

BRONX COMMUNITY COLLEGE
of the City University of New York

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

MATH 05
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Exam 1
September 17, 2018

KEY

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) $\frac{5}{11}$ $\frac{7}{11}$

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

(b) (2 points) $\frac{5}{12}$ $\frac{4}{9}$

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

(c) (2 points) $\frac{7}{12}$ $\frac{5}{9}$

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

(d) (2 points) $\frac{5}{11}$ $\frac{10}{33}$

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

(e) (2 points) $-\frac{5}{9}$ $-\frac{7}{9}$

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

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

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

$$\frac{5}{12} = \frac{15}{36} \quad \frac{4}{9} = \frac{16}{36}$$

$$\frac{7}{12} = \frac{21}{36} \quad \frac{5}{9} = \frac{20}{36}$$

$$\frac{5}{11} = \frac{15}{33}$$

$$\left|-\frac{2}{3}\right| = \left|-\frac{4}{6}\right| = \frac{4}{6}$$

$$\left|-\frac{1}{2}\right| = \left|-\frac{3}{6}\right| = \frac{3}{6}$$

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

(a) (2 points) $\frac{1}{9} + \frac{5}{9} = \frac{6 \div 3}{9 \div 3} = \frac{2}{3}$

(b) (2 points) $\frac{3}{7} - \frac{5}{7} = \frac{-2}{7} = -\frac{2}{7}$

LCD(3,6)=6

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

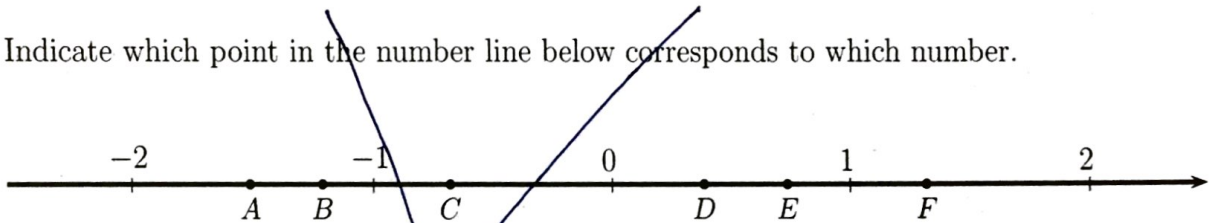
LCD(3,5)=15

(d) (2 points) $\frac{2}{3} + \frac{7}{5} = \frac{10}{15} + \frac{21}{15} = \frac{31}{15}$

LCD(4,5)=20

(e) (2 points) $\left(-\frac{7}{4}\right) + \frac{2}{5} = \left(-\frac{35}{20}\right) + \frac{8}{20} = \frac{-27}{20} = -\frac{27}{20}$

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



(a) (2 points) Point ___ corresponds to $-\frac{5}{6}$

(b) (2 points) Point ___ corresponds to $\frac{2}{5}$

(c) (2 points) Point ___ corresponds to $\frac{3}{4}$

(d) (2 points) Point ___ corresponds to $-\frac{5}{2} = -2\frac{1}{2}$

(e) (2 points) Point ___ corresponds to $\frac{4}{5}$

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

Mistaken

All answers are taken to be correct.

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

- A. -9 B. 9 C. 1 D. -6

$((-2) - (1))^2 = (-3)^2 = 9$

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

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

$-(-3)^2 + 2(-3) = -(9) + (-6) = -15$

6. (5 points) Evaluate: $9 - 2(3 - 4) - 4^2 \div 8 \cdot 4 = 9 - 2(-1) - 4^2 \div 8 \cdot 4$

$$= 9 - 2(-1) - 16 \div 8 \cdot 4$$

$$= 9 - (-2) - 2 \cdot 4$$

$$= 9 - (-2) - 8$$

$$= 9 + 2 - 8$$

$$= 11 - 8 = \boxed{3}$$

7. (5 points) Evaluate: $\frac{-16}{8} \cdot \frac{8}{28} \cdot \left(\frac{-5}{8}\right) \cdot \frac{-8}{2} \cdot \frac{1}{1} = -\frac{2}{1} = \boxed{-2}$

3 negative factors
so product is negative

8. (5 points) Evaluate: $\frac{-3^2 + 4(5 - 3)}{2 \cdot 7 - (3 - 7)^2} = \frac{-9 + 4(+2)}{14 - (-4)^2}$

$$= \frac{-9 + (8)}{14 - (16)}$$

$$= \frac{-1}{-2} = \boxed{\frac{1}{2}}$$

9. (5 points) Evaluate: $\frac{\frac{3}{2} + \frac{1}{4}}{1 - \frac{3}{2}} = \frac{\frac{7}{4}}{-\frac{1}{2}} = \frac{7}{4} \cdot \left(-\frac{2}{1}\right) = \boxed{-\frac{7}{2}}$

$$\frac{3}{2} + \frac{1}{4} = \frac{6}{4} + \frac{1}{4} = \frac{7}{4}$$

$$1 - \frac{3}{2} = \frac{2}{2} - \frac{3}{2} = -\frac{1}{2}$$

10. (5 points) Evaluate the expression $\sqrt{b^2 - 4ac}$, when $a = 6$, $b = 1$, and $c = -2$.

$$\begin{aligned} \sqrt{(1)^2 - 4(6)(-2)} &= \sqrt{1 - 4(6)(-2)} \\ &= \sqrt{1 - (24)(-2)} \\ &= \sqrt{1 - (-48)} \\ &= \sqrt{1 + 48} = \sqrt{49} = \boxed{7} \end{aligned}$$

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

$$\frac{(5) - (3)}{(-3) - (-1)} = \frac{2}{-2} = \boxed{-1}$$

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

$$\begin{aligned} (-3)^2 - 2(-3)(2) + (2)^2 &= 9 - 2(-3)(2) + 4 \\ &= 9 - (-6)(2) + 4 \\ &= 9 - (-12) + 4 \\ &= 9 + 12 + 4 \\ &= 21 + 4 = \boxed{25} \end{aligned}$$

13. (5 points) Evaluate $x^2 - y$, when $x = \frac{1}{2}$ and $y = -\frac{1}{4}$.

- A. 0 B. $\frac{1}{4}$ **C. $\frac{1}{2}$** D. $-\frac{1}{4}$

$$\begin{aligned} \left(\frac{1}{2}\right)^2 - \left(-\frac{1}{4}\right) &= \left(\frac{1}{4}\right) - \left(-\frac{1}{4}\right) \\ &= \frac{1}{4} + \frac{1}{4} = \frac{2}{4} \\ &= \boxed{\frac{1}{2}} \end{aligned}$$

14. (5 points) Evaluate the expression $\frac{-x^2 + 10}{2x + 4}$ when $x = -4$.

- A. $\frac{2}{3}$ B. $-\frac{2}{3}$ ~~C. $\frac{13}{2}$~~ D. $-\frac{13}{2}$

$$\begin{aligned} \frac{-(-4)^2 + 10}{2(-4) + 4} &= \frac{-(16) + 10}{(-8) + 4} \\ &= \frac{-6}{-4} = \boxed{\frac{3}{2}} \end{aligned}$$

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

- A. True **B. False.**

Mistakenly all answers are taken correct.

$$\begin{aligned} -3(-2)^2 + 4(-2) - 4 \\ &= -3(4) + 4(-2) - 4 \\ &= -(12) + (-8) - 4 \\ &= -24 \end{aligned}$$

16. (3 points) If x represents an unknown number then 7 subtracted from twice that number is represented by the expression:

A. $2x - 7$ B. $7 - 2x$ C. $2(x - 7)$ D. $2(7 - x)$

17. (3 points) If x represents an unknown number then 11 divided by three times that number is represented by the expression:

A. $11 - 3x$ B. $3x - 11$ C. $\frac{3x}{11}$ D. $\frac{11}{3x}$

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

The sum of six times a number and five, divided by seven less than the same number

$x - 7$
Let x stand for the number

$6x + 5$

$$\frac{6x + 5}{x - 7}$$