

BRONX COMMUNITY COLLEGE
of the City University of New York

DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE

MTH 05 Review Sheet

Go to <http://www.cuny.edu/testing> for more information on the CUNY Elementary Algebra final exam, including sample finals such as <http://www.cuny.edu/academics/testing/Sample-CEAFE-A.pdf>

I. Operations with signed numbers and fractions

1. Evaluate:

(a) $\frac{2}{5} - \frac{3}{4}$	(b) $\left(-\frac{3}{8} \div \frac{9}{4}\right)$	(c) $4 - \frac{3}{5}$
(d) $\frac{2}{3}(95) - \left(\frac{1}{6}\right)^2$	(e) $-\frac{3}{4}\left(3 - \frac{1}{3}\right)$	(f) $\left(-\frac{2}{3}\right)^2 + \left(-\frac{1}{3}\right)^3$

2. Evaluate:

(a) $\sqrt{b^2 - 4ac}$ when $a = 1, b = -7, c = 6$.
(b) $\sqrt{b^2 - 4ac}$ when $a = 1, b = \frac{1}{2}, c = -\frac{1}{2}$.
(c) $-\frac{b}{2a}$ when $a = -\frac{2}{3}, b = -4$
(d) $\frac{y_2 - y_1}{x_2 - x_1}$ when $x_1 = 4, x_2 = -2, y_1 = 3, y_2 = -9$.
(e) $2x^2 - 4xy$ when $x = -3, y = -2$

II. Linear equations and systems

3. Solve:

(a) $6x - 4 = 18$	(b) $5y - 3(y + 2) = y + 4$	(c) $3(2t - 4) - t + 5 = 5t - 7$
(d) $10(z - 2) = -4(z + 1)$	(e) $\frac{x}{3} - 5 = \frac{2x + 7}{6} + 6$	(f) $\frac{2w - 3}{4} + \frac{w}{3} = \frac{1}{6}$

4. Solve for the indicated variable:

(a) $I = P \cdot r \cdot t$ for t	(b) $F = \frac{9}{5}C + 32$ for C	(c) $2x - 3y = 8$ for y
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5. Sketch the graphs of the following linear equations:

(a) $2x - 3y = 6$	(b) $x + 4y = 8$	(c) $y = -\frac{1}{2}x + 4$	(d) $y = 2x - 3$
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6. Find the slope of the lines described by the following information:

- (a) With equation $y = \frac{2}{3}x + 4$
(b) With equation $2x - 3y = 8$
(c) Passing through the points $(4, -2)$ and $(5, 1)$
(d) Perpendicular to the line with equation $x - 4y = 1$

7. Write an equation of the line described by the following information:
- With slope $-\frac{1}{2}$ and passing through the point $(3, -2)$
 - Passing through the points $(2, -1)$ and $(-4, -3)$
 - Parallel to the line with equation $y = 3x - 4$ and passing through $(1, 9)$.
 - Parallel to the line with equation $3x - 5y = 4$ and having the same y -intercept as the line with equation $x - 4y - 8 = 0$.
8. Solve the systems:

$$(a) \begin{cases} x + y = 1 \\ 2x - y = 8 \end{cases} \quad (b) \begin{cases} 5x - 2y = 10 \\ 2x - 7y = 14 \end{cases} \quad (c) \begin{cases} 2x + y = 4 \\ 2x - 3y = 1 \end{cases}$$

9. Write an algebraic equation in order to solve the following questions:
- Ojanay has 39 coins. If she has a total of \$6.30 and the coins are only dimes and quarters, how many of each type of coin does she have?
 - The length of a rectangle is three centimeters more than twice its width. The perimeter is 54 cm. Find the length and the width of the rectangle.
 - One number is six more than three times another number. Their sum is 75. Find the two numbers.
 - Find two consecutive integers such that three times the first is seven more than two times the second.
 - Three consecutive integers have the property that the sum of the first two is 21 less than three times the third. Find the three integers.

III. Inequalities

10. Solve and graph the solution set of the inequalities:
- $x - 3 > 2$
 - $2x - 7 \leq 5x - 1$
11. Graph the solution set of the following inequalities:
- $5x + 2y \geq 10$
 - $x - 3y < 6$

IV. Operations with polynomials

12. Perform the indicated operations:
- $(3x - 1)(4x + 5)$
 - $(2x - 3)^2$
 - $(2x - 1)(x^2 - x + 2)$
 - $(y^2 - 3y + 5) - (2y^2 + y - 5)$
 - $\frac{4x^7 - 16x^5 + 24x^4}{4x^3}$
13. Factor completely:
- $4p^2q^5 - 12p^2q^3$
 - $x^2 - 15x + 56$
 - $2y^2 + y - 1$
 - $4x^2 - 36$
 - $y^4 - 16$
 - $6x^5 + x^4 - 12x^3$
 - $4x + 10xy - 6y - 15y^2$

V. Operations with radicals rational exponents and complex numbers

14. Simplify the following radical expressions:

(a) $\sqrt{75}$ (b) $\sqrt[3]{54}$ (c) $\sqrt{-9}$ (d) $\sqrt{-12}$ (e) $\sqrt[3]{\frac{8}{27}}$ (f) $\sqrt{\frac{1}{2}}$

15. Perform the indicated operations and express the answers in simplest radical form:

(a) $-3\sqrt{50} + 2\sqrt{27} + \sqrt{8}$
(b) $\sqrt{3}(\sqrt{28} - \sqrt{7})$
(c) $(\sqrt{5} - \sqrt{3})(\sqrt{5} + \sqrt{3})$

VI. Quadratic Equations

16. Solve. Write all solutions in simplest radical or standard complex form $a + bi$:

(a) $x^2 + 3x - 10 = 0$
(b) $x^2 - 6x = 16$
(c) $y^2 - 3y + 3 = 0$
(d) $4y^2 + 2y = 1$
(e) $2x^2 - 5x + 3 = 0$
(f) $x^2 = 2x + 4$

17. Graph the following parabolas. Make a table of values showing at least five solutions.

(a) $y = x^2 - 5$
(b) $y = x^2 + 4x$
(c) $y = 4 - x^2$

18. Solve the following problems by writing and using an algebraic equation:

- (a) A rectangle has perimeter 48 feet and area 80 square feet. Find the dimensions of the rectangle.
(b) One leg of a right triangle measures three inches more than the other leg. Find the length of both legs if the hypotenuse is 15 inches long.
(c) The product of two consecutive integers is 29 more than their sum. Find the two integers.

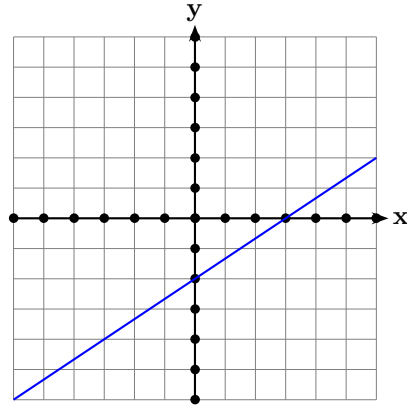
Answers

1. A. $-\frac{7}{20}$ B. $-\frac{1}{6}$ C. $\frac{17}{5}$ D. $\frac{2279}{36}$ E. -2 F. $\frac{11}{27}$

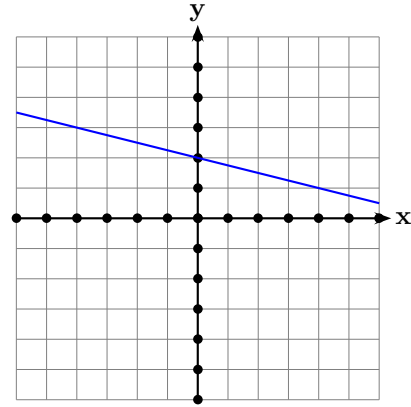
2. A. 5 B. $\frac{3}{2}$ C. -3 D. 2 E. -6

3. A. $\frac{11}{3}$ B. 10 C. $(-\infty, \infty)$, i.e., all real numbers D. $\frac{8}{7}$ E. \emptyset , i.e., no solution F. $\frac{11}{10}$

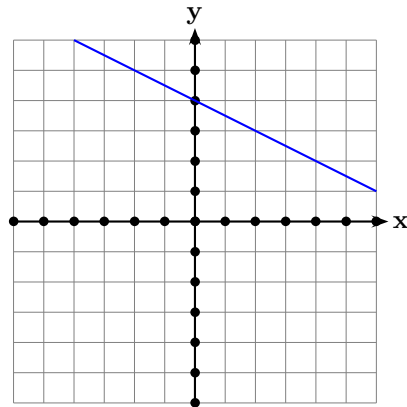
4. A. $t = \frac{I}{pr}$ B. $C = \frac{5F - 160}{9}$ C. $y = \frac{2x - 8}{3}$



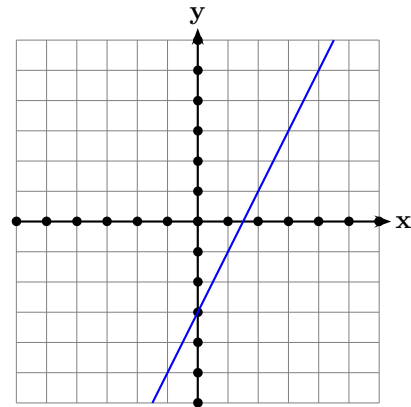
(a)



(b)



(c)



(d)

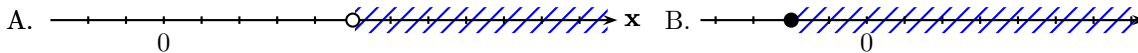
5.

6. A. $\frac{2}{3}$ B. $\frac{2}{3}$ C. 3 D. -4

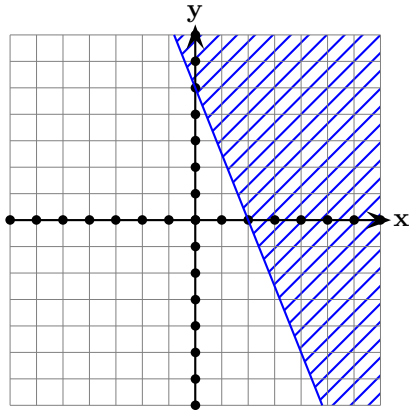
7. A. $x + 2y = -1$ B. $x - 3y = 5$ C. $y = 3x + 6$ D. $y = \frac{3}{5}x - 2$

8. A. $(3, -2)$ B. $(\frac{42}{31}, -\frac{50}{31})$ C. $(\frac{13}{8}, \frac{3}{4})$

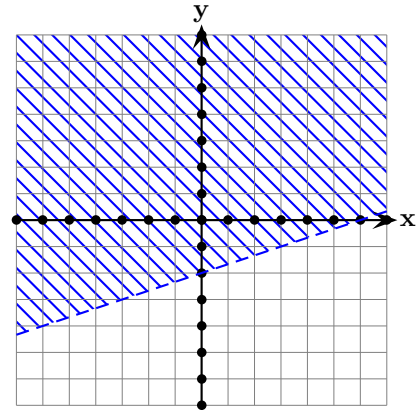
9. A. 23 dimes and 16 quarters. B. The length is 19 cm; the width is 8 cm. C. $\frac{69}{4}$ and $\frac{231}{4}$ D. 9, 10
E. 16, 17, and 18



10.



(a)



(b)

11.

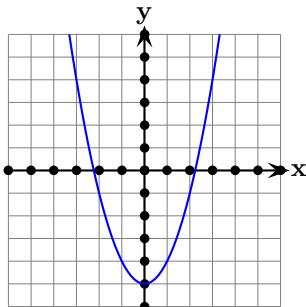
12. A. $12x^2 + 11x - 5$ B. $4x^2 - 12x + 9$ C. $2x^3 - 3x^2 + 5x - 2$ D. $-y^2 - 4y + 10$ E. $x^4 - 4x^2 + 6x$

13. A. $4p^2q^3(q^2 - 3)$ B. $(x - 7)(x - 8)$ C. $(y + 1)(2y - 1)$ D. $4(x + 3)(x - 3)$ E. $(y + 2)(y - 2)(y^2 + 4)$
 F. $x^3(2x + 3)(3x - 4)$ G. $(5y + 2)(2x - 3y)$

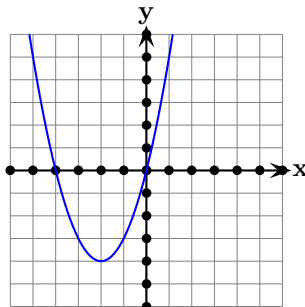
14. A. $5\sqrt{3}$ B. $3\sqrt[3]{2}$ C. $3i$ D. $2i\sqrt{3}$ E. $\frac{2}{3}$ F. $\frac{\sqrt{2}}{2}$

15. A. $-13\sqrt{2} + 6\sqrt{3}$ B. $\sqrt{21}$ C. 2

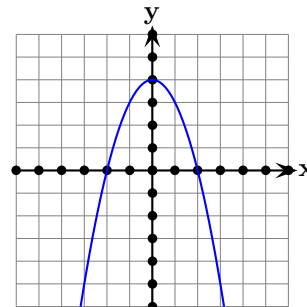
16. A. 5 and -2 B. 8 and -2 C. $\frac{3}{2} + \frac{i\sqrt{3}}{2}$ and $\frac{3}{2} - \frac{i\sqrt{3}}{2}$ D. $\frac{-1 + \sqrt{5}}{4}$ and $\frac{-1 - \sqrt{5}}{4}$ E. 1 and $\frac{3}{2}$
 F. $1 + \sqrt{5}$ and $1 - \sqrt{5}$



(a)



(b)



(c)

17.

18. A. 20 feet by 4 feet B. 9 inches by 12 inches. C. 6, 7 or $-5, -4$