2002 Q3

3. What is the smallest possible average of four distinct positive even integers?

(A) 3   (B) 4   (C) 5   (D) 6   (E) 7

3. **(C)** The smallest average will occur when the numbers are as small as possible. The four smallest distinct positive even integers are 2, 4, 6, and 8 and their average is 5.

Note: These numbers form an arithmetic sequence. The average of the numbers in any arithmetic sequence is the average of the first and last terms.

2016 Q3

3. Four students take an exam. Three of their scores are 70, 80, and 90. If the average of their four scores is 70, then what is the remaining score?

(A) 40   (B) 50   (C) 55   (D) 60   (E) 70

3. Answer (A):

The given scores 70, 80, and 90 are a total of 30 above the stated average. Thus the remaining score is 30 points below the average, and $70 - 30 = 40$.

OR

Let x be the missing score. Then the sum $70 + 80 + 90 + x = 70 \cdot 4 = 280$. So x must be 40.

1

2010 Q4

4. What is the sum of the mean, median, and mode of the numbers $2, 3, 0, 3, 1, 4, 0, 3$?

(A) 6.5   (B) 7   (C) 7.5   (D) 8.5   (E) 9

4. **Answer (C):** Arrange the numbers in increasing order: $0, 0, 1, 2, 3, 3, 3, 4$. The mean is the sum divided by 8, or $\frac{16}{8} = 2$. The median is halfway between 2 and 3, or 2.5. The mode is 3, because there are more 3's than any other number. The sum of the mean, median, and mode is $2 + 2.5 + 3 = 7.5$.

2011 Q4

4. Here is a list of the numbers of fish that Tyler caught in nine outings last summer:

$$2, 0, 1, 3, 0, 3, 3, 1, 2.$$

Which statement about the mean, mode, and median of these numbers is true?

(A) median < mean < mode   (B) mean < mode < median

(C) mean < median < mode   (D) median < mode < mean

(E) mode < median < mean

4. **Answer (C):** The ordered list is 0, 0, 1, 1, 2, 2, 3, 3, 3. The mean is $\frac{15}{9} = \frac{5}{3}$, the median is 2, and the mode is 3. Because $\frac{5}{3} < 2 < 3$, the correct order is mean < median < mode.

2

1985 Q5

5.
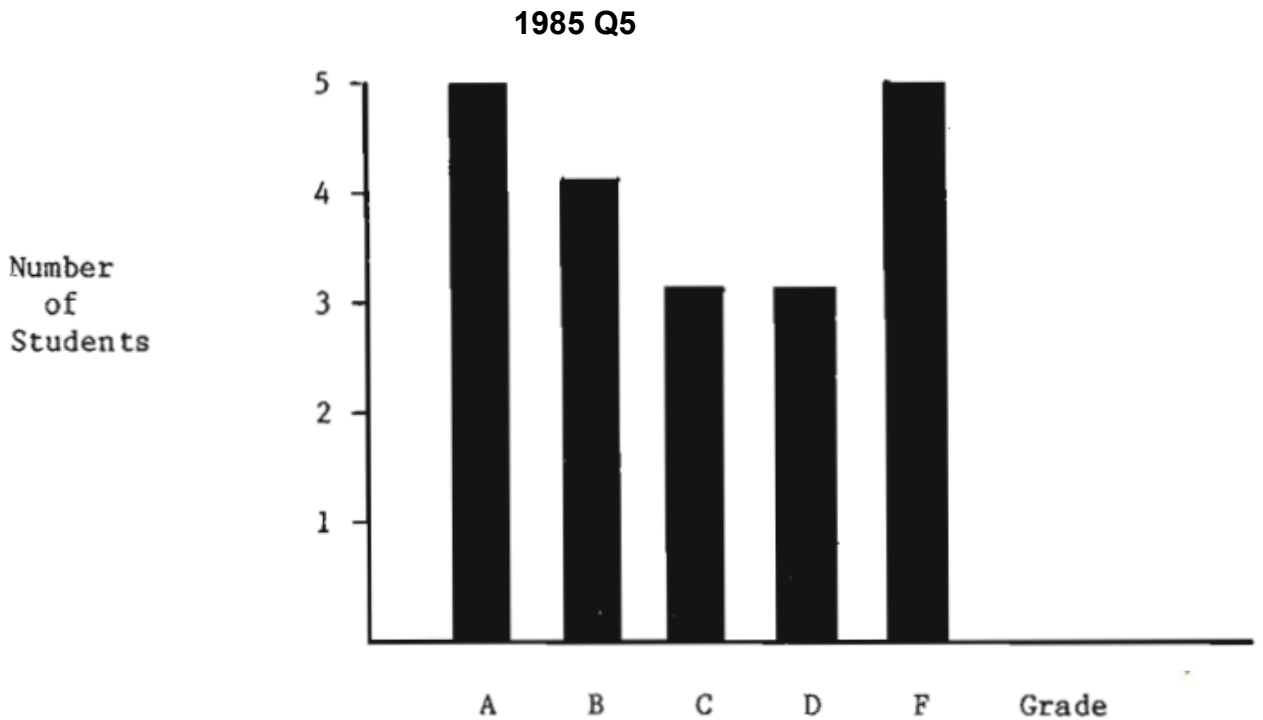
The bar graph shows the grades in a mathematics class for the last grading period. If A, B, C and D are satisfactory grades, what fraction of the grades shown in the graph are satisfactory?

A) $\frac{1}{2}$ B) $\frac{2}{3}$ C) $\frac{3}{4}$ D) $\frac{4}{5}$ E) $\frac{9}{10}$
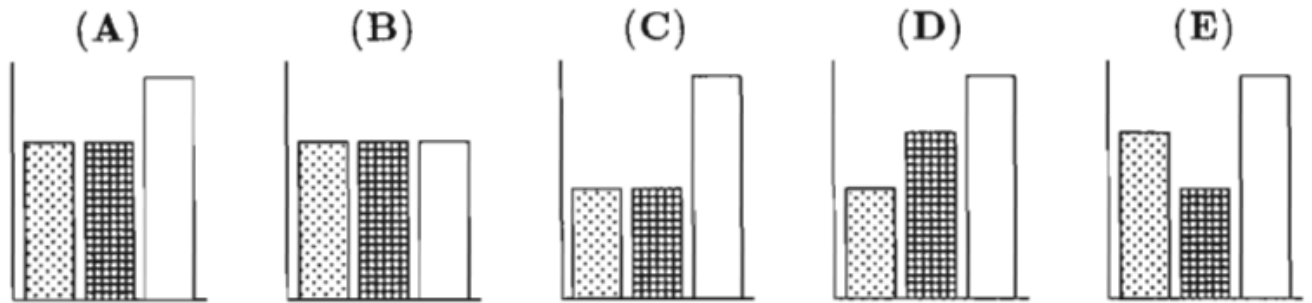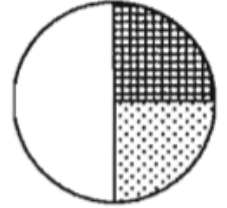
5.   (C) By reading the graph, there are 5 A's, 4 B's, 3 C's, 3 D's, and 5 F's. Thus the fraction of satisfactory grades is

$\frac{5 + 4 + 3 + 3}{20} = \frac{15}{20} = \frac{3}{4}$

OR

By reading the graph, $\frac{5}{20} = \frac{1}{4}$ of the grades are not satisfactory so $1 - \frac{1}{4} = \frac{3}{4}$ of the grades are satisfactory.

3

1993 Q5

5. Which one of the following bar graphs could represent the data from the circle graph?

(A)   (B)   (C)   (D)   (E)

5. **(C)** The unshaded area is half the total, and each of the shaded areas is one fourth of the total. This is represented in bar graph **(C)**.

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4

5. Billy's basketball team scored the following points over the course of the first 11 games of the season:

$$42, 47, 53, 53, 58, 58, 58, 61, 64, 65, 73.$$

If his team scores 40 in the 12th game, which of the following statistics will show an increase?

(A) range   (B) median   (C) mean   (D) mode   (E) mid-range

5. **Answer (A):** The range is the high score minus the low score, so the range changes from 31 to 33. The range is the only listed statistic that will increase. Because 40 is the lowest score for the season, it will cause the mean to decrease. The median value of the first 11 games is the 6th highest score, or 58. The median value of the first 12 games will be the average of the 6th highest and 7th highest scores, or $(58 + 58)/2 = 58$, so no change will occur in the median. Similarly, the score that occurs most frequently in either situation is 58, so the mode will not change. The mid-range is the average of the highest score and the lowest score. The mid-range of the first 11 games is $(73 + 42)/2 = 57.5$. The mid-range of the first 12 games is 56.5, a decrease from 57.5.

5. Hammie is in the 6th grade and weighs 106 pounds. His quadruplet sisters are tiny babies and weigh 5, 5, 6, and 8 pounds. Which is greater, the average (mean) weight of these five children or the median weight, and by how many pounds?

(A) median, by 60   (B) median, by 20   (C) average, by 5

(D) average, by 15   (E) average, by 20

5. **Answer (E):** The total weight is 130 pounds, so the average is 26 pounds. The median is 6 pounds, so the average is greater by 20 pounds.