MRC use: Time In _____ Out _____
Instructor use only: No Notes, No Book, Calculator OK, One Part Test, Time Limit 110 min., Last Day:

Name:	Date:

Math 25 Arithmetic Test

Work for up to 80 minutes.
*Calculators **are** allowed. Your personal Math 25 "solutions manual" **is** allowed.*
Reduce fraction answers.
No need to change improper fraction answers to mixed numerals.
Show numbered step-by-step answers!

1. The prime factorization of 320 has how many 2's?

2. A number minus $\frac{1}{56}$ equals $\frac{1}{8}$. What is the number?

3. Brand A costs $19.36 for 11 ounces. Brand B costs $15.49 for 8 ounces. What is the price per ounce for each? Which is the better buy?

4. 79% of what is 36?

5. A small business borrows $7,833.50 at a 8% annual simple interest rate. It repays the loan after 213 days. How much interest does it owe?

6. Find the sum of $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{6}$.

7. Solve and write your answer as a rounded decimal: $\frac{40}{9} = \frac{n}{48}$

8. ***(2 pts)*** Find the mean and median of these six numbers: 608, 624, 640, 612, 624, 618.

9. One serving of toaster tarts has 4 grams of fat, 35 grams of carbohydrates (including 15 from sugar), and 2 grams of protein. Change to calories these amounts of fat, carbohydrate, sugar, and protein.

10. Continuing the previous probem, what percentage of the food's calories come from sugar?

11. ***(4 pts)*** Your friend is a 47-year-old very active woman who weighs 122 pounds and is 5 feet 8 inches tall. What is her estimated BMR, DCI, BMI, and percent body fat?

12. Continuing the previous probem, that same friend walks for 3 hours and 22 minutes. Walking burns 0.037 calories per pound per minute. How many calories does your friend burn? To how many 165-calorie *York Peppermint Pattie* candies is this equivalent?

13. Continuing the previous probem, what is that friend's maximum safe heart rate, minimum aerobic exercise heart rate, and maximum aerobic exercise heart rate?

14. An archaeologist finds a rectangular artifact that measures 5 inches by 5 inches by 8 inches. The artifact is 45% gold and 55% silver. Gold weighs 10.179 troy ounces per cubic inch. Silver weighs 5.527 troy ounces per cubic inch. What is the weight of the gold and silver that constitute the artifact?

15. Continuing the previous probem, currently gold costs $1,245.67 per troy ounce and silver costs $18.89 per troy ounce. What is the value of the gold and silver that constitute the artifact?

16. Scale up this simple but yummy single-serving cracker recipe to make 6 servings.

• 2 Tbsp milk	• 1 tsp olive oil
• 1 Tbsp flaxseed meal	• 1 tsp sugar
• $\frac{1}{4}$ cup flour	• pinch salt

show answers

Answers

1. There are **6** twos in the prime factorization.

2. First notice that 56 will work as a common denominator. So change the second fraction to get $^{1}/_{56} + {}^{7}/_{56}$. Then add numerators to get $^{8}/_{56}$. The reduced fraction is **$^{1}/_{7}$**.

3. Brand A costs $1.76 per ounce. Brand B costs $1.94 per ounce. **Brand A** is the better buy.

4. Translate the percent sentence as $0.79 \times y = 36$. Solve for y by dividing both sides by 0.79. The answer is about **45.57**.

5. Use the simple interest formula. $I = P \times r \times t$ = $7,833.50 × 0.08 × (213 ÷ 365) = **$365.71**.

6. The common denominator is 12. We add $^{4}/_{12} + {}^{3}/_{12} + {}^{2}/_{12} = {}^{9}/_{12}$. The reduced fraction is **$^{3}/_{4}$**.

7. $n = 40 \times 48 \div 9 \approx$ **213.3**

8. The sum of the six numbers is 3,726. The mean is **621**. The sorted numbers are: 608, 612, 618, 624, 624, 640, so the median is the average of 618 and 624, which is **621**.

9. The toaster tarts has 4 × 9 = **36 calories** from fat. It has 35 × 4 = **140 calories** from carbohydrates. Sugar is a kind of carbohydrate, so it also has 15 × 4 = **60 calories** from sugar. It has 2 × 4 = **8 calories** from protein.

10. We find the total calories by adding up the calories from fat, carbohydrates, and protein. This total is 184. Then we divide the 60 calories from sugar by the 184 total calories (and use RIP LOP) to get an answer of about **33%**.

11. A woman's BMR = (weight × 4.55) + (height × 15.88) − (age × 5) + 5 = (122 × 4.55) + (68 × 15.88) − (47 × 5) + 5 ≈ **1,405 calories per day**.

The DCI for a very active woman is BMR × 1.82 ≈ **2,557 calories per day**.

BMI is (weight ÷ 2.2) ÷ (height ÷ 39.37)^2 = (122 ÷ 2.2) ÷ (68 ÷ 39.37)^2 = **18.6**.

A woman's percent body fat is estimated by (1.2 × BMI) + (0.23 × age) − 5.4 = (1.2 × 18.6 + (0.23 × 47) − 5.4 ≈ **28 percent body fat**.

12. 0.037 × 122 × 202 ≈ **912 calories**, equivalent to about 6 *York Peppermint Pattie* candies.

13. Our friend's maximum safe heart rate = 220 − age = 220 − 47 = **173 beats per minute**. The upper limit for aerobic exercise = maximum safe heart rate × 0.85 ≈ **147 beats per minute**. The lower limit for aerobic exercise = maximum safe heart rate × 0.5 ≈ **87 beats per minute**

14. The artifact has a volume of 200 cubic inches. It contains 90.00 cubic inches of gold and 110.00 cubic inches of silver. The gold weighs **916.11** troy ounces and the silver weighs **607.97** troy ounces.

15. The value of the gold is **$1,141,170.74**, and the value of the silver is **$11,484.55**.

16. Multiplying by 6 gives us:

• 12 Tbsp milk	• 6 tsp olive oil
• 6 Tbsp flaxseed meal	• 6 tsp sugar
• 1.5 cups flour	• salt

There are 3 teaspoons in one Tablespoon. Rounding to the nearest Tablespoon as we adjust the olive oil and sugar, this gives us:

- 12 Tbsp milk
- 6 Tbsp flaxseed meal
- 1.5 cups flour
- 2 Tbsp olive oil
- 2 Tbsp sugar
- salt

There are 4 Tablespoons in $\frac{1}{4}$ cup. Rounding to the nearest quarter-cup, this gives us:

- 3 quarter-cups milk
- 2 quarter-cups flaxseed meal
- 1.5 cups flour
- 2 Tbsp olive oil
- 2 Tbsp sugar
- salt

Finally, adjust the quarter-cups to half-cups or cups. Rounding any decimals that are not 0.5, this gives us:

- 3 quarter-cups milk
- 2 quarter-cups flaxseed meal
- 1.5 cups flour
- 2 Tbsp olive oil
- 2 Tbsp sugar
- salt