

BLC150–Algebra Workshop- Sp2020
HW-6: Sample Quiz 1: Answers at end of quiz.

A. Prime Factorization

Factor the following numbers into their primes.

		Raw form	Exponential form
E.g.	60 =	= 2 · 30 = 2 · 2 · 15 = 2 · 2 · 3 · 5	= 2 ² · 3 · 5
1	99 =	=	
2	496 =	=	
3	2310 =	=	
4	100 =	=	

B. Convert the following fractions by filling in the missing numbers.

Members of each row are all equal.

e.g. 1	$\frac{3}{0.5}$	=	$\frac{6}{1}$	=	$\frac{12}{2}$	=	$\frac{36}{6}$
e.g. 2	$\frac{2.5}{50}$	=	$\frac{5}{100}$	=	$\frac{10}{200}$	=	$\frac{50}{1000}$
1	$\frac{1}{2}$	=	$\frac{2}{\quad}$	=	$\frac{\quad}{6}$	=	$\frac{4}{\quad}$
2	$\frac{\quad}{2.5}$	=	$\frac{1\psi}{5}$	=	$\frac{\quad}{10}$	=	$\frac{3\psi}{\quad}$
3	$\frac{9}{\quad}$	=	$\frac{18}{2}$	=	$\frac{\quad}{4}$	=	$\frac{\quad}{3}$

C. Evaluate these. You need to find common denominators.
 This is much like the exercise above. I did one to show you the method.

		Put answers here
A	$\frac{5}{3} - \frac{6}{9} =$	
D	$\frac{4}{2} + \frac{\pi}{\pi} + \frac{9}{3} =$	
I	$\frac{100}{5} - 15 =$	
L	$1 + \frac{2}{3} + \frac{8}{24} =$	2
O	$\frac{2}{1/2} =$	
T	$3.1 - \frac{1}{10} =$	

Now put your answers in ascending order (low to high) and place the letter of each answer in the boxes below.

Hint: Curiously Strong

	2				
	L				

D. Conversions

- You know that the distance between Red Hook and Atlanta is 806 miles. You measure this distance on a map and it is exactly 32.24 centimeters. On this map, what is 1 centimeter? How many miles?
- €1.00 = \$1.15. How much does one dollar equal in euros?
- In Yakistan two *blorgs* are the equivalent 7 *marajans*. What does one *marajan* equal in *blorgs*?

E. Tips, Deductions, and Taxes
(round all answers to the nearest cent)

1. What is a 20% tip on a \$380.00 meal?
2. What is a 15% tip on a \$14.00 meal?
3. What is a 12% tip on a \$38.00 cab ride?
4. If a store is selling everything for 18% off the marked price, what will a \$120 jacket cost?
5. You buy a pack of butts (cigarettes) with a \$20-dollar bill. You get \$5.45 back in change. You are in rural North Carolina and were told that the sales tax is 4.75%. What did the butts cost before tax?

F. Compound Interest

$$A(t) = P \left(1 + \frac{r}{n} \right)^{nt}$$

E.g. You have an outstanding student loan debt to Navient of \$10,000. If the annual interest rate is 7%, compounded monthly, how much will you owe in 10 years? [Monthly means that n = 12.]

$$A(t) = \$10,000 \left(1 + \frac{0.07}{12} \right)^{12 \cdot 10} \cong \$20,096.61$$

1. You invest \$100 with your friend who promises you an annual return of 30% compounded annually. How much will you have after 5 years? [n = 1]
2. You have a balance of \$382.13 on your Visa credit card. They charge you a 22% annual interest rate compounded daily. How much will you owe in 1 year? [n = 365]
3. You have \$1000 to invest for 12 years. Which is the better investment? An annual interest rate of 7.8% compounded daily, or 8% compounded annually? [n = 365 or n = 1].

If you have any problems with this practice quiz, go to the Math Study Room (Sunday-Wednesday, 7:00-10:00 pm, in RKC 101) or contact me for an appointment.

Answers are below.....

A. Prime Factorization

1) $99 = 3 \times 3 \times 11 = 3^2 \cdot 11$

2) $496 = 2 \times 2 \times 2 \times 2 \times 31 = 2^4 \cdot 31$

3) $2310 = 2 \times 3 \times 5 \times 7 \times 11$

4) $100 = 2 \times 2 \times 5 \times 5 = 2^2 \cdot 5^2$

B. Convert the following fractions by filling in the missing numbers.
Members of each row are all equal.

e.g. 1	$\frac{3}{0.5}$	=	$\frac{6}{1}$	=	$\frac{12}{2}$	=	$\frac{36}{6}$
e.g. 2	$\frac{2.5}{50}$	=	$\frac{5}{100}$	=	$\frac{10}{200}$	=	$\frac{50}{1000}$
1	$\frac{1}{2}$	=	$\frac{2}{4}$	=	$\frac{3}{6}$	=	$\frac{4}{8}$
2	$\frac{0.5\psi}{2.5}$	=	$\frac{1\psi}{5}$	=	$\frac{2\psi}{10}$	=	$\frac{3\psi}{15}$
3	$\frac{9}{1}$	=	$\frac{18}{2}$	=	$\frac{36}{4}$	=	$\frac{27}{3}$

C. Evaluate these.

also is $\frac{2}{3} \rightarrow \frac{5}{3} - \frac{2}{3} = \frac{3}{3} = 1$

$$A) \frac{5}{3} - \frac{6}{9} = \frac{3 \cdot 5}{3 \cdot 3} - \frac{6}{9} = \frac{15}{9} - \frac{6}{9} = \frac{9}{9} = 1$$

$$D) \frac{4}{2} + \frac{\pi}{\pi} + \frac{9}{3} = \text{simplify} = 2 + 1 + 3 = 6$$

$$I) \frac{100}{5} - 15 = 20 - 15 = 5$$

$\frac{20}{5 \overline{)100}}$

$$L) 1 + \frac{2}{3} + \frac{8}{24} = \text{simplify this} = 1 + \frac{2}{3} + \frac{1}{3} = 1 + \frac{3}{3} = 1 + 1 = 2$$

$$O) \frac{2}{\frac{1}{2}} = \frac{2 \cdot 2}{\frac{1}{2} \cdot 2} = \frac{4}{1} = 4$$

$$T) 3 \cdot \frac{1}{10} - \frac{1}{10} = 3 + \frac{1}{10} - \frac{1}{10} = 3$$

1 2 3 4 5 6
A L T O I D

D. Conversions

$$1) 806 \text{ miles} = 32.24 \text{ cm} \rightarrow \frac{806 \text{ m}}{32.24} = \frac{32.24 \text{ cm}}{32.24} \rightarrow 1 \text{ cm} = 25 \text{ miles}$$

use calculator

$$2) \text{€} 1.00 = \$ 1.15 \rightarrow \frac{\text{€} 1.00}{1.15} = \frac{\$ 1.15}{1.15} \rightarrow \$ 1.00 \approx \text{€} 0.87$$

→ 1 dollar

$$3) 2b = 7m \rightarrow \frac{2b}{7} = \frac{7m}{7} \rightarrow 1m = \frac{2}{7} b$$

E. Tips, Deductions, and Taxes

- 1) 10% of \$380.00 is \$38. 20% is \$76.00
- 2) 10% of \$14.00 is \$1.40. 5% is \$0.70. 10% + 5% of \$14 is 1.40 + 0.70 = \$2.10
- 3) 12% of \$38. 10% is 3.8. 1% is 0.38. 2% is 0.76 \Rightarrow 3.8 + 0.76 = \$4.56
- 4) 18% of \$120 = ^{or use a calculator} = 0.18 * \$120 = \$21.60
 18% off \$120 = 120 - 21.60 = \$98.40

5) \$20 - x = 5.45 \rightarrow x = \$14.55 = ^{what you paid.}

(Cost of Cigarettes) + 0.0475(Cost of Cigarettes) = \$14.55

Let "cost of cigarettes" = C

$$\begin{aligned} (1) C + 0.0475C &= \$14.55 \\ 1.0475C &= \$14.55 \\ C &= \frac{\$14.55}{1.0475} \approx \$13.89 \end{aligned}$$

F. Compound Interest

- 1) P = \$100, 30% annual interest rate = r t = 5 years n = 1 (compounded annually)

$$A(5) = \$100 \left(1 + \frac{0.3}{1}\right)^5 \approx \$371.29$$

- 2) P = \$382.13 r = 22% n = 365 (compounded daily) t = 1 year

$$A(1) = \$382.13 \left(1 + \frac{0.22}{365}\right)^{365} = \$382.13 \left(1 + \frac{0.22}{365}\right)^{365} \approx \$476.13$$

- 3) P = \$1000 t = 12 years
 r = 7.8% n = 365

$$A(12) = \$1000 \left(1 + \frac{0.078}{365}\right)^{365 \cdot 12} \approx \$2549.51$$

\leftarrow The Winner

- P = \$1000 t = 12 years
 r = 8% n = 1

$$A(12) = \$1000 \left(1 + \frac{0.08}{1}\right)^{12} \approx \$2518.17$$