Letter to Instructors of Math 118 Spring 2010

Dear instructor of Math 118,

In the fall 2009 the following revision of Math 118 was approved.

> **All students must take the Mathematics Departmental examination. The Mathematics Departmental examination shall count for at least 25% of each student's final grade.**

A student who does not take the Departmental Final Exam may only be assigned a grade of F or I (Incomplete). A student cannot receive any other grade (A, B, C or D) without taking the Departmental Final Exam. If a student, for a legitimate reason, does not take the final exam, his make-up exam should be scheduled with the Math Department Head, Dan Jacobson.

What will Math 118 exam look like?
The Departmental Final Exam is a 2 hour exam. Calculators are not allowed on the final exam. Standards for the exam and a sample exam are appended at the end of this document and can be seen and downloaded at http://faculty.ccp.edu/dept/math/devmath.html. The ultimate goal is to create a computerized (but not a multiple choice) form of the exam that will be graded instantaneously by computers. While we are working on an appropriate platform for this, for the Spring 2010 there will be an online version of the Departmental Final Exam in MyLabsPlus and a paper and pencil version. Which sections get which version will be determined by the Math Dept Head later during the Spring 2010 semester.

What do you, as an instructor of Math 118, need to do in the Spring 2010 semester?

Before the semester starts:

➢ Sign and return to the Math Department Head the form DEVELOPMENTAL MATH REVISION ACKNOWLEDGEMENT AND TEACHING ASSIGNMENT ACCEPTANCE. You should have received this form with notification of your Spring 2010 teaching assignment, or it can be downloaded at http://faculty.ccp.edu/dept/math/devmath.html

At the beginning of the semester:

➢ Inform the students about the new policies in Math 118 i.e. required common final exam, no calculators. Please include this information on your syllabus.

At the end of the semester:

- ➢ If your class is using the paper and pencil version, you will be given instructions on administering the exam.
- ➢ If your class is using the computerized version, get the final exam scores of your students from the Math Dept Head.
- ➢ Use the final exam score of your students to determine their final grades in the course, counting the score on the exam as at least 25% of the grade. Students who do not take the Departmental Final Exam may only be assigned a grade of F or I (incomplete).
- ➢ As usual, enter the final grade for each student through MyCCP (due date is May 11).

Please do not hesitate to contact me if you have any questions.

Dan Jacobson
Mathematics Department Head

Standards for the Math 118 Departmental Exam *November 5, 2009*

1. Evaluate polynomial and rational expressions given a value for each variable. For example evaluate:

    (a) $ab - 3ab^2$ if $a = -2$ and $b = -3$ (b) $\dfrac{x+y}{x-y}$ if $x = -3$ and $y = -4$

2. Write a rational expression so that powers of the same base are combined and all exponents are positive. For example write with positive exponents, combine, and reduce:

    (a) $(3x^{-2}y^4)^{-2}$ (b) $\dfrac{m - 3n^2 m - 6}{m^5 n^{-8}}$

3. Solve linear equations in one variable. For example solve:

    (a) $3 - 2x = 3x + 8$ (b) $3(x-2) = 3x - 6$ (c) $\dfrac{x}{6} - \dfrac{3}{4} = \dfrac{1}{3}$

    (d) $3(2x - 1) = 4x + 2(x - 8)$ (e) $3x - 6(2x - 1) = 5x + 2$

4. Solve a literal equation for a given variable. For example solve

    (a) $A = \frac{1}{2}(a + b)h$ for a (b) $y = 2x - 3$ for x

5. Solve a linear inequality and graph the solution set on a number line. For example solve for x and graph the solution set on a number line:

    (a) $4 - 2x \le 7$ (b) $x - 5 \ge x + 5$ (c) $2 - x < 3 - x$ (d) $2x - 3(x + 4) < 5$

6. Solve absolute value equations. For example solve:

    (a) $|2x - 1| = 5$ (b) $|x - 1| + 2 = 8$ (c) $|x| + 5 = 2$ (d) $|x - 5| = |x + 2|$

7. Solve absolute value inequalities and graph the solution set on a number line. For example solve for x and graph the solution set on a number line:

    (a) $|2x - 3| \le 7$ (b) $2 + |x - 4| > 3$ (c) $|x| + 5 < 4$ (d) $|x - 2| + 4 > 1$

8. Find multiple solutions of a linear equation in 2 variables. For example find 3 solutions of $3x - 2y = 18$.

9. Graph a linear equation in two variables on a 2-dimensional coordinate system. For example sketch the graph:

    (a) $2x - 5y = 20$ (b) $5y = 4$ (c) $y = 2x - 3$ (d) $x - 2 = 3$ (e) $3x - y = 0$

10. Graph a line given a point and the slope or given two points. For example graph the line with slope $-\frac{2}{3}$ through the point $(-1, 5)$.

11. Find the slope of a line given its equation or given 2 points. For example find the slope of the line:

    (a) $3x - 5y = 8$ (b) through the points $(-3, 2)$ and $(1, 4)$.

    (c) $2y - 3 = 7$ (d) through the points $(-3, 4)$ and $(-3, -1)$

    (e) $y - x = 5$ (f) with y-intercept 3 through the point $(2, -1)$

12. Find equations of lines given a point and the slope or given 2 points. For example find the equation of the line:

    (a) with slope -2 through the point $(4, -1)$ (b) through the points $(-3, 5)$ and $(2, 1)$

13. Determine the equation of a line perpendicular or parallel to a given line through a given point. For example find the equation of the line through $(2, 0)$ and perpendicular to $3x - 2y = 5$.

14. Given the equations of two lines determine whether or not they are parallel or perpendicular. For example are the lines determined by the given equations parallel, perpendicular, or neither?

    (a) $\begin{cases} 2x - 5y &= 7 \\ 3x + 2y &= 8 \end{cases}$ (b) $\begin{cases} 6x - 4y &= 10 \\ 2y &= 3x + 7 \end{cases}$

15. Solve a system of 2 linear equations in 2 variables. For example solve:

    (a) $\begin{cases} 2x - 5y &= 7 \\ 3x + 2y &= 8 \end{cases}$ (b) $\begin{cases} 6x - 4y &= 10 \\ 2y &= 3x + 7 \end{cases}$

    (c) $\begin{cases} 6a - 3b &= 12 \\ -4a + 2b &= -6 \end{cases}$ (d) $\begin{cases} 3x - y &= 0 \\ x + y &= 2 \end{cases}$

16. Solve word problems involving linear equations in 1 or 2 variables. For example a bag of dimes and quarters contains 35 coins. The total value is \$6.05. How many dimes are there?

17. Add, subtract, and multiply polynomials. For example perform the indicated operations.

    (a) $(4x^3 - 5x + 6) + (3x^2 - 7x - 5)$ (b) $(6p^2 - 5p - 8) - (4p^2 - 6p + 9)$

    (c) $(2x - 3y) - (3x + 5y)$ (d) $-3x^2(4x^2 - 7x + 1)$

    (e) $-5m^3n(4m^2n^6)$ (f) $(3x - 2)(5x + 1)$

    (g) $(4x - 1)(5x^2 - 7x + 3)$ (h) $5x - 4(3x - 2)$

18. Divide polynomials finding quotient and remainder. For example divide and find quotient and remainder.

    (a) $\dfrac{2x^2 + 5x - 10}{x + 4}$ (b) $(10x^3 - 27x^2 + 28x - 10) \div (2x - 3)$

19. Using only integer coefficients factor polynomials so that the greatest common factor is written as compactly as possible and so that other factors are factored as completely as possible. For example factor completely:

(a) $-15x^3y + 20x^4y^7z - 25x^3y^4$ (b) $m^3 + 1$

(c) $81x^4 - 16$ (d) $2x^3 + 3x^2 - 8x - 12$

(e) $x^2 - 11xy + 28y^2$ (f) $4x^3 - 32x^2y + 64xy^2$

20. Simplify square root expressions by extracting roots of perfect square factors. For example simplify

(a) $\sqrt{50}$ (b) $\sqrt{48}$

21. Solve quadratic equations in one variable. For example solve

(a) $3x^2 - 7x = 0$ (b) $6x^2 + 12 = 17x$ (c) $x^2 = 4x + 1$

(d) $(x - 2)^2 = 0$ (e) $x(8 - x) = 17$

22. Add, subtract, multiply, divide, and reduce rational expressions. For example perform the indicated operations and reduce.

(a) $\dfrac{6}{x} - 4x - 1$ (b) $\dfrac{8}{a} + 6a^2 - a$

(c) $\dfrac{2x^2 + 5x - 12}{x^2 - 4} \div \dfrac{2x^2 + 7x - 15}{x^2 - 25}$ (d) $\dfrac{x^2 - 8x + 12}{x^2 - 9xy + 18y^2} \div \dfrac{x^2 - 9y^2}{x^2 - 4}$

(e) $\dfrac{\dfrac{1}{x} + \dfrac{1}{y}}{\dfrac{1}{x} - \dfrac{1}{y}}$ (f) $\dfrac{x^2 - 4}{x^3 + 8}$

23. Solve rational equations reducible to linear or quadratic equations in one variable.
For example solve for x: $\dfrac{3}{x} + \dfrac{5}{x - 1} = \dfrac{2}{x^2 - x}$

Students are permitted to see this exam only under supervision and only while taking the exam or reviewing their graded exam. Students are not permitted to take this exam home.

No calculators. No partial credit. For credit you must show work and have correct final answer. No scratch paper. Show work in blank areas below the question. Use back sides of exam for additional scratch work as needed. For multiple choice questions darken the letter corresponding to the correct answer on the answer sheet. For open ended questions put final answer in space provided on answer sheet.

1. Evaluate $a - ab^2$ when $a = -4$ and $b = -3$.

    (A) -148

    (B) -72

    (C) 0

    (D) 576

    (E) none of the above

2. $(5x^{-3}y^7)^{-2} =$

    (A) $\dfrac{5}{x^3 y^{14}}$

    (B) $\dfrac{5x^5}{y^{14}}$

    (C) $\dfrac{25x^6}{y^{14}}$

    (D) $\dfrac{x^6}{25y^{14}}$

    (E) none of the above

3. Solve for r: $A = P(1 + rt)$.

    (A) $r = \dfrac{A - P - 1}{t}$

    (B) $r = \dfrac{A - P}{Pt}$

    (C) $r = \dfrac{A/P}{1 + t}$

    (D) $r = \dfrac{A - P}{1 + t}$

    (E) none of the above

4. Solve for x: $3 - x \leq 8$.

    (A) $x \leq -5$

    (B) $x \geq -5$

    (C) $x \leq 5$

    (D) $x \geq 5$

    (E) none of the above

5. Select the best graph or portion of graph of the solution of: $|2x - 5| < 7$.

(A)

-6 -4 -2 0 2 4 6

(B)

-6 -4 -2 0 2 4 6

(C)

-6 -4 -2 0 2 4 6

(D)

-6 -4 -2 0 2 4 6

(E)

-6 -4 -2 0 2 4 6
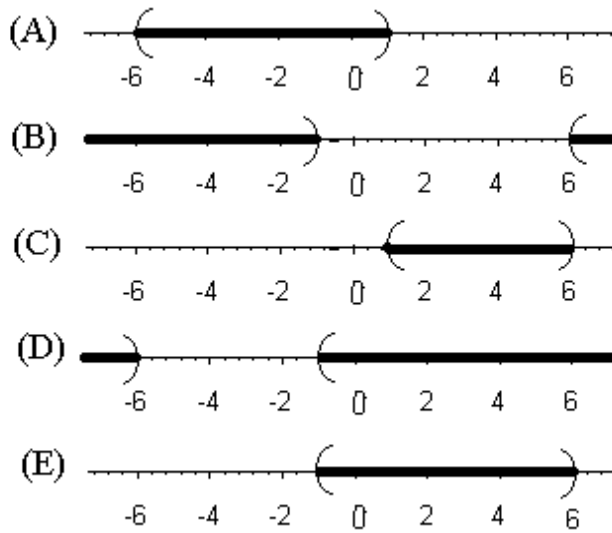
6. Which ordered (x, y) pair is *not* a solution to $5x - 4y = 10$?

   (A) $(10, 10)$

   (B) $(-6, -10)$

   (C) $(-4, -8)$

   (D) $(4, 2\frac{1}{2})$

   (E) $(10, 10)$

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

(A)   (B)   (C)   (D)   (E)
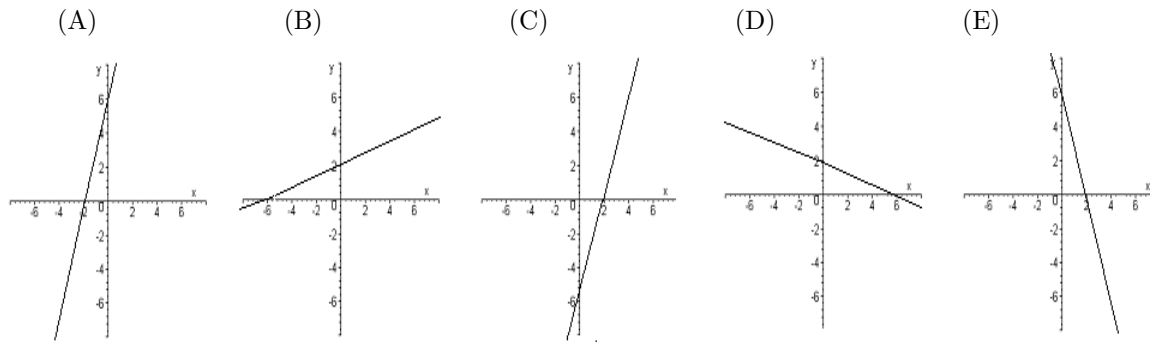
8. Select an equation for a line perpendicular to $3x - 2y = 15$.

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

(B) $y = \frac{2}{3}x + 6$

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

(D) $y = -\frac{3}{2}x + 8$

(E) none of the above

9. Find the x-coordinate of a solution to the system: $\begin{cases} 2x + 6y &= 15 \\ -3x + 4y &= 8 \end{cases}$

(A) $-\frac{54}{5}$

(B) $-\frac{6}{5}$

(C) $\frac{6}{5}$

(D) $\frac{54}{5}$

(E) none of the above

10. A theater charges \$6 for adults and \$4 for children. If the theater collected a total of \$440 for 100 tickets, then how many of those tickets were for children?

(A) 50

(B) 60

(C) 70

(D) 80

(E) none of the above

11. A news stand operator pays $240 rent and 26 cents for each newspaper sold and sells each newspaper for 50 cents. How many newspapers does the news stand operator need to sell in order to break even?

    (A) 10

    (B) 100

    (C) 1000

    (D) 10000

    (E) none of the above

12. $(2x^2 - 8x - 9) - (4x^2 - 3x + 6) =$

    (A)$-2x^2 - 11x - 3$

    (B)$-2x^2 - 5x - 3$

    (C)$2x^2 - 11x - 3$

    (D)$2x^2 - 5x - 3$

    (E)none of the above

13. $(2x - 9)(4x - 5) =$

    (A)$8x^2 - 46x + 45$

    (B)$8x^2 - 26x + 45$

    (C)$8x^2 + 26x + 45$

    (D)$8x^2 + 46x + 45$

    (E)none of the above

14. $(6x^2 - 23x + 15) \div (2x - 5) =$

    (A) $3x - 4 + \frac{5}{2x-5}$

    (B) $3x - 4 - \frac{5}{2x-5}$

    (C) $3x + 4 + \frac{5}{2x-5}$

    (D) $3x + 4x - \frac{5}{2x-5}$

    (E) none of the above

15. $\dfrac{6}{x+2} - \dfrac{8}{x} =$

    (A) $\dfrac{-2x-16}{x(x-2)}$

    (B) $\dfrac{x-8}{x(x-2)}$

    (C) $\dfrac{-2}{x(x-2)}$

    (D) -1

    (E) none of the above

16. $\dfrac{2x^2 - 13x + 15}{x^2 - 25} \div \dfrac{x^2 - x - 30}{4x^2 - 9} =$

    (A) $\dfrac{2x-3}{x-5}$

    (B) $\dfrac{2x-3}{x+5}$

    (C) $\dfrac{2x+3}{x-6}$

    (D) $\dfrac{2x+3}{x+6}$

    (E) none of the above

17. $\dfrac{18x^{-4}y^7x^{-2}}{30x^2y^{-4}} =$

(A) $\dfrac{3y^3}{5x^4}$

(B) $\dfrac{3x^4}{5y^3}$

(C) $\dfrac{3y^{11}}{5x^8}$

(D) $\dfrac{3x^8}{5y^{11}}$

(E) none of the above

18. $\sqrt{12x} + \sqrt{75x} =$

(A) $4\sqrt{3x}$

(B) $5\sqrt{3x}$

(C) $6\sqrt{3x}$

(D) $7\sqrt{3x}$

(E) none of the above

19. $16x^4y^2 - 20xy^8z^5 + 12x^6y^3z^2 =$

   (A) $4x^4y^2(4 - 5y^6z^5 + 3xyz^2)$

   (B) $4xy^2(4x^3 - 5y^6z^5 + 3x^5yz^2)$

   (C) $-4x^4y^{10}z^5 + 12x^6y^3z^2$

   (D) $8x^{10}y^{13}z^7$

   (E) none of the above

20. If $x^2 + 7 = 6x$ then x can equal

   (A) -7

   (B) -1

   (C) $2 - \sqrt{3}$

   (D) $3 - \sqrt{2}$

   (E) none of the above

Math 118 Exit Exam Form A

The following questions are open-ended. Put final answers on answer sheet provided. No partial credit is given for incorrect answers. For credit you must show work and have correct final answer.

21. Evaluate $\dfrac{5(F-32)}{9}$ when $F = 23$.

22. Solve for x: $\dfrac{5}{8} - \dfrac{7}{2x} = \dfrac{3}{4}$.

23. Solve for x: $x^2 + 24 = 11x$.

24. Find the slope of the line through the points $(-2, 6)$ and $(4, 1)$.

25. Factor completely: $2x^3 + 5x^2 - 18x - 45$

This draft should not be shown to students before the year 2010. Draft May 29, 2009

No calculators. No partial credit. For credit you must show work and have the correct final answer. For multiple choice shade in the bubble on the answer sheet. For open-ended questions write final answers in the space provided on the answer sheet.

1. Evaluate $rs - r^2$ at $r = -5$ and $s = -3$.

   (A) -10

   (B) 10

   (C) -40

   (D) 40

   (E) none of the above

2. $(3x^{-4}y^6)^{-2} =$

   (A) $-9x^8y-12$

   (B) $3x^{-4}y^{-12}$

   (C) $\dfrac{x^8}{9y^{12}}$

   (D) $\dfrac{3}{x^4y^{12}}$

   (E) none of the above

3. Solve for x: $y - 5 = \frac{3}{4}(x - 8)$.

   (A) $x = \frac{4}{3}y + 3$

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

   (C) $x = 4y - 12$

   (D) $x = 4y - 20$

   (E) none of the above

4. Solve for L: $P = 2L + 2W$

   (A) $L = \dfrac{P}{2} - 2W$

   (B) $L = \dfrac{P - 2W}{2}$

   (C) $L = P - 2W$

   (D) $L = P - W$

   (E) none of the above
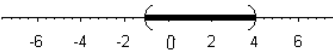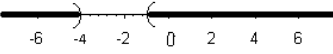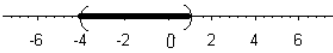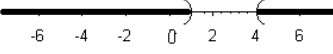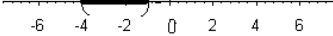
5. Solve for x: $2 - x \leq 9$.

(A) $x \leq -7$

(B) $x \leq 7$

(C) $x \geq 7$

(D) $x \geq -7$

(E) none of the above

7. Which number is *not* a solution to $5 - x \geq 8$?

(A) -8

(B) -5

(C) -4

(D) -3

(E) -1

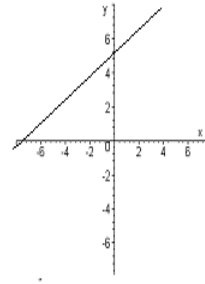6. Select the best graph or portion of graph of the solution of: $|2x - 3| < 5$.

(A)

-6　-4　-2　0　2　4　6

(B)

-6　-4　-2　0　2　4　6

(C)

-6　-4　-2　0　2　4　6

(D)

-6　-4　-2　0　2　4　6

(E)

-6　-4　-2　0　2　4　6
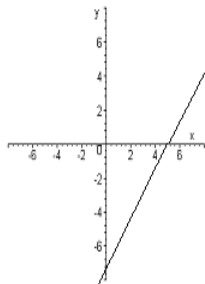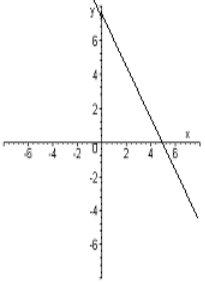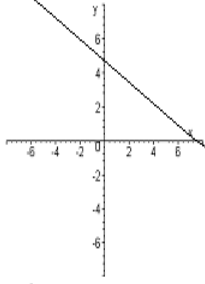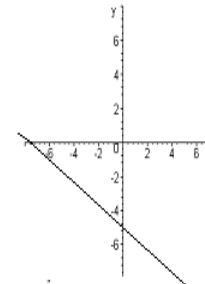
8. Which ordered (x, y) pair is *not* a solution to $2x - 3y = 12$?

(A) $(0, -4)$

(B) $(2, -3)$

(C) $(3, -2)$

(D) $(6, 0)$

(E) $(15, 6)$

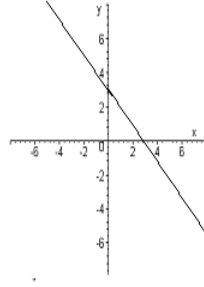9. Graph $3x - 2y = 15$.
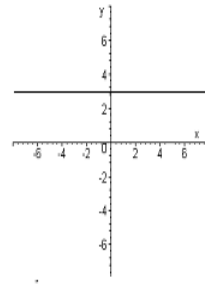
(A)　　　　(B)　　　　(C)　　　　(D)　　　　(E)

10. Graph $3x - y = 0$.
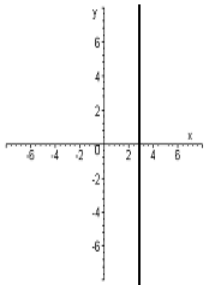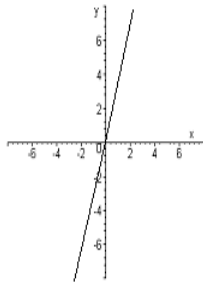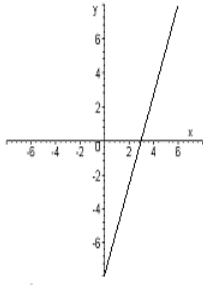
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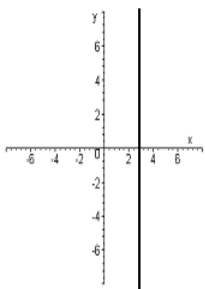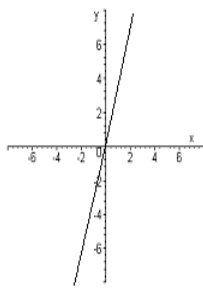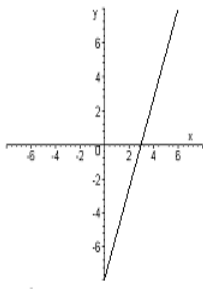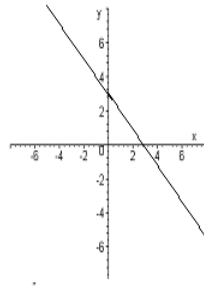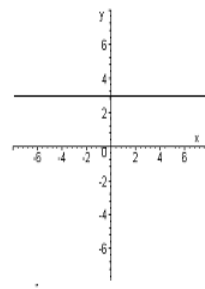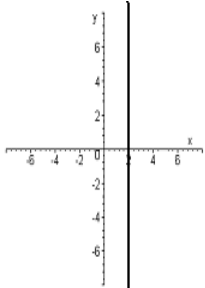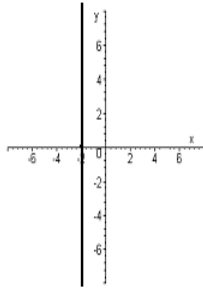
11. Graph $y = 3$.

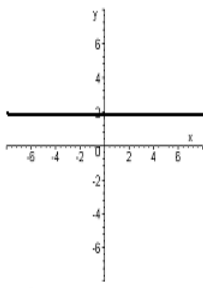(A)　　　　　　　(B)　　　　　　　(C)　　　　　　　(D)　　　　　　　(E)

12. Graph $x = -2$.

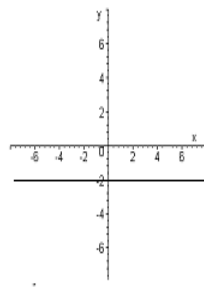(A)　　　　　　　(B)　　　　　　　(C)　　　　　　　(D)　　　　　　　(E)
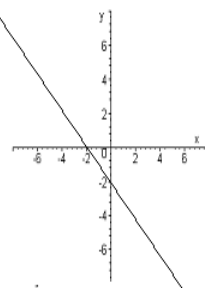
13. Graph the line with slope $\frac{2}{3}$ through the point $(1, -2)$.

(A)   (B)   (C)   (D)   (E)
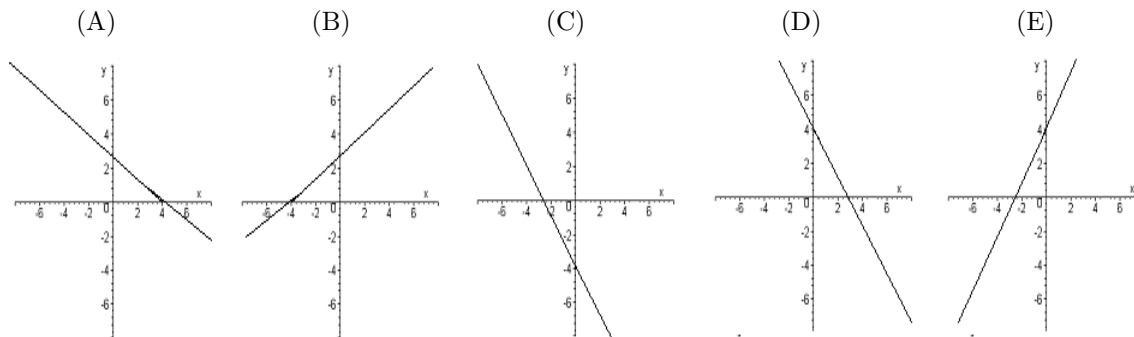
14. Select an equation for a line perpendicular to $3x - 4y = 24$.

(A) $y = -\frac{4}{3}x + 6$

(B) $y = \frac{4}{3}x - 6$

(C) $y = \frac{3}{4}x - 6$

(D) $y = -\frac{3}{4}x + 6$
(E) none of the above

15.   Find the x-coordinate of a solution to the system:
$$\begin{cases} 2x + 5y = 20 \\ -3x + 2y = 12 \end{cases}$$

(A) $-\frac{2}{19}$

(B) $-\frac{5}{19}$

(C) $-\frac{20}{19}$

(D) $\frac{-84}{19}$

(E) none of the above

16.   Find the x-coordinate of a solution to the system:
$$\begin{cases} 2x - 4y = 12 \\ -3x + 6y = 18 \end{cases}$$

(A) -3
(B) 0
(C) 6
(D) 72
(E) none of the above

17.   Find the x-coordinate of a solution to the system:
$$\begin{cases} x - 2y = 10 \\ -3x + 6y = -30 \end{cases}$$

(A) $-\frac{5}{6}$

(B) $-\frac{1}{6}$

(C) $\frac{1}{6}$

(D) $\frac{5}{6}$

(E) none of the above

18.   A news stand operator pays $300 rent and 38 cents for each newspaper sold. S/he sells the newspapers for 50 cents each.   How many newspapers does s/he need to sell in order to break even?

(A) 25000
(B) 2500
(C) 250
(D) 25
(E) none of the above

19. How much would 9 pounds of apples cost if 6 pounds of apples cost $4?

(A) $4.50
(B) $5
(C) $5.50
(D) $6
(E) none of the above

20. Three cartons of eggs and four loaves of bread cost $17.75. Four cartons of eggs and three loaves of bread cost $15.50. How much does one carton of eggs cost?

(A) $1.25
(B) $1.50
(C) $1.75
(D) $2.00
(E) none of the above

21. A bag contains dimes and quarters, a total of 40 coins. The value of the coins is $7.15. How many dimes are there?

(A) 15
(B) 16
(C) 17
(D) 18
(E) none of the above

22.   A chemist needs to mix a 10% acid solution with a 50% acid solution to make 200 milliliters of a 40% acid solution. How many milliliters of the 10% acid solution should be used?

(A) 150
(B) 120
(C) 90
(D) 50
(E) none of the above

23. $(5a^2b^4)(-3ab^5c^2) =$

(A) $-15a^2b^{20}c^2$

(B) $-15a^3b^9c^2$

(C) abc^2

(D) $2a^2b^9c^2$

(E) none of the above

24. $(2x^2 - 6x - 7)$
$-(5x^3 - 8x + 6) =$

(A) $-5x^3 + 2x^2 - 14x - 1$

(B) $-3x^2 - 14x - 1$

(C) $-5x^3 + 2x^2 + 2x - 1$

(D) $3x^2 - 14x - 1$

(E) none of the above

25. $(3x^2 - 6x - 11)$
$+(2x^2 - 8x + 9) =$

(A) $5x^2 - 14x - 2$

(B) $5x^4 - 14x^2 - 2$

(C) $6x^4 + 48x^2 - 99$

(D) $6x^2 + 48x - 99$

(E) none of the above

26. $4x^2y(6x - 2y + 1) =$

(A) $10x^3y - 2y + 1$

(B) $24x^3y - 2y + 1$

(C) $24x^3y - 8x^2y^2 + 4x^2y$

(D) $10x^3y + 2x^2y^2 + 5x^2y$

(E) none of the above

27. $(2x - 6y) - (5x - y) =$

(A) $3x - 7y$

(B) $-3x - 7y$

(C) $3x - 5y$

(D) $-3x - 5y$

(E) none of the above

28. $(2x - 7)(3x - 5) =$

(A) $6x^2 + 35$

(B) $5x - 12$

(C) $-15x + 35$

(D) $6x^2 - 31x - 35$

(E) none of the above

29. $(3x - 8)(4x^2 - 7x + 1) =$

(A) $12x^3 - 53x^2 + 59x - 8$

(B) $12x^2 - 56x - 8$

(C) $12x^3 + 53x^2 + 59x - 8$

(D) $4x^2 - 4x - 7$

(E) none of the above

30. $(x^2 - 5x + 7) \div (x + 4) =$

    (A) $x - 1 + \frac{3}{x+4}$

    (B) $x - 1 + \frac{11}{x+4}$

    (C) $x - 9 - \frac{29}{x+4}$

    (D) $x - 9 + \frac{43}{x+4}$

    (E) none of the above

31. $\dfrac{6x^3 - 17x^2 + 26x + 17}{2x - 3} =$

    (A) $3x^2 - 13x + 22 + \frac{x+83}{2x-3}$

    (B) $3x^2 - 13x + 22 + \frac{x-49}{2x-3}$

    (C) $3x^2 - 4x + 7 + \frac{40}{2x-3}$

    (D) $3x^2 - 4x + 7 - \frac{2}{2x-3}$

    (E) none of the above

32. $\dfrac{3}{4x} + \dfrac{5}{6x} =$

    (A) $\dfrac{5}{8x}$ (B) $\dfrac{19}{12x}$

    (C) $\dfrac{2}{3x}$ (D) $\dfrac{4}{5x}$

    (E) none of the above

33. $\dfrac{6}{x+3} - \dfrac{4}{x} =$

    (A) $\dfrac{2x-4}{x(x+1)}$ (B) $\dfrac{2}{x+3}$

    (C) $\dfrac{2}{x(x+3)}$ (D) $\dfrac{2x-12}{x(x+3)}$

    (E) none of the above

34. $\dfrac{x^2 - 4}{2x^2 - 5x - 12} \div \dfrac{x^2 + 10x + 24}{4x^2 - 9} =$

    (A) $\dfrac{2x-1}{x+2}$ (B) $\dfrac{2x-3}{x+6}$

    (C) $\dfrac{(x+2)(x-2)(2x-3)}{(x-4)(x+4)(x+6)}$ (D) $\dfrac{2x-3}{(x+4)(x+6)}$

    (E) none of the above

35. $\dfrac{x^2 - 4y^2}{x^2 - xy - 2y^2} \cdot \dfrac{x^2 - 3xy - 4y^2}{x^2 - 6xy - 16y^2} =$

(A) $\dfrac{x - 4y}{x - 8y}$ (B) $\dfrac{x - y}{x - 2y}$ (C) $\dfrac{2}{2xy + 4}$ (D) $\dfrac{1}{4}$

(E) none of the above

36. $\dfrac{\dfrac{1}{2y} - \dfrac{3}{x}}{\dfrac{1}{y} - \dfrac{2}{x}} =$

(A) $\dfrac{x - 3y}{2x - 2y}$ (B) $\dfrac{x - 3y}{x - 2y}$

(C) $\dfrac{x - 3y}{x - 4y}$ (D) $\dfrac{x - 6y}{x - 4y}$

(E) none of the above

37. $\dfrac{x^2 + x - 6}{x^3 + 3x^2 - 4x - 12} =$

(A) $\dfrac{1}{x - 2}$

(B) $\dfrac{1}{x + 2}$

(C) $\dfrac{1}{x + 3}$

(D) $\dfrac{x - 6}{3x^2 - 4x - 12}$

(E) none of the above

38. $\dfrac{15x^{-5}y^6 x^{-3}}{25x^2 y^{-4}} =$

(A) $\dfrac{3y^{10}}{5x^{10}}$ (B) $\dfrac{3x^{10}}{5y^{10}}$

(C) $\dfrac{3x^6}{5y^2}$ (D) $\dfrac{3y^2}{5x^6}$

(E) none of the above

39. $(64x^{12}y^6)^{1/6} =$

(A) $64x^2 y$ (B) $\dfrac{32x^{12}y^6}{3}$

(C) $16x^{12}y^6$ (D) $4x^2 y$

(E) none of the above

40. $\sqrt{50x^{16}y^9} =$

   (A) $7x^4y^3$

   (B) $7x^8y^4\sqrt{y}$

   (C) $25x^8y^4\sqrt{y}$

   (D) $25x^4y^3$

   (E) none of the above

42. $\dfrac{5}{2-\sqrt{3}} =$

   (A) $\dfrac{5(2+\sqrt{3})}{7}$

   (B) $\dfrac{5(2-\sqrt{3})}{7}$

   (C) $5(2-\sqrt{3})$

   (D) $5(2+\sqrt{3})$

   (E) none of the above

41. $\sqrt{8x} + \sqrt{50x} =$

   (A) $7\sqrt{2x}$

   (B) $\sqrt{10x}$

   (C) $\sqrt{29x}$

   (D) $\sqrt{58x}$

   (E) none of the above

43. If $x^2 + 9x = 0$ then x can equal

   (A) 0

   (B) 1

   (C) 2

   (D) 3

   (E) none of the above

44. $15x^3y^2 - 20x^4yz^6 + 25x^6y^3z^4 =$

   (A) $5x^3yz^4(3y - 4xz^2 + 5x^3y^2)$ (B) $5x^3y(3y - 4xz^6 + 5x^3y^2z^4)$

   (C) $5x^3y^2(-4xz^6 + 5x^3yz^4)$ (D) $10x^{13}y^5z^{10}$

   (E) none of the above

45. If $(x-2)^2 = 16$
    then x can equal

    (A) 0

    (B) -1

    (C) -2

    (D) -3

    (E) none of the above

47. If $x^2 + 25 = 6x$
    then x can equal

    (A) -7

    (B) -1

    (C) 1

    (D) 7

    (E) none of the above

46. If $x^2 = 2x + 6$
    then x can equal

    (A) $2 - \sqrt{28}$

    (B) $1 - \sqrt{28}$

    (C) $1 - 2\sqrt{7}$

    (D) $1 - \sqrt{7}$

    (E) none of the above

48. If $2x^2 + 7x = 4$
    then x can equal

    (A) $-\frac{1}{2}$

    (B) $\frac{1}{2}$

    (C) 4

    (D) 7

    (E) none of the above

The following questions are open-ended. About 20% of questions on the actual exam will be open-ended. Put final answers on answer sheet provided. No partial credit is given for incorrect answers. For credit you must show the work and have the correct final answer.

49. Evaluate $\dfrac{5(F-32)}{9}$ at $F = 14$.

50. Solve for x: $2x - 8 = 3x + 4(x-2)$.

51. Solve for x: $\dfrac{5}{6} - \dfrac{3}{2x} = \dfrac{3}{4}$.

52. Solve for x: $|3x - 2| = 6$.

53. Solve for x: $x^2 + 18 = 11x$.

54. Solve for x: $x = 2 + \sqrt{19 - 2x}$

55. Solve for x: $\sqrt{x - 2} = 7$

56. Find the slope of the line through the points $(-2, 5)$ and $(4, 1)$.

57. Find the slope-intercept form of the equation of the line with x-intercept $3, 0)$ and y-intercept $(0, 5)$.

58. Factor completely: $x^2 - 13xy - 90y^2$

59. Factor completely: $2x^3 + 5x^2 - 8x - 20$

60. Factor completely: $16a^4 - 1$

61. Factor completely: $x^3 - 8$

62. Factor completely: $36r^2 - 60rs + 25s^2$