

Instructions: You must show all work to receive credit. Unless the problem states otherwise you should do the work by hand and check by calculator, and report exact values (no decimals). Use proper notation for your answers and be sure to answer all part of each question.

Part I. After answering these questions, you will submit your answers to the online exam form in Canvas. After submitting your answers, include the work for these questions to the Exam #2, Part 2 dropdown along with your written answers for Part II.

1. A farmer calculates that for every 100 seeds he plants, he harvests 84 ears of corn. If he wants to harvest 7200 ears, how many seeds should he plant? (8 points)

$$\frac{100}{84} = \frac{x}{7200} \quad 84x = 720000$$

$$x = \frac{720,000}{84}$$

$$x = 8,571.428 \dots$$

$$8571 \text{ or } 8572$$

2. An iPod is on sale for \$159.20 and the normal price is \$199. What is the discount being applied? (8 points)

$$199 - 159.20 = 39.8$$

$$\frac{39.8}{199} = 0.2 \quad 20\% \text{ discount}$$

3. Write each of the expressions in standard decimal form (not in scientific notation). (3 points each).

a. 7.1×10^{-8}

$$0.000000071$$

b. 6.22×10^9

$$6,220,000,000$$

4. Calculate the following problems and write your answers to the indicated number of significant digits. You may use your calculator. (6 points each)

a. (5 sig fig) $567.009 + 2.34432 + 78.099 = 647.45232 \rightarrow 647.45$

b. (1 sig fig) $2.103 \div 0.03 = 70.1 \rightarrow 70$

c. (2 sig fig) $13.25 \times 2.2 = 29.15 \rightarrow 29$

5. Solve the proportions for the variable. (5 points)

$$\frac{3}{4} : 8 = 9 : x$$

$$\frac{\frac{3}{4}}{8} = \frac{9}{x}$$

$$\frac{3 \cdot \frac{1}{8}}{4} = \frac{9}{x}$$

$$\frac{3}{32} = \frac{9}{x}$$

$$3x = 288$$

$$x = 96$$

6. If 7 bottles of water per day will support 5 hikers, how many people could you accommodate with 28 bottles of water? (8 points)

$$\frac{7}{5} = \frac{28}{x}$$

$$7x = 140$$

$$x = 20 \text{ people}$$

7. $52\frac{1}{3}\%$ of the students in a school district are women. If there are 1099 female students, how many male students are there? (8 points)

$$\frac{0.523\bar{3}}{1099} = \frac{0.476\bar{6}}{x}$$

$$0.523\bar{3}x = 523.85\bar{6}$$

$$x = 1001$$

male students

8. If one inch is equal to 2.54 centimeters, how many centimeters are there in 5.5 inches? (8 points)

$$\frac{1}{2.54} = \frac{5.5}{x}$$

$$x = 13.97$$

9. Evaluate each expression for the given values of the variables. (6 points each)

a. $(x - y)^2$ when $x = 10, y = 7$

$$(10 - 7)^2 = 3^2 = 9$$

b. $a^2 + b^2$ when $a = -3, b = 8$

$$(-3)^2 + 8^2 = 9 + 64 = 73$$

10. Simplify. $|9 - 3| - |5 - 12|$ (5 points)

$$|6| - |-7| = |6| - |-7| = 6 - 7 = -1$$

11. Simplify: $\frac{7(-1) + 9(-3)}{-5(3) - 2}$. (8 points)

$$\frac{-7 - 27}{-15 - 2} = \frac{-34}{-17} = 2$$

Part II. Submit your written answers to these questions into the Exam #2, Part 2 dropbox.

12. Write the following expressions in scientific notation. You may round all figures to two significant figures. (4 points each)

a. 0.00460

$$4.6 \times 10^{-3}$$

b. 12,009

$$1.2 \times 10^4$$

$$1.2009 \times 10^4$$

c. 876,092,356,000

$$8.8 \times 10^{11}$$

$$8.76092356 \times 10^{11}$$

13. Simplify the expression and write your final answer in scientific notation. Use two significant figures. (5 points each)

a. $(7.25 \times 10^3)^4$

$$2762.81640625 \times 10^{12}$$

$$2.8 \times 10^{15}$$

b. $(1.1 \times 10^{-2}) \div (8.9 \times 10^{-4})$

$$\frac{(1.1)}{8.9} \cdot \frac{10^{-2}}{10^{-4}} = 0.12359... \times 10^2$$
$$1.2 \times 10^1$$

14. Divide, write as a repeating decimal. $\frac{3}{13}$ (6 points)

$$0.\overline{230769}$$

15. Write the following decimals as fractions. (8 points each)

a) 0.00104 b) 2.03 c) -1.931762

$$\frac{104}{100,000} = \frac{26}{25,000} = \frac{13}{12,500} \qquad \frac{203}{100} \qquad \frac{-1931762}{1000000} = \frac{965,881}{500,000}$$

16. Write the expression $0.\overline{384615}$ as a fraction in reduced form. You may use your calculator, but be very careful. If you show no work, I cannot give partial credit. (8 points)

$$\frac{384615}{999999} = \frac{128,205}{333,333} = \frac{42,735}{111,111} = \frac{14,245}{37,037} = \frac{2035}{5291} = \frac{185}{481}$$

17. Translate the following into algebraic expressions. (5 points each)

- a. 3 less than x

$$x - 3$$

- b. The quotient of 36 and 9

$$\frac{36}{9}$$

- c. three times the difference of a and b

$$3(a - b)$$

18. Simplify the expression. (6 points each)

- a. $3(4q + 1) - 2(5q - 9)$

$$12q + 3 - 10q + 18$$

$$2q + 21$$

b. $\frac{1}{2}(4k - 6) + \frac{2}{3}(9 - 12k)$

$$2k - 3 + 6 - 8k$$

$$-6k + 3$$

19. The following problem below has at least one error in it (possibly more than one). Find the error(s), explain why they are wrong, and solve the problem correctly. (15 points)

$$\frac{1}{4}(8x - 12) - \frac{1}{6}(18x - 24)$$

Not an equation
can't do this

$$\begin{aligned} &\rightarrow \textcircled{12} \left[\frac{1}{4}(8x - 12) - \frac{1}{6}(18x - 24) \right] \\ &3(8x - 12) - 2(18x - 24) \\ &24x - 36 - 36x - 48 \\ &\quad -12x - 84 \\ &\quad -12x = 84 \leftarrow \text{there is no } = \text{ sign in the original problem} \\ &\quad \underline{-12} \quad \underline{-12} \\ &\quad x = -7 \end{aligned}$$

$-2x - 24 = +48$

$$2x - 3 - 3x + 4$$

$$-x + 1$$

20. Distribute and simplify $6(7y + 8) - (30y - 15)$ (6 points)

$$42y + 48 - 30y + 15$$

$$12y + 63$$

21. Below are three solved linear equations. For each one state the solution set, and whether the equation is an identity, a conditional equation, or a contradiction. (6 points each)

$$3(x+4) = 2x + 7(x-1)$$

$$3x + 12 = 2x + 7x - 7$$

$$3x + 12 = 9x - 7$$

a. $-6x + 12 = -7$

$$-6x = -19$$

$$x = \frac{19}{6}$$

Conditional

$$X = \left\{ \frac{19}{6} \right\}$$

$$6(x-2) + 11 = 4(x-1) + 2x$$

b. $6x - 12 + 11 = 4x - 4 + 2x$

$$6x - 1 = 6x - 4$$

$$-1 = -4$$

Contradiction

no solutions

$$\frac{1}{2}(2x+22) - 1 = 3(x+9) - (2x+17)$$

c. $x + 11 - 1 = 3x + 27 - 2x - 17$

$$x + 10 = x + 10$$

identity

any real # is a solution

$X \in \mathbb{R}$