Name: _____

MATH 100
Fall 2021
HW 1: Due 09/22

"[Rebecca] Do you believe in ghosts, Ted? [Ted] I do. But more importantly, I think they need to believe in themselves."
–Rebecca Welton & Ted Lasso, Ted Lasso

Problem 1. (5pt) Give the definition of a real number.

Problem 2. (15pt) For each of the following, determine if the associative property, commutative property, distributive property, additive identity property, multiplicative identity property, additive inverse property, or multiplicative inverse property is being used.

(a) _____ $2^2 + (6 \cdot 4 + 1) - 3/6^3 = (2^2 + 6 \cdot 4) + 1 - 3/6^3$

(b) _____ $5 - x^2(2a - 3b) = 5 - 2ax^2 + 3bx^2$

(c) _____ $19 - 4^2 + 3 \cdot (-5) - 16 = 19 - 4^2 - 5(3)$

(d) _____ $3 - 16 + 0 - 1/7 = 3 - 16 - 1/7$

(e) _____ $-17 + 2(5 \cdot 6 + 8^3)/2 = -17 + (5 \cdot 6 + 8^3)$

(f) _____ $45 - 4(5 \cdot 3) - 25/5^2 = 45 - (4 \cdot 5)3 - 25/5^2$

(g) _____ $1/3 - 6 \cdot 5^2 - (5 + \pi^2 \cdot 1) = 1/3 - 6 \cdot 5^2 - (5 + \pi^2)$

(h) _____ $4 \cdot 7/5 + (1 - 41^2) - 6^2 + 36 = 4 \cdot 7/5 + (1 - 41^2)$

(i) _____ $(5 - 1)^2 + 4(-3)6 \cdot 1/4 = (5 - 1)^2 + (-3)6 \cdot 4/4$

(j) _____ $-4 - (15 - 3^2)/2 + 1^3 + 4 = -(15 - 3^2)/2 + 1^3 - 4 + 4$

(k) _____ $61 - 19(1(5) + 6) + 8^5 - 8^5 = 61 - 19(1(5) + 6)$

(l) _____ $6^6 + 7(2 - 6) = 6^6 + 14 - 42$

(m) _____ $19^2((1 - 3)4) + 0^3 = (19^2(1 - 3))4 + 0^3$

(n) _____ $15 - 2\pi/\pi = 15 - 2$

(o) _____ $(5/3)^2 + 12 - (6 - 2) = (5/3)^2 + 12 - 2(3 - 1)$

Problem 3. (10pt) Translate the following sentences into arithmetic:

(a) _____ The sum of a number and 20.

(b) _____ The quotient of one-hundred and five and six.

(c) _____ A number is decreased by nine.

(d) _____ The product of nineteen and negative eight.

(e) _____ Fifteen more than seven.

(f) _____ One-third times a number.

(g) _____ The difference of x and y is one.

(h) _____ A number is divided by sixteen.

(i) _____ Twice the difference of a number and 5.

(j) _____ Six more than five times a number is 27.

Problem 4. (20pt) Compute the following:

(a) _____: $50 + 50 - (25 \cdot 0) + 2 + 2$

(b) _____: $3 + 6(9) - 5(8) + 48/6$

(c) _____: $3 \cdot 8 - 4/2 + 5 \cdot 2^2$

(d) _____: $2(1-1)^2 + 6/3 \cdot 2$

(e) _____: $2(1-1)^2 + 6/(3 \cdot 2)$

(f) _____: $6 - \frac{3}{4} \cdot 8 + 2^2$

(g) _____: $\dfrac{1-1}{4+3^2}$

(h) _____: $7 - (4-6) + 5^3$

(i) _____: $4(1) + 28/2^2 - (4-1)/3$

(j) _____: $4 \cdot 2^{1-2} - (5-6)$

Problem 5. (20pt) Compute the following:

(a) _____: $3\left(4-(3-5)\right)-4/2$

(b) _____: $3\left(2^2\left(1-5\left(3\left(4-5\right)\right)\right)\right)$

(c) _____: -3^2-9+2^4

(d) _____: $\left(\left((2-10)/2\right)/4\right)^3$

(e) _____: $(3\cdot 4^2)/4-\left(15/\left(-3\cdot 5\right)^3\right)^2$

(f) _____: $\left(6^2-(-10)^2\right)/2$

(g) _____: $1-\left((-1)^3-2(3-(1+1))^2\right)$

(h) _____: $\dfrac{x^2+y}{y-x}$; where $x=-3$ and $y=1$

(i) _____: $y-x^3$; where $x=-1$ and $y=18$

(j) _____: $\dfrac{3x-4}{y-7}$; where $x=2$ and $y=5$

Problem 6. (10pt) Compute the following:

(a) _____: 8^2-8^0

(b) _____: $(-7)^2$

(c) _____: $2^{-3}-2^{-1}$

(d) _____: $\dfrac{5^3}{5}$

(e) _____: $\dfrac{2^2\cdot 3^3}{2^{-2}\cdot 3^2}$

Problem 7. (10pt) 'Simplify' the following as much as possible, being sure to not use any negative powers:

(a) _____: $x^5 \cdot x^{-8}$

(b) _____: $\dfrac{x^9}{x^3}$

(c) _____: $(x^2y)(x^3/y^5)$

(d) _____: $\dfrac{(2x^2)^3}{x^{-2}}$

(e) _____: $(x^5/y^4)(x^2y^{-1})^{-3}$

Problem 8. (5pt) Express the following numbers in scientific notation:

(a) _____: 0.0013

(b) _____: 22100

(c) _____: 44.35

(d) _____: 4531453210

(e) _____: 5.8

Problem 9. (5pt) Convert the following numbers from their scientific notation to their decimal notation:

(a) _____: 1.871×10^5

(b) _____: 1.6×10^{-2}

(c) _____: 5.0×10^0

(d) _____: 0.9×10^{-7}

(e) _____: 2.66×10^1