Department of Mathematics
Moreno Valley College

Mathematics 52
Course ID: (27501)
First Midterm
Fall 2016

Date: October 4th, 2016 **Time: 8:00 AM – 10:05 AM**

Professor: Mohammed Kaabar

P1	P2	P3	P4	P5	P6	P7	P8	EC1	EC1	Total
20	20	10	10	10	10	10	10	5	6	100

Student Name: Mohammed Kaabar

Student ID: – Solution –

Exam Instructions:

1- Do not open this exam until you are told to begin.
2- Calculators are not allowed.
3- This exam has 8 questions and two extra credit questions.
4- Make sure you answer all questions.
5- Turn off all cell phones and remove all headphones.
6- Communication of any kind is not allowed during the exam
7- Cheating = "F"

Student Signature:.....

Problem 1 (20 points): Determine whether the following is **TRUE** or **FALSE** and if it is **FALSE,** then **EXPLAIN** why it is false:

a. $0.\bar{3} > 0.62$ False $0.\bar{3} \approx 0.33333 < 0.62$

b. $-500.34 \leq -200.87$ True

c. $\pm 6.53 \leq \pm 6.53$ True

d. $3\frac{1}{2} = \frac{7}{2}$ True

e. $15 \cdot \left(\frac{1}{3}\right) = 5$ True

f. $-\left|-\frac{100}{2}\right| \geq \{(3455.45) - (4000.23)\}$ True

$-50 \stackrel{?}{\geq} -544.78$

g. $\left(\frac{1}{3} - 0.\bar{3}\right) > (-0.022 + 0.010)$

$0 > -0.012$ True

Hint: $\frac{1}{3}$ ***is approximatly equal to*** 0.33333333333333

True

h. $2^0 < 2^{1-0.5} \rightarrow 2^{1/2} = \sqrt{2} \approx 1.414$

$1 < 2^{0.5}$

Hint: ***any number to power zero is*** 1, ***and*** $2^{\frac{1}{2}} = \sqrt{2} \approx 1.4142$

i. Zero divided by any non-zero number is undefined False because zero divided by any non-zero number is zero.

j. Set of real numbers ($\mathbb{R}$) is considered the smallest set of numbers.

False because set of real numbers is considered the largest set of numbers.

Problem 2 (20 points): Answer each of the following questions:

a. What is the definition of **variable**? is defined as something that is always changeble, and it is represented by alphabetic character (letter).

b. Give a word example of **variable**?

1- The age of humans. or any other
2- The age of cars. reasonable answers.

c. What is the definition of a **rational number**?

is defined as integer divided by non-zero integer.
OR a number that terminates or repeats such as 3.5 and $\frac{1}{3} \approx 0.3333 = 0.\overline{3}$.

d. Give a numerical example of an **irrational number**?

π, e^1, $\sqrt{2}$, or $\sqrt{3}$.

e. What is the definition of **percent**? is defined as the number of hundredths. In other words, a certain number as a part of 100. Percent is denoted as $\boxed{?}\,\% = \frac{\boxed{?}}{100}$

f. Write the **general form** of **multiplicative identity**?

For any real numbers x, y, and z, then we have:
$x \cdot 1 = x$, $y \cdot 1 = y$, or $z \cdot 1 = z$

g. Write $\frac{5}{2}$ in a **percent form**?

$\frac{5}{2} = 2.5 = \boxed{250\%}$

h. Write $\frac{1}{2}\%$ in a **decimal form**?

$\frac{1}{2}\% = \frac{1/2}{100} = \frac{0.5}{100} = \boxed{0.005}$

i. Write the **four important steps** in the **order of operation**?

1- Evaluate the inside of brackets.
2- Evaluate powers (exponents)
3- Evaluate the multiplication & division from left to right
4- Evaluate the addition & subtraction from left to right

j. What is the definition of **the set of whole numbers**?

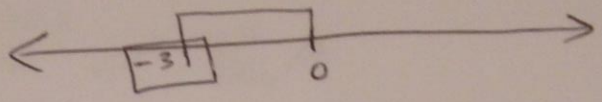
is a set that has zero and natural numbers $\Rightarrow \{0, 1, 2, 3, 4, 5, \cdots\}$

Problem 3 (10 points): Add the following using the **NUMBER LINE for EACH ONE**:

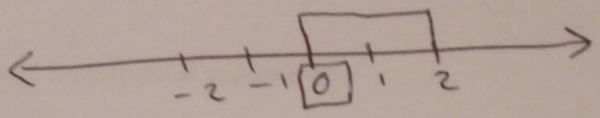
Note: Make sure that you have one number line for each part.

a. $0-3=0+(-3)$

$=\boxed{-3}$

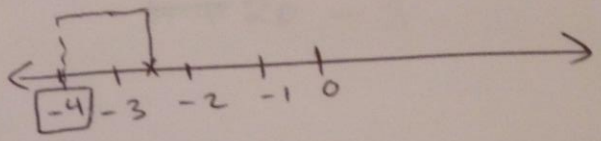


b. $2+(-2)=\boxed{0}$



c. $-2.5-1.5=-2.5+(-1.5)$

$=\boxed{-4}$

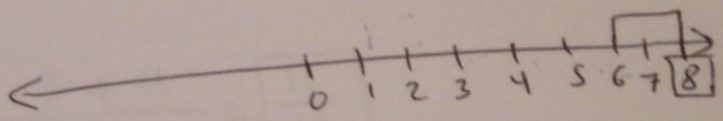


d. $((-3)\cdot(-2))-((-2\cdot|-1|))$

$(6) \quad -(-2\cdot 1)$

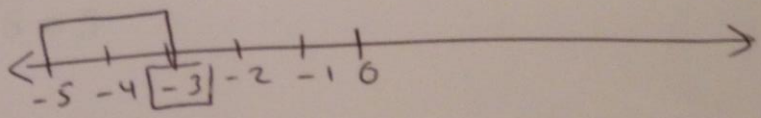
-2

$6--2=6+2=\boxed{8}$



e. $\frac{15}{-3}+\left(-\frac{14}{-7}\right)$

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



Problem 4 (10 points): Translate each of following English phrases to the math language **(algebraic expression)**

a. Four more than three times some number, x, added to the product of six and some number, y. $4+3x+6y$

b. Three added to seventeen times some number. Assume that some number is t, then, we have: $3+17t$

c. Seven more than three multiplied by some number. Assume that some number then $7 + 3k$

d. Twenty-seven percent of some number, μ.

$27\%\,\mu$ or 0.27μ or $\frac{27}{100}\mu$

e. Two plus seventy-times some number, δ.

$2 + 70\delta$

Problem 5 (10 points): Simplify the following mathematical expressions:

a. $\dfrac{\sqrt[3]{125}+2^3+\left(\frac{15}{3}\right)+(-1546.4567)^0}{\left(\frac{22}{2}\right)+|-20|-1} = \dfrac{5+8+5+1}{11+20-1}$

$= \boxed{\dfrac{19}{30}}$

b. $\dfrac{\sqrt{100}-|-23+20|+16^{\frac{1}{2}}}{2+(\sqrt{2}\cdot\sqrt{2})} = \dfrac{10-3+4}{2+2} = \boxed{\dfrac{11}{4}}$

Hint: **square root of a number multiplied by a square root of the same number is the number itself, for example,** $\sqrt{5}\cdot\sqrt{5} = 5$

Problem 6 (10 points): Solve the following linear equations:

a.

$$5(\psi + 3) = 15 + 2$$

$\Rightarrow 5\psi + 15 = 17$

$\Rightarrow 5\psi = 17 - 15$

$\Rightarrow 5\psi = 2$

$\Rightarrow \boxed{\psi = \frac{2}{5}}$ ← this is the solution (root) of the linear equation.

b.

$$3\left(\frac{1}{3}\lambda - 2\right) + \lambda = 3\lambda + 12$$

$\Rightarrow 3\left(\frac{1}{3}\right)\lambda - 6 + \lambda = 3\lambda + 12$

$\Rightarrow \boxed{\lambda} - 6 + \boxed{\lambda} = \boxed{3\lambda} + 12$

$\Rightarrow 2\lambda - 3\lambda = 12 + 6$

$\Rightarrow -\lambda = 18$

$\Rightarrow \boxed{\lambda = -18}$ ← this is the solution (root) of the linear equation.

Problem 7 (10 points): In Labor Day, Annalise is a successful businesswoman in California, and she decided to go to one of the Rolls Royce dealerships in Beverly Hills, California to buy a 2004 Rolls Royce Phantom. The price of this car was listed as $100,000. A Labor Day discount of 10% on the price of this car, followed by another discount of 5% because she is working in a partner company of the Rolls Royce dealership, is equivalent to a single discount of what percent of the original price?

Solution:

Original price = $100,000, Discount 1 = 10%, Discount 2 = 5%, % = ?!

the deductible value for the price after discount 1 is

$(100,000) \cdot \left(\frac{10}{100}\right) = \boxed{10,000}$

So, the price after discount 1 becomes: $100,000 − $10,000 = $\boxed{\$90,000}$

The deductible value for the price after discount 2 is

$(90,000) \cdot \left(\frac{5}{100}\right) = \boxed{4500}$

So, the price after discount 2 is: $90,000 − $4500 = $\boxed{\$85,500}$

Therefore, the final price is ($100,000 − $85,500) = $14,500 less than the original price.

Hence, $\frac{14,500}{100,000} = \frac{29}{200} = 0.145 = \boxed{14.5\%}$

Problem 8 (10 points): Daniel is working in a real estate company in Yermo, CA. He earned $30,000 profit from the sale of a land in Yermo, CA. So, he decided to invest part at 3% interest, and the remaining at 1% interest. He received a total of $1500 interest per year. How much did Daniel invest at 3%.

interest rates

Solution

We assume that the total amount invested at 3% is Ψ, then we obtain:

$(30,000 - \Psi)$ which is the amount invested at 1% interest.

Total amount earned per year is $1,500 interest.

$$\text{therefore, } 1,500 = 0.03\Psi + (30,000 - \Psi)\cdot(0.01)$$

$$\Rightarrow 1,500 = 0.03\Psi + (30,000)(0.01) - (0.01)\Psi$$

$$\Rightarrow 1,500 - (30,000)(0.01) = 0.03\Psi - 0.01\Psi$$

$$\Rightarrow 1,500 - 300 = 0.02\Psi$$

$$\Rightarrow \frac{1,200}{0.02} = \frac{0.02\Psi}{0.02}$$

$$\Rightarrow \Psi = \frac{1,200}{0.02} = \frac{1,200}{\frac{2}{100}} = 600 \cdot \frac{100}{2} = \$60,000$$

Therefore, Daniel invested $60,000 of 3% interest rate

Extra Credit Problem 1 (5 points): Simplify the following mathematical expressions

$$\left\{\frac{\left\{(-1)^{7}\cdot\left(\frac{\sqrt{81}-|-23+20|+121^{\left(\frac{1}{4}\right)^{\frac{1}{2}}}}{6\sqrt{100}-\sqrt{64}}\right)+\left\{\frac{\left\{2^{-3+2+5-2}+3\cdot(3+2--1)\cdot\sqrt[3]{125}+\left(\frac{15}{3}\right)\right\}}{|-20+10|--\left(\frac{4047682}{2213}\right)^{5-4+12-20+7}}\right\}\right\}^{2-5+3+}}{\left\{\frac{2^{-1}\left(\frac{10}{0.5}\right)+\sqrt[4]{390625}+e^{1-2+1}+|12-50|^{100-99-1}-1}{\left(\frac{50}{2}\right)-12+2^{0}+3\cdot\sqrt{25}}\right\}}$$

$$= \frac{\left(\frac{-9+3-11}{52}\right)+\left(\frac{2+90+5}{3}\right)}{\left(\frac{10+25+1+1-1}{25-12+1+15}\right)}$$

$$= \frac{\left(\frac{-17}{52}\right)+\left(\frac{97}{3}\right)}{\left(\frac{36}{29}\right)}$$

Extra Credit Problem 2 (6 points): Answer each of the following questions:

a. Write down the course ID for our MAT-52 class? 27501

b. Where is our MAT-52 classroom located? PSC 18

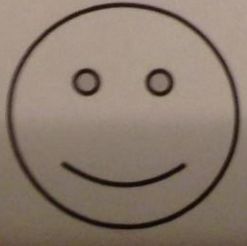
c. From which university in U.S. your Professor Mohammed Kaabar graduated? WSU

d. Your Professor Mohammed Kaabar has several favorite hobbies other than teaching mathematics. List one of them. Fishing, Hiking, and off-roading

e. If you pass this class successfully, what will be the next coming math class? MAT-53

f. Your Professor Mohammed Kaabar wrote two math textbooks for two different math classes. List one of those math classes.

1- A First Course in Linear Algebra.
2- A Friendly Introduction to Differential Equations.



I wish you best of luck in Exam 1

Best Regards

Professor: Mohammed Kaabar