

BRONX COMMUNITY COLLEGE
of the City University of New York

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

MATH 05
Nikos Apostolakis

Exam 2
April 27, 2006

Name: _____

Secret Name: _____

Directions: You *must* show all your work in the provided space. Simplify your answers whenever possible. Be certain to indicate your final answer clearly. **This exam is worth 3350 points.**

1. (150 points) Find the equation of the line that is perpendicular to the line $y = -\frac{4}{3}x + 5$ and passes through $(0, -6)$.

Answer. $y = \frac{3}{4}x - 6$ □

2. (150 points) Find the equation of the line that is parallel to the line $y = -5x + 4$ and passes through the point $(2, 3)$.

Answer. $y = 13 - 5x$ □

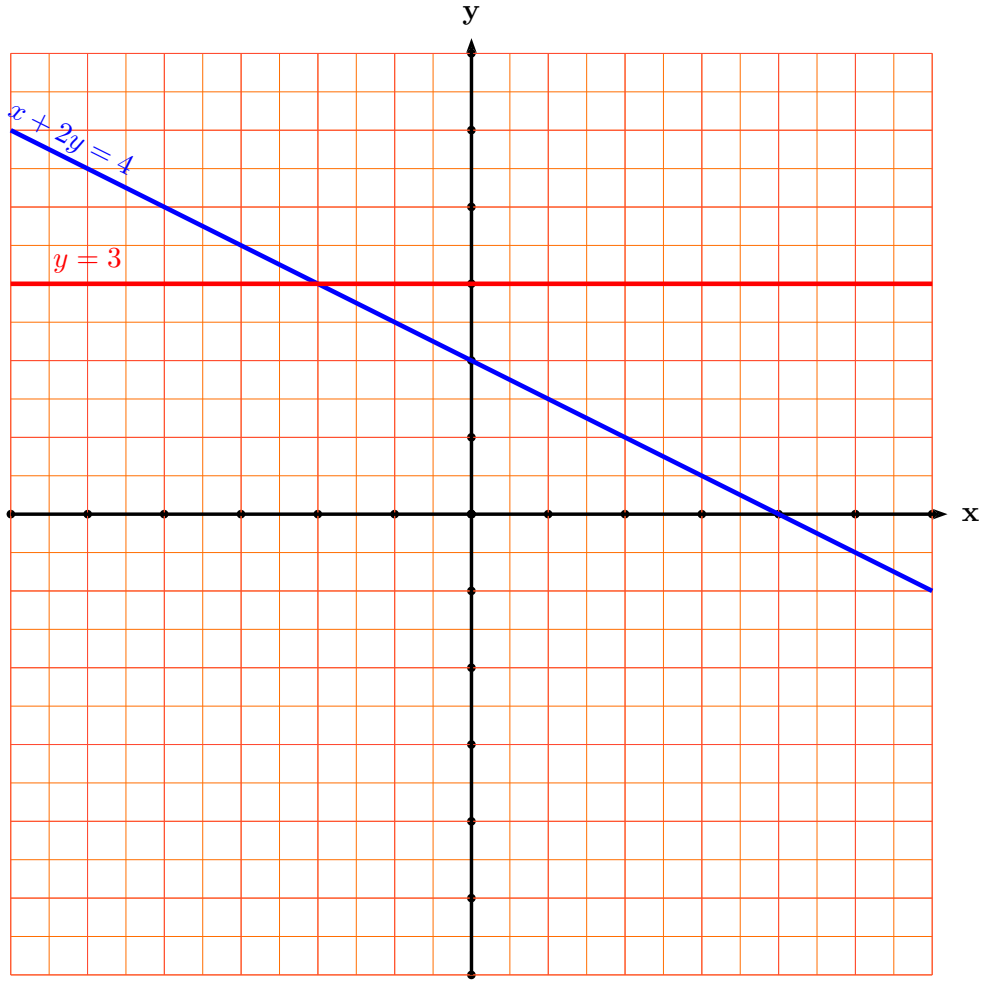
3. (200 points) Graph each of the following lines on the space provided:

(a) $x + 2y = 4$

(b) $y = 3$

4. (a) Simplify: $\sqrt{100}$

(b) Simplify: $\sqrt{50}$.



5. (200 points) Find the co-ordinates of the intersection of the lines in the previous question *without using the graph*.

Answer. $x = -2, y = 3$

□

6. The area of a rectangle is given by the polynomial $28x^2 - x - 15$ and one of its sides is given by $7x + 5$.

(a) (200 points) Find the other side.

Answer. $4x - 3$

□

(b) (100 points) Find the perimeter of the rectangle.

Answer. $22x + 4$

□

7. (250 points) Rachel wants to invest a total of \$10,000 in two different plans. Plan A has an annual interest rate of 5% and plan B has an annual interest rate of 3%. How much should she invest on each plan if she wants at the end of the year to earn a total of \$448.?

Answer. She should invest \$7400 in plan A and \$2600 in plan B.

□

8. (200 points) Solve for x and y :

$$\begin{cases} 4x - y = 2 \\ 2x + 3y = 8 \end{cases}$$

Answer. $x = 1$, $y = 2$

□

9. (250 points) A plane flies 480 mi with the wind in 4 hours. The return trip against the wind took 6 hours. What is rate of the plane in still air? What is the rate of the wind?

Answer. The rate of the plane in still air is 100 miles per hour. The rate of the wind is 20 miles per hour. \square

10. (200 points) Solve for x and y :

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

Answer. $x = -5$, $y = -3$ \square

11. (150 points) Simplify: $\left(\frac{3x^3y}{4z^4}\right)^2 (-2xy^2z^2)^4$.

Answer. $9x^{10}y^{10}$.

□

12. (150 points) Simplify: $\frac{9x^4y - 42x^3y^2 + 12x^2y^3}{3x^2y}$

Answer. $3x^2 - 14xy + 4y^2$

□

13. (200 points) Perform the division: $\frac{4x^3 + 8x^2 - 2x - 6}{x + 2}$

Answer. $\frac{4x^3 + 8x^2 - 2x - 6}{x + 2} = 4x^2 - 2 - \frac{2}{x + 2}$

□

14. Factor completely each of the following:

(a) (150 points) $2a^2b^3 + 2abz - 3ab^2 - 3z$

Answer. $(ab^2 + z)(2ab - 3)$ □

(b) (150 points) $27z^3 + 8$.

Answer. $(3z + 2)(9z^2 - 6z + 4)$. □

(c) (150 points) $50x^2 - 18$.

Answer. $2(5x + 3)(5x - 3)$. □

(d) (150 points) $x^2 + 100$.

Answer. Irreducible. □

(e) (150 points) $x^2 + x - 12$

Answer. $(x + 4)(x - 3)$ □

(f) (200 points) $8x^2 - 15x - 2$

Answer. $(8x + 1)(x - 2)$ □