MRC use: Time In _____ Out _____
Instructor use only: Notes and Book OK, Calculator/Phone/Computer OK, One Part Test, Time Limit 110 min., Last Day:

Name:	Date:

Math 25 Arithmetic Test

Work for up to 110 minutes.

*Calculators **are** allowed. Your Math 25 notes and the Math 25 Packet **are** allowed.*
*Looking at the Math25.net website online **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 120 has how many 2's?

2. A number minus $\frac{1}{54}$ equals $\frac{1}{6}$. What is the number?

3. Brand A costs $10.57 for 7 ounces. Brand B costs $12.48 for 8 ounces. What is the price per ounce for each? Which is the better buy?

4. 60 is 36% of what?

5. A small business borrows $6,318.00 at a 6% annual simple interest rate. It repays the loan after 263 days. How much interest does it owe?

6. Find the sum of $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$.

7. Solve and write your answer as a rounded decimal: $\frac{6}{7} = \frac{n}{42}$

8. ***(2 pts)*** Find the mean and median of these six numbers: 408, 472, 456, 416, 432, 414.

9. One serving of spaghetti with meat sauce has 13 grams of fat, 31 grams of carbohydrates (including 7 from sugar), and 19 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 fat?

11. ***(4 pts)*** Your friend is a 21-year-old minimally active woman who weighs 108 pounds and is 5 feet 1 inches tall. What is her estimated BMR, DCI, BMI, and percent body fat?

12. Continuing the previous probem, that same friend walks for 1 hour and 41 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 4 inches by 9 inches by 6 inches. The artifact is 94% gold and 6% 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 $1,194.36 per troy ounce and silver costs $13.68 per troy ounce. What is the value of the gold and silver that constitute the artifact?

16. Scale up only the **milk** in this simple but yummy single-serving cracker recipe to make 54 servings. Round if appropriate when moving from teaspoons to tablespoons, or tablespoons to quarter-cups.

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

show answers

Answers

1. There are **3** twos in the prime factorization.

2. First notice that 54 will work as a common denominator. So change the second fraction to get $\frac{1}{54} + \frac{9}{54}$. Then add numerators to get $\frac{10}{54}$. The reduced fraction is $\frac{5}{27}$.

3. Brand A costs $1.51 per ounce. Brand B costs $1.56 per ounce. **Brand A** is the better buy.

4. Translate the percent sentence as $60 = 0.36 \times y$. Solve for y by dividing both sides by 0.36. The answer is about **166.67**.

5. Use the simple interest formula. $I = P \times r \times t$ = $6,318.00 × 0.06 × (263 ÷ 365) = **$273.15**.

6. The common denominator is 8. We add $\frac{4}{8} + \frac{2}{8} + \frac{1}{8} = \frac{7}{8}$.

7. $n = 6 \times 42 \div 7 \approx$ **36.0**

8. The sum of the six numbers is 2,598. The mean is **433**. The sorted numbers are: 408, 414, 416, 432, 456, 472, so the median is the average of 416 and 432, which is **424**.

9. The spaghetti with meat sauce has 13 × 9 = **117 calories** from fat. It has 31 × 4 = **124 calories** from carbohydrates. Sugar is a kind of

carbohydrate, so it also has 7 × 4 = **28 calories** from sugar. It has 19 × 4 = **76 calories** from protein.

10. We find the total calories by adding up the calories from fat, carbohydrates, and protein. This total is 317. Then we divide the 117 calories from fat by the 317 total calories (and use RIP LOP) to get an answer of about **37%**.

11. A woman's BMR = (weight × 4.55) + (height × 15.88) − (age × 5) + 5 = (108 × 4.55) + (61 × 15.88) − (21 × 5) + 5 ≈ **1,360 calories per day**.

The DCI for a minimally active woman is BMR × 1.56 ≈ **2,122 calories per day**.

BMI = weight ÷ height^2 × 703 = 108 ÷ 61^2 × 703 = **20.4**.

A woman's percent body fat is estimated by (1.2 × BMI) + (0.23 × age) − 5.4 = (1.2 × 20.4 + (0.23 × 21) − 5.4 ≈ **24 percent body fat**.

12. 0.037 × 108 × 101 ≈ **404 calories**, equivalent to about 2 *York Peppermint Pattie* candies.

13. Our friend's maximum safe heart rate = 220 − age = 220 − 21 = **199 beats per minute**. The upper limit for aerobic exercise = maximum safe heart rate × 0.85 ≈ **169 beats per minute**. The lower limit for aerobic exercise = maximum safe heart rate × 0.5 ≈ **100 beats per minute**

14. The artifact has a volume of 216 cubic inches. It contains 203.04 cubic inches of gold and 12.96 cubic inches of silver. The gold weighs **2,066.74** troy ounces and the silver weighs **71.63** troy ounces.

15. The value of the gold is **$2,468,436.55**, and the value of the silver is **$979.90**.

16. Multiplying by 54 gives us 108 Tbsp of milk.

There are 4 Tablespoons in $\frac{1}{4}$ cup. Rounding to the nearest quarter-cup, we adjust the milk to be 27 quarter-cups.

Finally, adjust the quarter-cups to half-cups or cups. Rounding any decimals that are not 0.5, this gives us 7 cups of milk.