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

### DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

MATH 05 — Exam 1
Nikos Apostolakis — September 13, 2016

**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. This exam contains 100 points.

1. Which of the following is *larger*?

(a) (2 points) $\frac{5}{12}$ $\frac{7}{12}$

A. The first. **B. The second.** C. They are equal.

(b) (2 points) $\frac{5}{12} = \frac{15}{36}$ $\frac{4}{9} = \frac{16}{36}$

A. The first. **B. The second.** C. They are equal.

(c) (2 points) $\frac{5}{12} = \frac{15}{36}$ $\frac{5}{9} = \frac{20}{36}$

A. The first. **B. The second.** C. They are equal.

(d) (2 points) $\frac{5}{7} = \frac{10}{14}$ $\frac{10}{14}$

A. The first. B. The second. **C. They are equal.**

(e) (2 points) $-\frac{5}{12}$ $-\frac{7}{12}$

**A. The first.** B. The second. C. They are equal.

(f) (2 points) $\left|-\frac{2}{3}\right| = \frac{2}{3} = \frac{4}{6}$ $\left|-\frac{1}{2}\right| = \frac{1}{2} = \frac{3}{6}$

**A. The first.** B. The second. C. They are equal.

2. Perform the following operations. Simplify your answers as much as possible:

(a) (2 points) $\frac{1}{8}+\frac{3}{8}=$ $\frac{4}{8}=\frac{1}{2}$

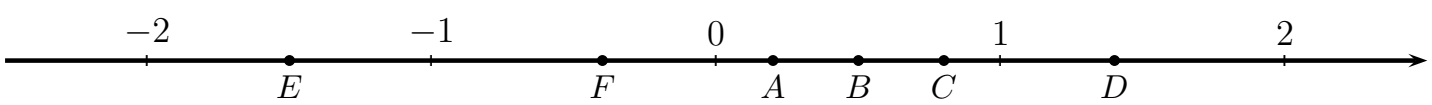
(b) (2 points) $\frac{5}{9}-\frac{8}{9}=$ $-\frac{3}{9}=-\frac{1}{3}$

(c) (2 points) $\frac{5}{6}-\frac{2}{3}=$ $\frac{5}{6}-\frac{4}{6}=\frac{1}{6}$

(d) (2 points) $\frac{3}{5}+\frac{7}{4}=$ $\frac{12}{20}+\frac{35}{20}=\frac{47}{20}$

(e) (2 points) $\left(-\frac{3}{5}\right)+\frac{7}{4}=$ $\left(-\frac{12}{20}\right)+\frac{35}{20}=\frac{23}{20}$

3. Indicate which point in the number line below corresponds to which number.




(a) (2 points) Point F corresponds to $-\frac{2}{5}$

(b) (2 points) Point B corresponds to $\frac{1}{2}$

(c) (2 points) Point A corresponds to $\frac{1}{5}$

(d) (2 points) Point C corresponds to $\frac{4}{5}$

(e) (2 points) Point D corresponds to $\frac{7}{5}$

(f) (2 points) Point E corresponds to $-\frac{3}{2}$

4. (4 points) Evaluate: $(a-b)^2$, when $a=-1$, and $b=2$. $((-1)-(2))^2=(-3)^2=1$

A. 5 B. $-5$ C. 9 D. 1

5. (4 points) Evaluate: $-x^2+2x$, when $x=3$. $-(3)^2+2(3)=-9+6=-3$

A. $-3$ B. 3 C. $-15$ D. 15

6. (5 points) Evaluate: $5 - 3(4-3) - 2^3 \div 8 \cdot 4 =$ $5 - 3(1) - 2^3 - 8 \quad 4$

$= 5 - 3(1) - 8 - 8 \quad 4$

$= 5 - 3 - 1 \quad 4$

$= 5 - 3 - 4$

$= 2 - 4$

$= -2$

7. (5 points) Evaluate: $\dfrac{-16}{9} \cdot \dfrac{18}{-25} \cdot \left(-\dfrac{10}{6}\right) \cdot \dfrac{-5}{4} \cdot \dfrac{3}{4} =$ $2$

8. (5 points) Evaluate: $\dfrac{-2^2 + 3(6-4)}{12 - (3-7)^2} =$ $\dfrac{-2^2 + 3(2)}{12 - (-4)^2}$

$= \dfrac{-4 + 3(2)}{12 - (16)}$

$= \dfrac{-4 + 6}{-4}$

$= \dfrac{2}{-4}$

$= -\dfrac{1}{2}$

9. (5 points) Evaluate: $\dfrac{2 - \frac{3}{2}}{\frac{1}{2} + \frac{3}{4}} = \dfrac{\frac{4}{2} - \frac{3}{2}}{\frac{2}{4} + \frac{3}{4}} = \dfrac{\frac{1}{2}}{\frac{5}{4}} = \dfrac{1}{2} \cdot \dfrac{4}{5} = \dfrac{2}{5}$

10. (5 points) Evaluate the expression $\sqrt{b^2 - 4ac}$, when $a = -2$, $b = -3$, and $c = 2$.

$\sqrt{(-3)^2 - 4(-2)(2)} = \sqrt{9 - 4(-2)(2)}$

$= \sqrt{9 - (-8)(2)}$

$= \sqrt{9 + 16}$

$= \sqrt{25}$

$= 5$

11. (5 points) Evaluate the expression $\dfrac{y_2 - y_1}{x_2 - x_1}$, when $x_1 = 1$, $x_2 = -3$, $y_1 = -3$, and $y_2 = -9$.

$\dfrac{(-9) - (-3)}{(-3) - (1)} = \dfrac{(-9) + 3}{(-3) + (-1)}$

$= \dfrac{-6}{-4}$

$= \dfrac{3}{2}$

12. (5 points) Evaluate the expression $x^2 - 2xy + y^2$, when $x = 3$ and $y = -2$.

$(3)^2 - 2(3)(-2) + (-2)^2 = 9 - 2(3)(-2) + 4$

$= 9 - (6)(-2) + 4$

$= 9 - (-12) + 4$

$= 9 + 12 + 4$

$= 25$

13. (5 points) Evaluate $a^2 - b^2$, when $a = 3$ and $b = -3$.

A. 18 B. $-18$ C. 0 D. 12

$(3)^2 - (-3)^2 = 9 - 9 = 0$

14. (5 points) Evaluate the expression $\dfrac{-x^2 + 3}{2 - x}$ when $x = -2$.

A. $\dfrac{1}{4}$ B. $-\dfrac{1}{4}$ C. $\dfrac{12}{5}$ D. $-12$

$\dfrac{-(-2)^2 + 3}{2 - (-2)} = \dfrac{-4 + 3}{2 + 2} = \dfrac{-1}{4}$

$= -\dfrac{1}{4}$

15. (3 points) If $x = -\dfrac{3}{2}$ then $4x^2 + 4x - 3 = 0$

A. True B. False.

$4\left(-\frac{3}{2}\right)^2 + 4\left(-\frac{3}{2}\right) - 3 = 0$

$4\left(\frac{9}{4}\right) + 4\left(-\frac{3}{2}\right) - 3 = 0$

$9 + (-6) - 3 = 0$

$3 - 3 = 0$

16. (3 points) If $x$ represents an unknown number then 8 subtracted from three times that number is represented by the expression:

A. $3x - 8$ B. $8 - 3x$ C. $3(x - 8)$ D. $3(8 - x)$

17. (3 points) If $y$ represents an unknown number then 8 divided by twice that number is represented by the expression:

A. $8 - 2y$ B. $2y - 8$ C. $\dfrac{2y}{8}$ D. $\dfrac{8}{2y}$

18. (4 points) Write a mathematical expression that represents the following phrase:

**The sum of four times a number and six, divided by nine more than the same number.**

$\dfrac{4x+6}{x+9}$