Week in Review #12

MATH 365 — Marcia Drost

Review for Final —

Created and complied by Sherry Scarborough with thanks for additional problems from Zach Barcevac, Lynnette Cardenas, Greg Klein, David Manuel, Jane Schielack, and Jenn Whitfield.

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1. The following table describes a binary operation Φ on the set $U = \{m, n, p, q, r\}$. For example $q \ \Phi \ p = r$. Use the table to answer the following questions.

Φ	p	r	m	q	n
p	n	q	m	r	p
r	q	m	m	p	n
m	m	m	m	m	m
q	r	p	m	q	m
n	p	n	m	m	r

   a. $r \ \Phi \ q =$

      $p \ \Phi \ r =$

   b. Is Φ closed under U?

   c. Is Φ commutative?

   d. Does Φ have an identity element? If so, what is it?

2. Negate, "All apples are red or some pears are yellow."

3. Write a word problem that uses the missing addend model for subtraction.

4. Of the four main operations on real numbers, which ones are commutative?

5. $GCD(2332, 1590) =$

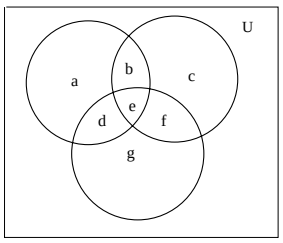
6. Prove or disprove: If $a, b, c, d \in Z$ and $b, c, d \neq 0$, then $\dfrac{\dfrac{a}{b}}{\dfrac{c}{d}}$ is a rational number.

7. $19 - 5^2 + \mid -4^2 \mid + 360 \div 18 \div 2 =$

8. Using the definition of less than, show $\pi + 3 < \sqrt{29} + 4$

9. How many positive divisors does 484^{19} have?

10. What set does the portion of the Venn diagram labeled b, d, and e, represent?



11. Over the rational numbers, factor completely: $-48a^8 + 243$

12. What is the contrapositive of the statement, "A whippet is a dog."

13. Fully simplify: $\dfrac{(-5x^2yz^3)^3}{(-2x^{-1}y^0z^4)^5}$

14. If $a_1 = 10$ and $a_3 = 200$ in a geometric sequence, find a_4.

15. Of the four main operations on real numbers, which ones are closed?

16. $2341_{nine} \div 87_{nine} =$

17. $\dfrac{3}{4xy^2} + \dfrac{10x}{45y}$

18. Change $5\dfrac{4}{7}$ to an improper fraction in simplest form; show your work and do not use any shortcut.

19. If a and b are real numbers, prove
    a. $(-a)(-b) = ab$
    b. $(-a)(b) = -ab$
    c. $(a)(-b) = -ab$

20. If r is a real number, prove
    a. $\dfrac{0}{r} = 0, r \neq 0$
    b. $\dfrac{r}{1} = r$
    c. $\dfrac{r}{0}$ is undefined.

21. Compute the following sum: $88 + 85 + 82 + 79 + \ldots +^{-} 77$.

22. Round $39,276.01465$ to the nearest hundredth.

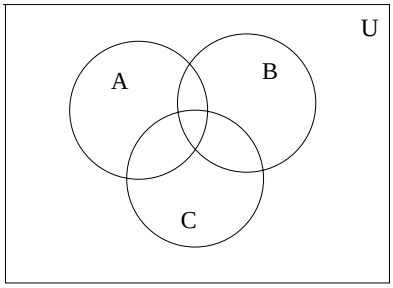
23. Students in a hurry make the mistake that $5 \cdot 5 = 10$. Give a model showing how to do the problem correctly.

24. $7607_{eight} + 325_{eight} =$ Find the solution showing all work in base eight.

25. Compute the following using any algorithm **except** the standard algorithm.
    a. $3206 \div 14$
    b. $2109 + 375 + 568$

26. Use a model to illustrate the following computations.
    a. $^{-}2 -^{-} 5$
    b. $\dfrac{3}{5} \times \dfrac{1}{4}$
    c. $\dfrac{1}{6} + \dfrac{3}{4}$

27. Let $A = \{1, 2, 3, 4\}$ and $B = \{3, 4, 5, 6\}$ and $C = \{7, 8\}$, where $U = A \cup B \cup C$.
    a. $A \cup B =$
    b. $n(A \cap B) =$
    c. $A \cap (\overline{B \cup C}) =$
    d. $B \cap C =$
    e. Give a nonempty subset of A.
    f. List all the proper subsets of C.
    g. List any two elements of $A \times B$.



28. Given the conditional statement $\sim p \rightarrow \sim q$ is true, which of the following must also be true?
    a. $\sim q \rightarrow \sim p$ b. $q \rightarrow p$ c. $p \rightarrow \sim q$ d. $p \rightarrow q$
29. $lcm(2700, 1750) =$
30. Write four different true proportions using the numbers $6, 14, 21$, and 49.
31. True or False:
    a. If $a \mid c$ and $b \mid c$, then $(a + b) \mid c$.
    b. $\mid x \mid$ is always positive.
    c. If $A \subset \overline{B}$, then $A \subseteq \overline{B}$.
    d. If $a \mid b$ then b is a factor of a.
    e. $\dfrac{43}{150}$ can be written as a terminating decimal.
32. Circle the numbers listed below that divide $164,916,224$.
    2 3 4 5 6 8 9 10 11
33. The sum of three numbers is 17. The second number is 3 less than the third. The third is 7 more than the first. Find the three numbers.
34. Write $-5.8\overline{34}$ in the form of an integer over a nonzero integer.
35. Justify each step in finding the product of 27.1 and 3.9.
36. If a long is one-hundredth, model 1.452 + 1.368 using base-ten blocks.
37. Find the product (3.95)(2.013)
    a. by representing each factor as a fraction and then multiplying.
    b. by using the standard algorithm.
38. Find the quotient $\dfrac{19.38}{5.7}$
    a. by representing the dividend and the divisor as fractions.
    b. by using the standard algorithm.
39. Scientific Notation
    a. Write 0.000586 in scientific notation.
    b. Write 3.9583×10^5 as a single number and not as a product of numbers.

40. $40.246 + 5.0035 + 3.305$
    a. Estimate the sum.
    b. Find the exact sum.
41. Order $3.02\overline{53}, 3.0\overline{2534}$, and $3.02\overline{5}$ from least to greatest.