

Homework Problems

Lecture 1 Solution Key

<u>Problems</u>	<u>Solutions</u>
1. 5 is a factor/multiple of 10.	Factor
2. 10 is a multiple/factor of 5	Multiple
3. True/False: The sum of two multiples of 6 must be a multiple of 12.	No Example 1: $6 + 12 = 18$, NOT multiple of 12 Example 2: $12 + 24 = 36$, YES multiple of 12
4. Is every multiple of 8 a multiple of 4?	Yes
5. Is every multiple of 4 a multiple of 8?	No, 4 is a multiple of 4 but not multiple of 8
6. Every number is both a factor and a multiple of _____.	Itself
7. Is 1 prime?	No; the first 20 prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97
8. What are the prime factors of 48?	2, 3
9. If the numbers 70 and 105 are both multiples of a prime number n , how many possible values are there for n ?	There are 2 prime numbers: 5 and 7
10. How many positive integers less than 50 are multiples of 4, but not multiples of 6?	There are 8 positive integers – 4, 8, 16, 20, 28, 32, 40, 44
11. If a and b are both odd integers and c is an even integer, then all of the following could be true EXCEPT: a. $a + b = c$ b. $ac = a + b$ c. $bc = a$ d. $b - c = a$ e. $ac/b = bc$	Can we find at least one example that agrees with each rule? a. $a + b = c \rightarrow a=3, b=5, c=8$ b. $ac = a + b \rightarrow a=3, b=9, c=4$ c. $bc = a \rightarrow$ NO ($b*c$ will always be even and a is an odd number) d. $b - c = a \rightarrow a=3, b=5, c=2$ e. $ac/b = bc \rightarrow a=9, b=3, c=2$. Then $ac=18$, $ac/b=6=bc$.
12. $\frac{2}{5} + \frac{1}{7} \div \frac{3}{4} =$	Orders of operation: PEMDAS $\frac{2}{5} + \frac{1}{7} \times \frac{4}{3} = \frac{2}{5} + \frac{4}{21} = \frac{2 \times 21 + 4 \times 5}{5 \times 21} = \frac{42 + 20}{105} = \frac{62}{105}$
13. What is 30% of 50?	$0.30 \times 50 = 15$
14. $(a^2 + a^3)/a^7 =$	$\frac{a^2 + a^3}{a^7}$

15. $\sqrt[3]{343} =$	7
16. $4913^{\frac{1}{3}} =$	17
17. If 125 percent of x is 150, what is x percent of 75?	$125\% \rightarrow 1.25$ $1.25x = 150$ $x = 120$ $120\% \rightarrow 1.20$ $1.20(75) = 90$
18. A co-ed soccer team has twice as many men as women. The players line up for inspection with a woman at the front of the line. Which of the following must be true? a. The second person in line is a woman. b. The last person in line is a woman. c. There are more women than men on the team. d. There are at least 2 women standing next to each other e. There are at least 2 men standing next to each other.	Answer (e) must be true
19. In a certain alloy, the ratio by weight of copper to brass is 4 to 9. If the alloy contains 16 pounds of copper, how many pounds of brass does it contain?	$\frac{4}{9} = \frac{16}{x}$ $4x = 144$ $x = 36$
20. It takes 4 minutes for Andy to drive a mile and it takes 6 minutes for Diane to drive a mile. If Andy and Diane both drive for 1 hour, how many more miles will Andy drive than Diane?	In an hour, Andy drives $\frac{60}{4}$ miles or 15 miles. In an hour, Diane drives $\frac{60}{6}$ miles or 10 miles. \therefore This means Andy drives 5 more miles than Diane.

<p>21. A certain survey was distributed to 2,400 people, 85% of whom responded. Of the respondents, 60% answered a particular yes-no question "no", while 352 left that question blank. How many people answered "yes" to that question?</p>	<p>There are a total of $((2400 \times 0.85)$ or 2040 respondents.</p> <p>$2040 \times 0.60 = 1224$ respondents answered "no."</p> <p>352 left blank.</p> <p>$\therefore 2040 - 1224 - 352 = 464$ respondents answered "yes."</p>
<p>22. If a is a positive number, which of the following must be true?</p> <p>a. $2a$ is negative</p> <p>b. $a - 3$ is positive</p> <p>c. $100 - a$ is positive</p> <p>d. $3 - a$ is negative</p>	<p>Suppose $a = 100$ or 1,</p> <p>a. $2(100)$ negative, no; $2(1)$ negative, no</p> <p>b. $100 - 3$ is positive, yes; $1 - 3$ is positive, no</p> <p>c. $100 - 100 = 0$, no; $100 - 1 = 99$, yes</p> <p>d. $3 - 100 = -97$ negative, yes; $3 - 1$ is negative, no</p> <p>\therefore None are true!</p>
<p>23. Between which two digits of the number 987654 should a decimal point be placed so that the value of the resulting number is equal to 9.87654×10^4?</p>	<p>Between the digits of 5 and 4</p>
<p>24. If an object travels at 5 feet per minute, how many feet does it travel in 2 seconds?</p>	$\frac{5}{60} = \frac{x}{2}$ $60x = 10$ $x = \frac{1}{6} \text{ feet} = 2 \text{ inches}$
<p>25. If Jorge earns \$2000 a month and spends \$600 a month on rent, what percent of Jorge's monthly earnings does he spend on rent?</p>	$600 = 2000x$ $x = 0.3 \text{ or } 30\% \text{ of monthly earnings.}$
<p>26. At a carnival, there are m families with n children per family. If a total of b balloons are distributed equally among the children, how many balloons are there for each child?</p>	<p>There are $\left(\frac{b}{mn}\right)$ balloons per child.</p>

<p>27. Which of the following is equal in value to plus (200 percent of 1)?</p> <ul style="list-style-type: none"> a. 150 percent of 1 b. 200 percent of 1 c. 250 percent of 1 d. 300 percent of 1 e. 350 percent of 1 	<p>Answer (b)</p>
<p>28. If x is an integer between 300 and 400 that is divisible by 3, 6, and 9, what is one possible value of x?</p>	<p>360</p>
<p>29. Andy, Bobby, and Carol each walked into a candy store with a different amount of money. Andy and Bobby had 33 cents together, Bobby and Carol had 56 cents together, and Carol and Andy had 41 cents together. If they each paid for 5 cents worth of candy, how much money did Andy leave the candy store with?</p>	<p><u>Given:</u></p> $A + B = 33$ $B + C = 56$ $A + C = 41$ <p>-----</p> $(41-C)+B = 33$ $(41-C) + (56-C) = 33$ $97-2C=33$ $-2C=-64$ $C=32$ $A=41-32=9$ $B=33-A=33-9=24$ <p>\therefore Andy leaves the candy store with $(9-5)$ or 4 cents</p>

<p>30. Larry spent $\frac{1}{4}$ of his weekly allowance on Monday and the rest on Tuesday, Wednesday, Thursday, and Friday of that week. If he spent an equal amount on each of those four days, what fraction of his weekly allowance did Larry spend on Friday?</p>	<p>Let A=Larry's allowance</p> <p>Monday: $\frac{1}{4}A$</p> <p>Tuesday: $\frac{\left(\frac{3}{4}A\right)}{4} = \left(\frac{3}{4}A\right) \times \left(\frac{1}{4}\right)$</p> <p>Wednesday: $\frac{\left(\frac{3}{4}A\right)}{4} = \left(\frac{3}{4}A\right) \times \left(\frac{1}{4}\right)$</p> <p>Thursday: $\frac{\left(\frac{3}{4}A\right)}{4} = \left(\frac{3}{4}A\right) \times \left(\frac{1}{4}\right)$</p> <p>$\therefore$ Friday: $\frac{\left(\frac{3}{4}A\right)}{4} = \left(\frac{3}{4}A\right) \times \left(\frac{1}{4}\right) = \frac{3}{16}A$ or 18.75%</p>
<p>31. Mona is pulling out gummy bears from a small pouch. In her first handful, she pulled out 5 red bears and 3 yellow ones. In her second handful, 40 percent of the bears were red. If after both handfuls, 50 percent of all the bears pulled were red, how many bears did Mona pull out in her second handful if she only pulled whole bears?</p>	<p>Let x = total # of gummy bears in second handful All reds = 0.5 (total # of gummy bears in both handfuls)</p> $5 + 0.4x = 0.5(8+x)$ $5 + 0.4x = 0.5(8+x)$ $5 + 0.4x = 4 + 0.5x$ $1 = 0.1x$ $\therefore x = 10$
<p>32. Cauky the Clown is preparing 9 jars of jellybeans for Big Hoopla Circus's jellybean guessing contest. If she puts 20 jellybeans into the first jar and each successive jar contains twice as many as the one before it, how many jellybeans will Cauky put in the 9th jar?</p>	<p>1st jar: 20</p> <p>2nd jar: 20×2</p> <p>3rd jar: $(20 \times 2) \times 2 = 20 \times 2^2$</p> <p>4th jar: $(20 \times 2 \times 2) \times 2 = 20 \times 2^3$</p> <p>.....</p> <p>$\therefore$ 9th jar: $20 \times 2^8 = 20 \times 256 = 5120$</p>

<p>33. What is the 100th term after the decimal point when you divide 4 by 13?</p>	$\frac{4}{13} = 0.307692$ <p>∴ The 100th digit is 6 of the repeating decimal.</p>
<p>34. $(27 \cdot 32) - (-27 \cdot -32) =$</p>	$(864) - (864) = 0$
<p>35. From his house, it takes Billy 16 minutes to walk to the museum. Walking at the same speed, it takes him 22 minutes to walk from his house to the park. If Billy's house is 2 miles from the museum, how far, in miles, is it from the park?</p>	<p>Distance = rate x time</p> <p>Rate = miles/min</p> <p>2 = (miles/min) (16)</p> <p>→ (miles/min) = 1/8</p> <p>x = distance from house to park = (miles/min) (22)</p> <p>x = (1/8) (22)</p> <p>∴ x = 2.75 miles</p>
<p>36. $16 - 4 \cdot 5 + 2 =$</p>	<p>Order of operations: PEMDAS</p> $16 - 20 + 2 = -4 + 2 = -2$
<p>37. On Monday morning, Sarah sold 14 boxes of Girl Scout cookies before lunch. If the cookies are \$3.25 a box and Sarah needs to sell at least \$80 worth for the day, how many more boxes must Sarah sell after lunch in order to meet her goal?</p>	<p>Morning sales: $14(\\$3.25) = \\45.5</p> <p>Evening sales: $\\$80 - \\$45.5 = \\$34.50$</p> <p>∴ $\\$34.50 / \\$3.25 \cong 11$ boxes</p>
<p>38. A cake recipe calls for 4 cups of flour, 1 cup of sugar, 2 cups of water, and 2 cups of frosting. If Eileen baked several cakes and used a total of 45 cups of ingredients, how many cups of frosting did she use?</p>	$4f + 1s + 2w + 2f = 9$ cups ingredients per cake <p>45 cups / 9 cups = 5 cakes were made</p> <p>∴ $2f \times 5 = 10$ cups of frosting was used</p>
<p>39. Mario has a crate of 400 cherries that weighs 22 pounds. If the empty crate weighs 2 pounds and he gives 145 cherries away to his friend Sandra, approximately how many pounds do the remaining cherries weigh?</p>	$400 - 145 = 255$ cherries remaining $\frac{400}{20} = \frac{255}{x}$ $400x = 5100$ <p>∴ $x = 12.75$ pounds</p>