

M2

Junior Genius Math Guide

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NUMERICAL SKILLS/PRE-ALGEBRA

Questions in the numerical skills/pre-algebra placement test range in content from basic arithmetic concepts and skills to the knowledge and skills considered prerequisites for a first algebra course. The test includes items from more than a dozen content areas; however, a majority of the questions come from the following categories:

- 1) Operations with Integers
- 2) Operations with Fractions
- 3) Operations with Decimals
- 4) Positive Integer Exponents, Square Roots, and Scientific Notation
- 5) Ratios and Proportions
- 6) Percentages
- 7) Averages (Means, Medians, and Modes)

SAMPLE PROBLEMS

(Averages: Means, Medians, and Modes)

1. What is the average (arithmetic mean) of 8, 7, 7, 5, 3, 2, and 2?

- A) $3\frac{4}{7}$
- B) $4\frac{5}{6}$
- C) $4\frac{6}{7}$
- D) 5
- E) $6\frac{4}{5}$

(Basic Operations with Decimals)

2. Ben is making wooden toys for the next arts and crafts sale. Each toy costs Ben \$1.80 to make. If he sells the toys for \$3.00 each, how many will he have to sell to make a profit of exactly \$36.00?

- A) 12
- B) 20
- C) 30
- D) 60
- E) 108

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(Basic Operations with Fractions)

3. How many yards of material from a 24-yard length of cloth remain after 3 pieces, each $3\frac{1}{2}$ yards long, and 5 pieces, each $2\frac{1}{4}$ yards long, are removed?
- A) $2\frac{1}{4}$
 - B) $4\frac{1}{4}$
 - C) $4\frac{5}{6}$
 - D) $10\frac{1}{4}$
 - E) $10\frac{5}{6}$

(Percentages)

4. Phillip charged \$400 worth of goods on his credit card. On his first bill, he was not charged any interest, and he made a payment of \$20. He then charged another \$18 worth of goods. On his second bill a month later, he was charged 2% interest on his entire unpaid balance. How much interest was Phillip charged on his second bill?
- A) \$8.76
 - B) \$7.96
 - C) \$7.60
 - D) \$7.24
 - E) \$6.63

ANSWERS:

- 1) C
- 2) C
- 3) A
- 4) B

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MORE NUMERICAL SKILLS/PRE-ALGEBRA EXAMPLES

1. $54 - 6 \div 2 + 6 = ?$

- A) 6
- B) 24
- C) 27
- D) 30
- E) 57

2. The lowest temperature on a winter morning was -8°F . Later that same day the temperature reached a high of 24°F . By how many degrees Fahrenheit did the temperature increase?

- A) 3
- B) 8
- C) 16
- D) 24
- E) 32

3. If $(\frac{3}{4} - \frac{2}{3}) + (\frac{1}{2} + \frac{1}{3})$ is calculated and the answer reduced to simplest terms, what is the denominator of the resulting fraction?

- A) 24
- B) 12
- C) 6
- D) 4
- E) 3

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4. $\frac{1}{2} + \left(\frac{2}{3} \div \frac{3}{4}\right) - \left(\frac{4}{5} \times \frac{5}{6}\right) = ?$

A) $\frac{1}{16}$

B) $\frac{17}{27}$

C) $\frac{13}{18}$

D) $\frac{7}{9}$

E) $\frac{5}{6}$

5. Mr. Brown went grocery shopping to buy meat for his annual office picnic. He bought $7\frac{3}{4}$ pounds of hamburger, 17.85 pounds of chicken, and $6\frac{1}{2}$ pounds of steak. How many pounds of meat did Mr. Brown buy?

A) 32.10

B) 31.31

C) 26.25

D) 22.10

E) 21.10

6. Four students about to purchase concert tickets for \$18.50 for each ticket discover that they may purchase a block of 5 tickets for \$80.00. How much would each of the 4 save if they can get a fifth person to join them and the 5 people equally divide the price of the 5-ticket block?

A) \$1.50

B) \$2.50

C) \$3.13

D) \$10.00

E) \$12.50

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7. In scientific notation, $20,000 + 3,400,000 = ?$

- A) 3.42×10^6
- B) 3.60×10^6
- C) 3.42×10^7
- D) 3.60×10^7
- E) 3.60×10^{12}

8. Saying that $4 < \sqrt{x} < 9$ is equivalent to saying what about x ?

- A) $0 < x < 5$
- B) $0 < x < 65$
- C) $2 < x < 3$
- D) $4 < x < 9$
- E) $16 < x < 81$

9. What value of x solves the following proportion? $\frac{9}{6} = \frac{8}{x}$

- A) $5\frac{1}{3}$
- B) $6\frac{3}{4}$
- C) $10\frac{1}{2}$
- D) 11
- E) 12

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10. If the total cost of x apples is b cents, what is a general formula for the cost, in cents, of y apples?

A) $\frac{b}{xy}$

B) $\frac{x}{by}$

C) $\frac{xy}{b}$

D) $\frac{by}{x}$

E) $\frac{bx}{y}$

11. On a math test, 12 students earned an A. This number is exactly 25% of the total number of students in the class. How many students are in the class?

A) 15

B) 16

C) 21

D) 30

E) 48

12. This year, 75% of the graduating class of Harriet Tubman High School had taken at least 8 math courses. Of the remaining class members, 60% had taken 6 or 7 math courses. What percent of the graduating class had taken fewer than 6 math courses?

A) 0%

B) 10%

C) 15%

D) 30%

E) 45%

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13. Adam tried to compute the average of his 7 test scores. He mistakenly divided the correct sum of all of his test scores by 6, which yielded 84. What is Adam's correct average test score?
- A) 70
 - B) 72
 - C) 84
 - D) 96
 - E) 98
14. A total of 50 juniors and seniors were given a mathematics test. The 35 juniors attained an average score of 80 while the 15 seniors attained an average of 70. What was the average score for all 50 students who took the test?
- A) 73
 - B) 75
 - C) 76
 - D) 77
 - E) 78

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CORRECT ANSWERS FOR SAMPLE NUMERICAL SKILLS/PRE-ALGEBRA ITEMS

Item Number	Correct Answer	Content Category
1	E	Operations with Integers
2	E	Operations with Integers
3	B	Operations with Fractions
4	C	Operations with Fractions
5	A	Operations with Decimals
6	B	Operations with Decimals
7	A	Exponents
8	E	Exponents
9	A	Ratios and Proportions
10	D	Ratios and Proportions
11	E	Percentages
12	B	Percentages
13	B	Averages
14	D	Averages

Additional practice with Numerical Skills/Pre-algebra

<http://www.math.com/students/practice.html>

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