Name: ey _____ Date: _____

ath 8 Midterm Outline:

Consists of:

- 40 Multiple Choice
- 20 Written response

Learning Outcomes Assessed on the Exam:

Unit 1 - Integers:

- demonstrate an understanding of addition and subtraction of integers
- demonstrate an understanding of multiplication and division of integers
- apply the order of operations with integers

Unit 2 - Fractions:

- demonstrate an ability to simplify fractions
- demonstrate an understanding of multiplying and dividing positive fractions and mixed numbers
- demonstrate an understanding of adding and subtracting positive fractions and mixed numbers, with like and unlike denominators
- apply order of operations with fractions

Unit 3 - Ratio, Rate and Percents:

1. demonstrate an understanding of ratio and rate
2. solve problems that involve rates, ratios, and proportional reasoning
3. demonstrate an understanding of percents greater than or equal to 0%

Tutorial Times:

Exam Date:

Thursday, December 17 at 8:00 am

Unit 1 - Integers:

Learning Outcome 1: demonstrate an understanding of addition and subtraction of integers

1. Add. $(-10) + (-8)$

   a. 2 b. 18

   (c.) −18 d. −2

2. Subtract. $(+6) - (-9)$

   (a.) 15 b. −15

   c. 3 d. −3

3. Replace ☐ with an integer to make the equation true. $(-6) - ☐ = -5$

   a. −11 (b.) −1

   c. 1 d. 11

4. Add. $(-4) + (+9) + (-9)$

   (a.) −4 b. −22

   c. 4 d. 22

5. Is each statement always true, sometimes true, or never true? Provide examples to support your answers.

Statement	Example
a) The sum of a negative integer and a positive integer is negative. sometimes true	
b) The sum of two negative integers is positive. never true	
c) The sum of two opposite integers is 0. always true	

6. Perform the following operations:

a) Subtract: (–8) - (–5)	b) Subtract the integers in the opposite order: (–5) - (–8)
−3	+3
c) How does the answer in part b compare with the answer in part a? They are opposites of each other.	

7. A diver starts at sea level, goes down 12 m, rises 3 m, drops 5 m and rises 12 m.

   a) Represent the sentence with integers, then find the sum.

   $-12m + 3m - 5m + 12m = \boxed{-2m}$

   b) How much farther must the diver rise to reach the surface?

   He must rise 2m to reach the surface

Learning Outcome 2: Demonstrate an understanding of multiplication and division of integers

1. Which of these products are negative? (more than one answer)

a. $(+7)(+8)$
b. $(+7)(-9)$
c. $(-8)(+9)$
d. $(-8)(-8)$

2. Find this product. $(-8) \times (+6)$

a. -48
b. 14
c. -14
d. $+48$

3. $7(-8) =$

a. -1
b. 1
c. -56
d. 56

4. $2(-3)(-4) =$

a. 5
b. -5
c. 24
d. -24

5. Multiply -3×6.

a. 2
b. -2
c. 18
d. -18

6. Replace $\square$ with an integer to make the equation true.

$\square \times (-5) = -30$

a. -6
b. $+25$
c. -25
d. $+6$

7. Find this quotient. $(+9) \div (-3)$

a. -3
b. $+12$
c. -12
d. $+3$

8. Divide. $\frac{-84}{-12}$

a. $+7$
b. -7
c. -72
d. -96

9. Evaluate $-24 \div (-3)$.

a. 8
b. -8
c. 72
d. -72

10. Evaluate $-72 \div (-8) \div (-3)$.

a. 2
b. -2
c. 3
d. -3

11. Evaluate for x=2, y=-3, z=-1

$-2xyz$

a. 10
b. 12
c. -10
d. -12

12. Find this product. $(+5)(-4)(-9)$

a. -180
b. -9
c. $+180$
d. 9

Learning Outcome 3: Apply the order of operations with integers

1. What is the value of x? (SHOW YOUR WORK this is NOT MC)

a) $\frac{-36}{3} = x$

$x = -12$

b) $\frac{x}{20} = -2$

$x = -40$

c) $\frac{-54}{x} = 9$

$x = -6$

d) $\frac{x}{-8} = -4$

$x = 32$

2. Evaluate each expression.

a) $-10 + (-12) - 9$

-31

b) $-6 - 3 \times 2$

-12

c) $14 - (-21) \div (-7)$

11

d) $11 \times 6 \div (-3)$

-22

e) $20 \div 2 + 22 \times 4 =$

9

f) $(35 + 10) \div (16 - 11) =$

9

g) $3^2 \times 5^2 =$

225

h) $4 \times 7 - 3^3 =$

1

4. Evaluate for x=-2, y=-4, z=-1

$(-2x)(-3y)(-z)$

48

5. Asia took 32 minutes to descend the stairs in tallest tower in Warsaw. Her rate of descent was -75 stairs/min. How many stairs were in the tower?

There were 2400 stairs in the tower

Unit 2 - Fractions:

Learning Outcome 1: demonstrate an understanding of adding and subtracting positive fractions and mixed numbers, with like and unlike denominators

1. $\frac{3}{5}+\frac{1}{5}=$ $\frac{4}{5}$	**2.** $\frac{3}{4}+\frac{5}{6}$ $1\frac{7}{12}$	**3.** $\frac{1}{9}+\frac{5}{18}$ $\frac{7}{18}$
4. $\frac{5}{6}-\frac{3}{8}=$ $\frac{11}{24}$	**5.** $\frac{4}{5}+\frac{3}{8}$ $1\frac{7}{40}$	**6.** $\frac{3}{4}-\frac{1}{8}$ $\frac{5}{8}$
7. $\frac{3}{5}-\frac{1}{2}$ $\frac{1}{10}$	**8.** $4\frac{1}{6}+3\frac{2}{3}$ $7\frac{5}{6}$	**9.** $3\frac{3}{4}+\frac{1}{8}$ $4\frac{7}{8}$
10. $4\frac{1}{3}-1\frac{5}{6}$ $2\frac{1}{2}$	**11.** $4\frac{2}{5}-1\frac{1}{3}$ $3\frac{1}{15}$	**12.** $\frac{5}{10}-\frac{1}{4}=$ $\frac{1}{4}$
13. $9-7\frac{3}{8}=$ $\frac{13}{8}$	**14.** $2\frac{2}{5}-1\frac{3}{4}=$ $\frac{13}{20}$	**15.** $1\frac{4}{5}-\frac{2}{3}=$ $1\frac{2}{15}$
16. $1-\frac{3}{8}=$ $\frac{5}{8}$	**17.** $7\frac{3}{10}-4\frac{5}{6}=$ $2\frac{7}{15}$	**18.** $7\frac{7}{10}-5\frac{1}{2}=$ $2\frac{1}{5}$

19. Four children found a treasure chest buried in their backyard. They had an agreement about how the treasure was to be divided. The first child received $\frac{1}{5}$ of the treasure, the second child received $\frac{1}{4}$ of the treasure, and the third child received $\frac{1}{3}$ of the treasure.

a) How much of the treasure did the fourth child receive?
b) Which child received the greatest amount of treasure?
c) Which child received the least amount of treasure?

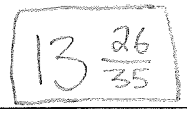
a) $\frac{13}{60}$

b) Third child

c) first child

Learning Outcome 2: demonstrate an understanding of multiplying and dividing positive fractions and mixed numbers

(LINED PAPER REQUIRED for #1-18)

1. $\frac{3}{4} \times \frac{4}{5}$ 	**2.** $\frac{4}{5} \times \frac{15}{20}$ 	**3.** $\frac{3}{4} \times \frac{1}{8}$ 
4. $\frac{4}{6} \times 3\frac{4}{5}$ 	**5.** $\frac{3}{4} \times 2\frac{2}{3}$ 	**6.** $6\frac{2}{3} \times 2\frac{1}{4}$ 
7. $\frac{2}{3} \div \frac{5}{6}$ 	**8.** $\frac{7}{4} \div \frac{2}{3}$ 	**9.** $\frac{14}{15} \div \frac{7}{9}$ 
10. $\frac{2}{5} \div 1\frac{2}{3}$ 	**11.** $\frac{3}{4} \div 6$ 	**12.** $\frac{5}{4} \div \frac{3}{2}$ 
13. $3\frac{1}{3} \div 2\frac{1}{3}$ 	**14.** $2\frac{3}{4} \div 6$ 	**15.** $9 \div 3\frac{3}{5}$ 
16. $2 \times 3\frac{3}{5} \times 1\frac{4}{9} =$ 	**17.** $7 \times 5\frac{1}{4} \times 2\frac{6}{7} =$ 	**18.** $\frac{4}{5} \times 4\frac{5}{8} \times 3\frac{5}{7} =$ 

19. A recipe calls for $2\frac{1}{4}$ cups of oatmeal. How much oatmeal is required to make $3\frac{1}{2}$ the recipe?

$7\frac{7}{8}$ cups of oatmeal are required to make $3\frac{1}{2}$ the recipe.

20. Evaluate $\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \frac{4}{5}$.

Learning Outcome 3: Apply order of operations with fractions

Express your answer in lowest terms:

1. $\frac{4}{9}+\frac{1}{6}\times\frac{2}{3}$

$\frac{5}{9}$

2. $\left(\frac{6}{7}-\frac{1}{2}\right)\times\frac{14}{15}$

$\frac{1}{3}$

3. $\frac{9}{10}\div\left(\frac{2}{5}+\frac{1}{8}\right)$

$3\frac{3}{11}$

4. $\frac{2}{5}\times\left(\frac{2}{3}+\frac{3}{10}\right)\div\frac{8}{15}$

$\frac{29}{40}$

5. $2\frac{1}{8}+1\frac{1}{4}\times1\frac{1}{2}$

4

6. $2\frac{5}{6}\div1\frac{2}{3}-1\frac{1}{2}$

$\frac{1}{5}$

7. $\frac{1}{6}\times1\frac{2}{3}\times3\frac{1}{2}$

$\frac{35}{36}$

8. $\frac{4}{5}-\left(\frac{5}{6}-\frac{3}{4}\right)\times4$

$\frac{7}{15}$

9. $\frac{1}{2}\times\left(\frac{5}{7}-\frac{4}{9}\right)\div\frac{20}{63}$

$\frac{17}{40}$

10. $\left(\frac{4}{7}-\frac{1}{5}\right)\div\frac{13}{35}=$

1

Unit 3 - Ratio, Rate and Percents:

Learning Outcome 1: Demonstrate an understanding of ratio and rate

1. What is the quotient of two like quantities?		**2.** What are the quotients of two or more unlike quantities are called?	
(a.) A ratio	c. A proportion	a. ratios	c. proportions
b. A rate	d. A fraction	(b.) rates	d. fractions

3. Write 1 other ratio equivalent to each ratio.

a) 30 to 5	**b)** 18:12	**d)** 50:10
6:1	6:4	5:1

4. A baseball team has 3 outfielders, 4 infielders, and a battery (the pitcher and the catcher). Write each ratio.

a) outfielders to infielders	**b)** infielders to the battery	**c)** the battery to the entire team
3:4	4:1	1:8

5. Sal earns $24 in 3 h. Josh earns $13 in 2 h.

a) Who makes the most money per hour?

$\frac{\$8}{1 hr}$ $\frac{\$6.50}{1 hr}$ Sal makes the most money

b) How much will the person who earns the most money per hour earn in 8 h?

Sal will make $64 in 8 hours

7. Which is a better buy?

a. $5.98 for 2 Hot Wheels
b. $3.98 for 1 Hot Wheel
(c.) $8.50 for 3 Hot Wheels

Learning Outcome 2: Solve problems that involve rates, ratios, and proportional reasoning

1. $\frac{x}{75} = \frac{3}{15}$ $X = 15$	**2.** $\frac{x}{25} = \frac{12}{15}$ $X = 20$	**3.** $\frac{81}{30} = \frac{3}{x}$ $X = \frac{10}{9}$ or $X = 1.\overline{11}$
4. $\frac{6}{x} = \frac{35}{25}$ $X = 4.29$	**5.** $\frac{80}{46.5} = \frac{x}{67}$ $X = 115.27$	**6.** $\frac{130}{50} = \frac{24}{x}$ $X = 9.23$
7. $\frac{72}{45} = \frac{x}{25}$ $X = 40$	**8.** $\frac{4}{x} = \frac{7}{112}$ $X = 64$	**9.** $\frac{x}{125} = \frac{15}{30}$ $X = 62.5$

10. A chainsaw's engine uses a mixture of 30 L of gas and 2 L of oil. How much oil must you mix with 5 L of gas to refuel the chainsaw?

You must mix $0.\overline{33}$L of oil with 5L of gas

11. Athena runs the 1500 m race in 4 minutes and 40 seconds. If her pace stays the same, how long will it take her to run 5 km? Round to 2 decimal places.

It will take 15.56 minutes to run 5km

Learning Outcome 3: Demonstrate an understanding of percents greater than or equal to 0%

Fill in the following table:

Fraction	Decimal	Percent
$2\frac{14}{25}$	2.56	256%
$\frac{15}{3}$	5.0	500%
$\frac{1}{400}$	0.0025	0.25%
$\frac{9}{6}$	1.5	150%
$\frac{13}{40}$	0.325	32.5
$\frac{9}{20}$	0.45	45%
$\frac{21}{35}$	0.6	60%
$1\frac{7}{20}$	1.35	135%
$\frac{1}{8}$	0.125	12.5%