MATH INTERLUDES EXTRA PRACTICE PROBLEMS

MATH INTERLUDES I: ORDER OF OPERATIONS AND EVALUATING EXPRESSIONS

1) Simplify each expression.

a) $2 \cdot 4 - 3 \div 3$ b) $4^2 \div 2 \cdot 4$ c) $(8-6)^2 + 2^3 \cdot 3$

2) Simplify each expression.

a) $4^3 + [3^2 - (10 \div 2)] - 7 \cdot 3$ b) $\frac{7-2\cdot 3+3^2}{5(2-1)}$ c) $64 \div 8 \cdot 2 + 4$

3) Simplify each expression.

a) $(5-7)^3 \cdot [9^2 \div (2+7)]$ b) $\frac{4\cdot 8-1\cdot 11}{3(2^3-9)}$

4) Simplify each expression (hint: be sure to enter the entire express in your calculator exactly as written).

a) $-6 + (-15) + 9$ b) $-13 + 8 + (-10) + (-27)$ c) $-16 + 6 + (-14) + (-20)$

5) Simplify each expression (hint: be sure to enter the entire express in your calculator exactly as written).

a) $-17 - (-59)$ b) $-4 + (-8) - 16 - (-9)$ c) $-4 - 15 - (-11)$

6) Simplify each expression.

a) $\frac{\sqrt{16+9}-35}{6}$ b) $\frac{\sqrt{100-6^2}+\sqrt{49}}{9-2\cdot 3}$

7) Use the given values to evaluate each expression.

a) $x - y \quad x = -4$ and $y = 7$ b) $2x - y \quad x = 8$ and $y = -10$

8) Use the given values to evaluate each expression.

a) $a + bx \quad a = 12,\ b = -5,\ x = -4$ b) $\frac{x-\mu}{\sigma} \quad x = -6,\ \mu = -2,\ \sigma = 4$

9) Given $SE = \sqrt{\frac{P(1-P)}{n}}$. Find SE when $p = 0.2$ and $n = 20$. Round to four decimal places.

10) Given $= \pi r^2$. Find A when $r = 20$. Round to one decimal place.

Answers: Math Interludes I Practice Problems

1a) 7	*1b) 32*	*1c) 28*	*2a) 47*	*2b) 2*	*2c) 20*	*3a) −72*	*3b) −7*
4a) −12	*4b) −42*	*4c) −44*	*5a) 42*	*5b) −19*	*5c) −8*	*6a) −5*	*6b) 5*
7a) −11	*7b) 26*	*8a) 32*	*8b) −1*	*9) 0.0894*	*10) 1,256.3*		

MATH INTERLUDES II: SOLVING PERCENTAGE PROBLEMS

Note: many of the problems in this activity were borrowed from *Prealgebra, 7th Edition* by Elayn Martin-Gay.

1) Translate each of the following into an equation and then solve the equation. If necessary, round your final answer to one decimal place.

   a) 24 is 1.5% of what number?

   b) 15% of 90 is what number?

   c) 297.5 is 85% of what number?

   d) 42% of what number is 63?

   e) 78 is what percent of 65?

   f) What percent of 99 is 128.7?

   g) What percent of 250 is 115?

   h) 95% of what number is 58.9?

2) There continues to be a shortage of nursing school facilities. Recently, of the 256,000 applications to bachelor degree nursing schools, 101,000 were accepted. What percent of these applications were accepted? Round your final answer to two decimal places. (*Source*: Bureau of Statistics)

3) Mr. Percy, the principal at Slidell High School, counted 31 freshmen absent during a particular day. If this is 4% of the total number of freshmen, how many freshmen are there at Slidell High School?

4) A day care worker found 28 children absent one day during an epidemic of chicken pox. If this was 35% of the total number of children attending the day care center, how many children attend this day care center?

5) Approximately 160,650 of America's 945,000 restaurants are pizza restaurants. What percent of restaurants in America are pizza restaurants? If necessary, round your final answer to the nearest whole number.

6) A furniture company currently produces 6200 chairs per month. If production decreases by 8%, find the decrease and the new number of chairs produced each month.

7) From 2010 to 2020, the number of people employed as physician assistants in the United States is expected to increase by 30%. The number of people employed as physician assistants in 2010 was 83,600. Find the predicted number of physician assistants in 2020. (*Source*: Bureau of Labor Statistics)

8) The population of Japan is expected to decrease from 127,799,000 in 2011 to 97,076,000 in 2050. Find the percent decrease. If necessary round your final answer to one decimal place. (*Source*: International Programs Center, Bureau of the Census, U.S. Department of Commerce)

9) As the largest health care occupation, registered nurses held about 2.7 million jobs in 2010. The number of registered nurses is expectd to be 7.1 million by 2020. What is the percent increase? If necessary round your final answer to one decimal place. (*Source*: Bureau of Labor Statistics)

Answers: Math Interludes II Practice Problems

1a) 1,600	1b) 13.9	1c) 350	1d) 150	1e) 120%	1f) 130%	1g) 46%	1h) 62
2) 39.45%	3) 775	4) 80	5) 17%	6) 496; 5704	7) 108,680	8) 24.0%	9) 163.0%

MATH INTERLUDES III: EXPONENTS AND COMBINING LIKE TERMS

1) Identify the place value of the digit 4 in each of the following numbers.

   a) 743,289 b) 421,803,000,918 c) 18,268,341,209 d) 183,042

2) Write each number as a word name.

   a) 743,289
   b) 421,803,000,918
   c) 183,042

3) Write each number in base 10 using an exponent.

   a) 100,000,000,000 b) 100 c) 10,000 d) 1,000,000

4) Write each of the following as a whole number.

   a) 10^{14} b) 10^{3} c) 10^{1}

5) If possible, write each expression using a single exponent.

   a) $x \cdot x^3 \cdot x^5$ b) $x^3 \cdot y^3$ c) $mi^2 \cdot mi$ d) $a^4 \cdot a^3$

6) Express each of the following in scientific notation.

   a) 405,000,000,000 b) 0.00000000871 c) 12,000 d) 0.0000000001

7) Simplify each expression by combining like terms.

   a) $12 - 3x + 5 + 6x$ b) $2a^2 + 3a + 2 - 4a^2 - a - 5$

   c) $4x^2 - 3xy - 2y^2 - 6x^2 + 6xy - y^2$ d) $a^2b + a^2b^2 + a^2 - 2a^2b^2$

Answers: Math Interludes III Practice Problems

1a) 40,000 1b) 400,000,000,000 1c) 40,000 1d) 40

2a) Seven hundred forty-three thousand, two hundred eighty-nine

2b) Four hundred twenty-one billion, eight hundred three million, nine hundred eighteen

2c) One hundred eighty-three thousand, forty-two

3a) 10^{11} 3b) 10^{2} 3c) 10^{4} 3d) 10^{6} 4a) 100,000,000,000,000 4b) 1,000 4c) 10

5a) x^{9} 5b) No - bases are different 5c) mi^{3} 5d) a^{7}

6a) 4.05×10^{11} 6a) 8.71×10^{-9} 6c) 1.2×10^{4} 6d) 1×10^{-10}

7a) $3x + 17$ 7b) $-2a^{2} + 2a - 3$ 7c) $-2x^{2} + 3xy - 3y^{2}$ 7d) $a^{2} + a^{2}b - a^{2}b^{2}$

MATH INTERLUDES IV: DIMENSIONAL ANALYSIS

Directions: Use the *6.7.1 Measurement Equivalencies* tables for the Dimensional Analysis. Also for consistency, you should use the following time equivalencies.

1 min = 60 sec	1 hour = 60 min	1 day = 24 hours
1 week = 7 days	1 month = 30 days	1 year = 12 months
1 year = 365 days		

1) Use dimensional analysis with unit fractions to convert each measurement.

a) How many gallons are in 1,000 liters? If necessary, round to the closest whole number.

b) Convert 1,000,000 minutes into years. If necessary, round to one decimal place.

b) A woman ways 154 points. What is her weight in kilograms?

d) Change 72 years into seconds.

e) Change 1 kilometer into feet.

e) If 1 ton is 2000 pounds, how many ounces are in 1 ton?

2) Use dimensional analysis with unit fractions to convert each measurement.

a) How many grams are in 120 pounds?

b) How many cups are in a 5-gallon water can?

3) Given 19.00 grams of fluorine (F) = 1 mole of F.
   a) How many moles are in 91.2 grams of fluorine?
   b) How many grams are in 3.5 moles of fluorine?
4) Given 244 grams of plutonium (Pu) = 1 mole of Pu.
   a) What is the molar mass (number of moles) in 400 grams of plutonium? If necessary, round to two decimal places.
   b) How many grams are in 0.2 mole of plutonium?
5) (This problem was borrowed from *Pathways to Math Literacy* by Sobecki and Mercer.)

   In the filming of the Academy Award-winning movie *Titanic*, a model of the stern of the ship was created at 12.5% of the actual size.
   a) If a section of rail on the stern of the real Titanic was 24 feet long, how long was the corresponding section on the model used for the movie?
   b) If an I-beam on the model spanned 30 feet of deck space, how big was the corresponding I-beam on the actual Titanic?

Answers: Math Interludes IV Practice Problems

1a) 264 gal	1b) 1.9 yrs	1c) 338.8 lbs	1d) 2,270,592,000 sec		1e) 3281 ft
1f) 32,000 oz	2a) 54,545 g	2b) 80 c	3a) 4.8 moles	3b) 66.5 g	4a) 1.64 mole
4b) 48.8 g	5a) 3 ft	5b) 240 ft			

MATH INTERLUDES V: RATES OF CHANGE

When appropriate, use the *Measurement Equivalencies* tables and dimensional analysis to answer the question.

1) You're shopping for a new car, and will need finance much of the cost. Your credit union offered you financing that results in monthly payments of $21.30 per $1,000 borrowed for 60 months.
   a) Write the rate offered by your credit union as a fraction.
   b) What would your monthly payment be if you borrowed $21,000?
   c) How much did you borrow if your monthly payment is $379.14?
   d) If you agree on a price of $24,800 and you have a down payment of $5,000, how much will your monthly payment be?
2) A hit baseball travels 151 yards in 5.4 seconds.
   a) Find the speed of the baseball in miles per hour. If necessary, round to four decimal places.
   b) How long (in seconds) will it take for the baseball to travel 100 ft? If necessary, round to four decimal places.
3) A car is cruising down the freeway at 75 miles per hour. How long (in seconds) will it take the car to travel 100 yards? Again, you need to use dimensional analysis to answer this question (and show your work). If necessary, round to two decimal places.

Answers: Math Interludes VI Practice Problems

1a) $\frac{21.3\ pay}{1{,}000\ borrow}$ 1b) $447.30 1c) $17,800 1d) $421.74 2a) $57.1970\frac{mi}{hr}$ 2b) 1.1921 sec

4) 2.73 sec

Math Interludes VI: Slope

Coming attraction

Answers: Math Interludes VII Practice Problems

Math Interludes VII: The Slope-Intercept Form of a Line

Coming attraction

Answers: Math Interludes VIII Practice Problems

Math Interludes VIII: Area and Volume

Coming attraction

Answers: Math Interludes IV Practice Problems
