

MRC use: Time In _____ Out _____

Instructor use only: Notes and Book OK, Calculator/Phone/Computer OK, One Part Test, Time Limit 80 min., Last Day:

Name:

Date:

Math 25 Midterm One

Work for up to 80 minutes.

*Calculators **are** allowed. Your Math 25 notes and the Math 25 Packet **are** allowed.
Looking at the Math25.net website online **is** allowed on this midterm only.*

Reduce fraction answers. No need to change improper fraction answers to mixed numerals.

Show numbered step-by-step answers!

Review Problems (Do 5 of 12)

1. How many factors does 24 have?
2. Find the prime factorization of 84.
3. Solve $4 \times (5 + 15 \times 5) + 6 - 3 + 81 \div 3^3 \times 2^4$
4. Find $^{16}/_{25} \div ^4/_5$
5. Find the sum of $^1/_3$, $^2/_4$, and $^5/_6$ using common denominators.
6. A number minus $^1/_30$ equals $^1/_5$. What is the number?
7. Brand A costs \$19.52 for 13 ounces. Brand B costs \$16.51 for 10 ounces. What is the price per ounce for each? Which is the better buy?
8. Solve: $^{25}/_6 = ^n/_20$
9. 183.96 is 21% of what?
10. Write 325% in decimal format.
11. Write 12.9375 in percent format.
12. Write the fraction $^{10}/_8$ in percent format.

Math 25 Problems (Do all 15)

1. One serving of bagel has 0.5 grams of fat, 44 grams of carbohydrates (including 4 from sugar), and 8 grams of protein. Change to calories these amounts of fat, carbohydrate, sugar, and protein.
2. Continuing the previous problem, what percentage of the food's calories come from sugar?
3. Frank is a 67-year-old very active man who weighs 106 pounds and is 5 feet 5 inches tall. What is his estimated BMR?

4. Continuing the previous problem, what is his estimated DCI?
5. Your friend is a 69-year-old minimally active woman who weighs 119 pounds and is 5 feet 3 inches tall. What is her estimated BMR?
6. Continuing the previous problem, what is her estimated DCI?
7. Continuing the previous problem, that same friend swims for 1 hour and 39 minutes. Swimming burns 0.07 calories per pound per minute. How many calories does your friend burn? To how many 50-calorie *York Peppermint Pattie* mini-size candies is this equivalent?
8. Continuing the previous problem, what is that friend's maximum safe heart rate, minimum aerobic exercise heart rate, and maximum aerobic exercise heart rate?
9. A recipe that makes 13 servings requires 10 pounds of Mogu Pumpkin. Mogu Pumpkin have a yield percent of 66%. How many pounds of Mogu Pumpkin should you purchase if you are scaling up the recipe to make 284 servings?
10. Continuing the previous problem, if Mogu Pumpkin cost \$0.60 per pound, what will that ingredient cost?
11. One gallon of whole milk weighs 8.6 pounds. What is the weight of 13.5 cups of whole milk?
12. Express 5.2 cups as 5 cups and some tablespoons.
13. Express 19 teaspoons as 6 tablespoons and some teaspoons.
14. Find the mean of these six numbers: 22, 153, 69, 8, 91, 11.
15. Continuing the previous problem, find the median of those six numbers.

Answers for Random Problems

Review Problems

1. There are **8** factors: 1, 24, 2, 12, 3, 8, 4, 6
2. The prime factorization is $2 \times 2 \times 3 \times 7$.
3. The amount in the parenthesis simplifies to 80. So the first term is $4 \times 80 = 320$.
The second and third terms are plain numbers: add 6 and subtract 3.
The fourth term involves two exponents. The first part becomes $81 \div 27 = 3$.
The second exponent equals 16. Then $3 \times 16 = 48$
Thus the entire list of terms is $320 + 6 - 3 + 48 = \mathbf{371}$.
4. First flip the second fraction change division to multiplication: $\frac{16}{25} \times \frac{5}{4}$.
Then cancel the top right and bottom left: $\frac{4}{25} \times \frac{5}{1}$.
Then cancel the bottom right and top left: $\frac{4}{5} \times \frac{1}{1}$.
Then multiply the fractions to find the final answer of $\frac{4}{5}$.
5. The common denominator is 12. We add $\frac{4}{12} + \frac{6}{12} + \frac{10}{12} = \frac{20}{12}$. The reduced fraction is $\frac{5}{3}$.

6. First notice that 30 will work as a common denominator. So change the second fraction to get $\frac{1}{30} + \frac{6}{30}$. Then add numerators to get $\frac{7}{30}$.

7. Brand A costs \$1.50 per ounce. Brand B costs \$1.65 per ounce. **Brand A** is the better buy.

8. $n = 25 \times 20 \div 6 \approx \mathbf{83.3}$

9. Translate the percent sentence as $183.96 = 0.21 \times y$. Solve for y by dividing both sides by 0.21. The answer is **876**.

10. Use RIP LOP and scoot the decimal point twice to the left to get 3.25

11. Use RIP LOP and scoot the decimal point twice to the right to get 1293.75%

12. First change the fraction into a decimal by using "top \div bottom" to get 1.25, then use RIP LOP and scoot the decimal point twice to the right to get 125%

Math 25 Problems

1. The bagel has $0.5 \times 9 = \mathbf{4.5}$ calories from fat.

It has $44 \times 4 = \mathbf{176}$ calories from carbohydrates.

Sugar is a kind of carbohydrate, so it also has $4 \times 4 = \mathbf{16}$ calories from sugar.

It has $8 \times 4 = \mathbf{32}$ calories from protein.

2. We find the total calories by adding up the calories from fat, carbohydrates, and protein. This total is 212.5. Then we divide the 16 calories from sugar by the 212.5 total calories (and use RIP LOP) to get an answer of about **8%**.

3. A man's BMR = (weight \times 4.55) + (height \times 15.88) – (age \times 5) – 161
 $= (106 \times 4.55) + (65 \times 15.88) - (67 \times 5) - 161 \approx \mathbf{1,019}$ calories per day.

4. The DCI for a very active man is $\text{BMR} \times 2.1 \approx \mathbf{2,140}$ calories per day.

5. A woman's BMR = (weight \times 4.55) + (height \times 15.88) – (age \times 5) + 5
 $= (119 \times 4.55) + (63 \times 15.88) - (69 \times 5) + 5 \approx \mathbf{1,202}$ calories per day.

6. The DCI for a minimally active woman is $\text{BMR} \times 1.56 \approx \mathbf{1,875}$ calories per day.

7. 0.07×119 pounds \times 99 minutes $\approx \mathbf{825}$ calories, equivalent to about 17 *York Peppermint Pattie* mini-size candies.

8. Our friend's maximum safe heart rate = $220 - \text{age} = 220 - 69 = \mathbf{151}$ beats per minute. The upper limit for aerobic exercise = maximum safe heart rate \times 0.85 $\approx \mathbf{128}$ beats per minute. The lower limit for aerobic exercise = maximum safe heart rate \times 0.5 $\approx \mathbf{76}$ beats per minute

9. We scale up the recipe by 284 desired servings \div 13 recipe servings ≈ 21.85 .

So 10 pounds \times 21.85 scale factor \div 0.66 yield percent $\approx \mathbf{331.1}$ pounds of **Mogu Pumpkin**.

10. 331.1 pounds \times $\$0.60$ per pound $\approx \mathbf{\$198.66}$.

11. Replace 1 gallon with 16 cups. Then use a proportion.
If 16 cups weigh 8.6 pounds, how much will 13.5 cups weigh?
 $13.5 \times 8.6 \div 16 \approx \mathbf{7.3}$ pounds.

12. There are 16 tablespoons in a cup. So we multiply the 0.2 by 16.

$0.2 \times 16 \approx 3$ tablespoons.

So our final answer is **5 cups and 3 tablespoons**.

13. First we divide to switch to tablespoons.

$19 \text{ tsp} \div 3 \text{ tsp per Tbsp} = 6.33 \text{ Tbsp}$.

Then we multiply the decimal amount by 3 to go backwards and change it back to teaspoons.

$0.33 \times 3 = 1$ teaspoons.

So our final answer is **6 tablespoons and 1 teaspoons**.

14. The sum of the six numbers is 354. The mean is $354 \div 6 = 59$.

15. The sorted numbers are: 8, 11, 22, 69, 91, 153, so the median is the average of 22 and 69, which is **45.5**.