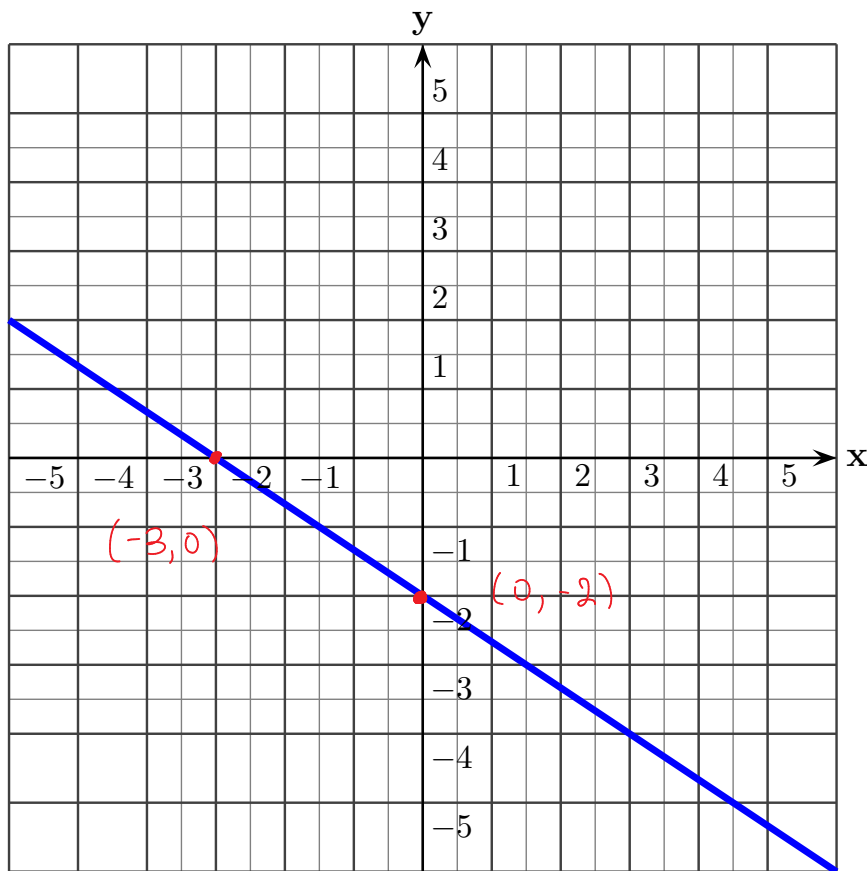
9. Simplify. Give your answers using positive exponents only:  $(-2x^2y^{-3}w^{-2})^{-3}$

$$\begin{aligned} (-2x^2y^{-3}w^{-2})^{-3} &= (-2)^{-3}(x^2)^{-3}(y^{-3})^{-3}(w^{-2})^{-3} \\ &= (-2)^{-3}x^{-6}y^9w^6 \\ &= \frac{y^9w^6}{(-2)^3x^6} = \frac{y^9w^6}{-8x^6} \\ &= \underline{-\frac{y^9w^6}{8x^6}} \end{aligned}$$

10. Simplify:  $\frac{30x^9 + 8x^7 - 2x^5}{-2x^5} = \frac{30x^9}{-2x^5} + \frac{8x^7}{-2x^5} + \frac{-2x^5}{-2x^5}$   
 $= -15x^4 - 4x^2 + 1$

11. Multiply:  $(x - 1)(x^2 - 2x + 3) = x^3 - \underline{2}x^2 + \underline{3}x - \underline{x^2} + \underline{2}x - \underline{3}$   
 $= \underline{x^3 - 3x^2 + 5x - 3}$

12. What is the slope of the line graphed below?



Using points  $(-3, 0)$ ,  $(0, -2)$

$$\frac{(-2) - (0)}{(0) - (-3)} = \frac{-2}{+3} = -\frac{2}{3}$$

- A.  $\frac{2}{3}$  **B.  $-\frac{2}{3}$**  C.  $\frac{3}{2}$  D.  $-\frac{3}{2}$

13. Which of the following is a factor of the polynomial:

- A.  $3b - 2x$**  B.  $3b + 2x$  C.  $7a - 5y$  D.  $7a + 2y$

$$21ab - 14ax + 15by - 10xy$$

$$= 7a(3b - 2x) + 5y(3b - 2x)$$

$$= (7a + 5y)(3b - 2x)$$

14. Factor completely:  $16a^2b - 100b^3$

$$16a^2b - 100b^3 = 4b(4a^2 - 25b^2)$$

$$= 4b(2a + 5b)(2a - 5b)$$

15. Factor completely:  $2x^2 - x - 55$

Using ac method:  $a = 2$   
 $b = -1$   
 $c = -55$

So we want two numbers that have

$$\text{Product } 2 \cdot (-55) = -110$$

$$\text{Sum } -1$$

The numbers are  $-11, 10$

$$2x^2 - x - 55 = 2x^2 - 11x + 10x - 55$$

$$= x(2x - 11) + 5(2x - 11)$$

$$= (x + 5)(2x - 11)$$

16. Solve:  $7z^2 + 28z = 0 \Leftrightarrow 7z(z+4) = 0$

$$\Leftrightarrow \frac{7z}{7} = \frac{0}{7} \text{ or } z+4=0$$

$$\Leftrightarrow \boxed{z = 0 \text{ or } z = -4}$$

17. Solve:  $y^2 + 2y = 15 \Leftrightarrow y^2 + 2y - 15 = 0$

$$\Leftrightarrow (y-3)(y+5) = 0$$

$$\Leftrightarrow \begin{matrix} y-3=0 & \text{or} & y+5=0 \\ +3 & +3 & -5 & -5 \end{matrix}$$

$$\Leftrightarrow \boxed{y = 3 \text{ or } y = -5}$$

$a = -15$  Numbers  
 $b = 2$  are  $5-3$

$$\begin{aligned} y^2 + 2y - 15 &= y^2 + 5y - 3y - 15 \\ &= y(y+5) - 3(y+5) \\ &= (y-3)(y+5) \end{aligned}$$

18. Solve:  $x^2 - 35 = 2x \Leftrightarrow x^2 - 2x - 35 = 0$

$$\Leftrightarrow (x+5)(x-7) = 0$$

$$\Leftrightarrow \begin{matrix} x+5=0 & \text{or} & x-7=0 \\ -5 & -5 & +7 & +7 \end{matrix}$$

$$\Leftrightarrow \boxed{x = -5 \text{ or } x = 7}$$

$a = -35$   
 $b = -2$

Numbers are  $-7, 5$

$$\begin{aligned} x^2 - 2x - 35 &= x^2 - 7x + 5x - 35 \\ &= x(x-7) + 5(x-7) \\ &= (x+5)(x-7) \end{aligned}$$



Points  $(-1, 4)$ ,  $(2, -2)$ . So the slope is

$$m = \frac{(-2) - (4)}{(2) - (-1)} = \frac{-6}{3} = -2$$

So if the  $y$ -intercept is  $b$ , we have the equation

$$y = -2x + b$$

Substituting the coordinates of  $(2, -2)$  we have

$$-2 = -2(2) + b \Leftrightarrow -2 = -4 + b$$

$$\Leftrightarrow b = 2$$

So the equation is  $y = -2x + 2$

22. What is the value of the  $y$ -coordinate of the solution to the following system of equations?

$$\begin{cases} x + 5y = 17 \\ -2x - 2y = -2 \end{cases}$$

$$\begin{aligned} 2x + 10y &= 34 \\ -2x - 2y &= -2 \end{aligned}$$

$$\frac{8y}{8} = \frac{32}{8} \Rightarrow y = 4$$

- A.  $y = -4$    **B.**  $y = 4$    C.  $y = 16$    D.  $y = -16$

23. Solve for  $x$ :  $18 - 5x = -3(x - 2)$

$$\begin{aligned} 18 - 5x &= -3x + 6 \\ 18 - 6 &= -3x + 5x \end{aligned}$$

- A.  $x = 10$    **B.**  $x = 6$    C.  $x = -12$    D.  $x = 12$

$$\begin{aligned} 12 &= 2x \\ x &= 6 \end{aligned}$$

24. Find all solutions of the equation:  $x(x - 1) = 12$ .

- A.**  $x = -3$ , or  $x = 4$

$$\Leftrightarrow x^2 - x = 12 \Leftrightarrow x^2 - x - 12 = 0$$

- B.  $x = 3$ , or  $x = -4$

$$\Leftrightarrow (x - 4)(x + 3) = 0$$

- C.  $x = 12$ , or  $x = 13$

$$\Leftrightarrow x - 4 = 0 \text{ OR } x + 3 = 0$$

- D.  $x = -12$ , or  $x = -13$

$$\Leftrightarrow x = 4 \text{ OR } x = -3$$

25. Which of the following is a factor of the polynomial  $6x^2 - 7x + 2$

- A.  $3x + 2$    **B.**  $2x - 1$    C.  $x - 3$    D.  $x - 4$

$$\begin{aligned} 6x^2 - 7x + 2 &= \underline{6x^2 - 3x} - \underline{4x + 2} \\ &= 3x(2x - 1) - 2(2x - 1) \\ &= (3x - 2)(\underline{2x - 1}) \end{aligned}$$

$$\begin{aligned} a &= 6 \\ b &= -7 \\ c &= 2 \end{aligned}$$

$$\begin{aligned} \text{Product} & \quad ac = 12 \\ \text{Sum} & \quad \quad b = -7 \end{aligned}$$

$$\underline{\underline{-3, -4}}$$