

Test 2 - Solutions

1. A test in a Geometry class is worth 50 points. Ten students took the test and got scores 25, 25, 30, 30, 35, 40, 40, 45, 45, 45. Find the mean, median, and mode of these scores.

The mean (average) is the sum of all the scores divided by the number of scores, i.e.

$$\frac{25 + 25 + 30 + 30 + 35 + 40 + 40 + 45 + 45 + 45}{10} = \frac{360}{10} = 36.$$

The median is the average of the two middle scores, i.e. $\frac{35 + 40}{2} = \frac{75}{2} = 37.5.$

The mode is the score that occurs most often, i.e. 45.

2. Answer “true” or “false”. (Note: you are not required to provide explanations, but you may receive partial credit if your explanations are on a right track even if they contain mistakes and your answer is wrong.)

- (a) The number 1 is rational.

True. 1 can be written as a quotient of integers: $\frac{1}{1}$.

- (b) The quotient of two irrational numbers is always irrational.

False. For example, π is an irrational number, but the quotient $\frac{\pi}{\pi} = 1$ is not irrational.

- (c) If a is a multiple of b , then $\frac{a}{b}$ is an integer.

True. If a is a multiple of b , then a is b times an integer, so the quotient $\frac{a}{b}$ is an integer.

3. (a) Answer “true” or “false”. Explain using the definition.

- i. 10 divides 50

True: $50 = 10 \cdot 5$

- ii. 10 is divisible by 50

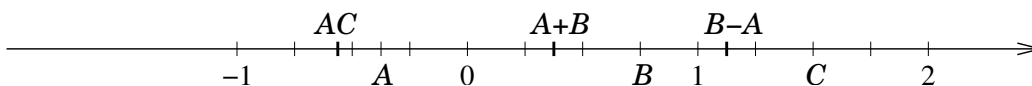
False: 10 is not 50 times an integer.

- (b) Find the greatest common factor and the least common multiple of 10 and 50.

Since 10 is the largest factor of itself and is a factor of 50, $GCF(10, 50) = 10$.

Since 50 is the smallest multiple of itself and is a multiple of 10, $LCM(10, 50) = 50$.

4. Numbers A , B , and C are shown on the real number line below.



Determine and show on the same picture approximate locations of the following numbers:

(a) $A + B \approx -\frac{3}{8} + \frac{3}{4} = \frac{3}{8}$

(b) $B - A \approx \frac{3}{4} - (-\frac{3}{8}) = \frac{3}{4} + \frac{3}{8} = \frac{9}{8}$

(c) $AC \approx (-\frac{3}{8}) \cdot \frac{3}{2} = -\frac{9}{16}$

5. Solve the following equation over the set of real numbers:

$$\frac{x - 3}{2} = \frac{x + 2}{3}$$

Multiply both sides by 6: $3(x - 3) = 2(x + 2)$

simplify: $3x - 9 = 2x + 4$

$x = 13$

6. **For extra credit:** Find an irrational number between 0.12345678 and 0.123456789.

$$0.12345678 + \frac{\pi}{10^9} = 0.12345678 + \frac{3.14\dots}{10^9} = 0.12345678 + 0.00000000314\dots = 0.12345678314\dots$$

is irrational since it is a non-repeating decimal and is between the given numbers.