6 GRE® Quantitative Reasoning Practice Questions

Your goals for this chapter

- Practice answering *GRE*® Quantitative Reasoning questions on your own
- Study answers and explanations, particularly for questions you answered incorrectly

This chapter contains four sets of GRE Quantitative Reasoning practice questions. Each of the first three practice sets consists of Quantitative Comparison questions, both types of Multiple-choice questions, and Numeric Entry questions. These three sets are arranged in order of increasing difficulty. The first is easy, the second is medium, and the third is hard. The fourth practice set consists of Data Interpretation questions of varying levels of difficulty.

Following the last set is an answer key for quick reference. Then, at the end of the chapter, you will find complete explanations for every question. Each explanation is presented with the corresponding question, so that you can easily see what was asked and what the various answer choices or Numeric Entry answer boxes were.

Sharpen your GRE Quantitative Reasoning skills by working your way through these question sets. For the Discrete question sets, begin with the easy sets and then move on to the medium and hard sets. Review the answers and explanations carefully, paying particular attention to explanations for questions that you answered incorrectly.

For the practice questions in this chapter, use the directions that begin on the following page.

General Directions

For each question, indicate the best answer, using the directions given.

Notes: All numbers used are real numbers.

All figures are assumed to lie in a plane unless otherwise indicated.

Geometric figures, such as lines, circles, triangles, and quadrilaterals, **are not necessarily** drawn to scale. That is, you should **not** assume that quantities such as lengths and angle measures are as they appear in a figure. You should assume, however, that lines shown as straight are actually straight, points on a line are in the order shown, and more generally, all geometric objects are in the relative positions shown. For questions with geometric figures, you should base your answers on geometric reasoning, not on estimating or comparing quantities by sight or by measurement.

Coordinate systems, such as *xy*-planes and number lines, **are** drawn to scale; therefore, you can read, estimate, or compare quantities in such figures by sight or by measurement.

Graphical data presentations, such as bar graphs, circle graphs, and line graphs, **are** drawn to scale; therefore, you can read, estimate, or compare data values by sight or by measurement.

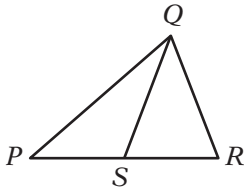
Directions for Quantitative Comparison questions

Compare Quantity A and Quantity B, using additional information centered above the two quantities if such information is given. Select one of the following four answer choices and fill in the corresponding oval to the right of the question.

(A) Quantity A is greater.
(B) Quantity B is greater.
(C) The two quantities are equal.
(D) The relationship cannot be determined from the information given.

A symbol that appears more than once in a question has the same meaning throughout the question.

	Quantity A	Quantity B	Correct Answer
Example 1:	(2)(6)	2 + 6	(A) (B) (C) (D)



	Quantity A	Quantity B	Correct Answer
Example 2:	*PS*	*SR*	(A) (B) (C) (D) (since equal lengths cannot be assumed, even though *PS* and *SR* appear equal)

Directions for Numeric Entry questions

Enter your answer in the answer box(es) below the question.

- **Your answer may be an integer, a decimal, or a fraction, and it may be negative.**
- **If a question asks for a fraction, there will be two boxes—one for the numerator and one for the denominator.**
- **Equivalent forms of the correct answer, such as 2.5 and 2.50, are all correct. Fractions do not need to be reduced to lowest terms.**
- **Enter the exact answer unless the question asks you to round your answer.**

SET 1. Discrete Questions: Easy

Quantitative Comparison

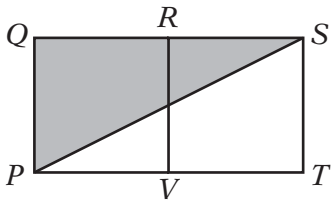
For Questions 1 to 6, compare Quantity A and Quantity B, using additional information centered above the two quantities if such information is given. Select one of the following four answer choices and fill in the corresponding oval to the right of the question.

Ⓐ Quantity A is greater.
Ⓑ Quantity B is greater.
Ⓒ The two quantities are equal.
Ⓓ The relationship cannot be determined from the information given.

A symbol that appears more than once in a question has the same meaning throughout the question.

Emma spent $75 buying a used bicycle and $27 repairing it. Then she sold the bicycle for 40 percent more than the total amount she spent buying and repairing it.

	Quantity A	Quantity B	
1.	The price at which Emma sold the bicycle	$140	Ⓐ Ⓑ Ⓒ Ⓓ



In the figure above, squares *PQRV* and *VRST* have sides of length 6.

	Quantity A	Quantity B	
2.	The area of the shaded region	36	(A) (B) (C) (D)

In 2009 the property tax on each home in Town *X* was *p* percent of the assessed value of the home, where *p* is a constant. The property tax in 2009 on a home in Town *X* that had an assessed value of $125,000 was $2,500.

	Quantity A	Quantity B	
3.	The property tax in 2009 on a home in Town *X* that had an assessed value of $160,000	$3,000	(A) (B) (C) (D)

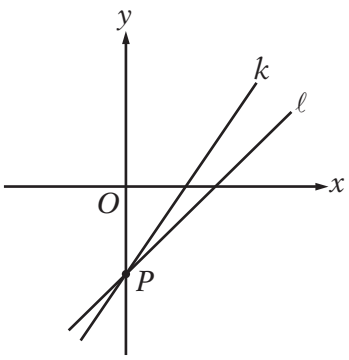
$$x + y = -1$$

	Quantity A	Quantity B	
4.	x	y	(A) (B) (C) (D)

---

r, s, and t are three consecutive odd integers such that $r < s < t$.

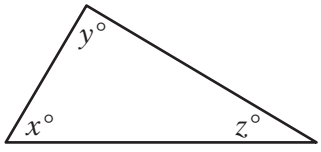
	Quantity A	Quantity B	
5.	$r + s + 1$	$s + t - 1$	(A) (B) (C) (D)



	Quantity A	Quantity B	
6.	The slope of line k	The slope of line ℓ	Ⓐ Ⓑ Ⓒ Ⓓ

Multiple-choice Questions—Select One Answer Choice

For Questions 7 to 11, select a single answer choice.



7. In the figure above, what is the value of $\frac{x+y+z}{45}$?

Ⓐ 2
Ⓑ 3
Ⓒ 4
Ⓓ 5
Ⓔ 6

8. A certain store sells two types of pens: one type for \$2 per pen and the other type for \$3 per pen. If a customer can spend up to \$25 to buy pens at the store and there is no sales tax, what is the greatest number of pens the customer can buy?

Ⓐ 9
Ⓑ 10
Ⓒ 11
Ⓓ 12
Ⓔ 20

9. If $y = 3x$ and $z = 2y$, what is $x + y + z$ in terms of x ?

   (A) $10x$
   (B) $9x$
   (C) $8x$
   (D) $6x$
   (E) $5x$

10. A certain shipping service charges an insurance fee of \$0.75 when shipping any package with contents worth \$25.00 or less and an insurance fee of \$1.00 when shipping any package with contents worth over \$25.00. If Dan uses the shipping company to ship three packages with contents worth \$18.25, \$25.00, and \$127.50, respectively, what is the total insurance fee that the company charges Dan to ship the three packages?

   (A) \$1.75
   (B) \$2.25
   (C) \$2.50
   (D) \$2.75
   (E) \$3.00

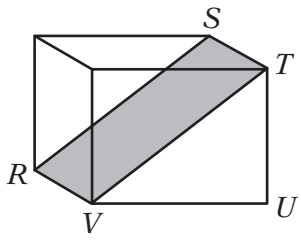
11. If 55 percent of the people who purchase a certain product are female, what is the ratio of the number of females who purchase the product to the number of males who purchase the product?

   (A) 11 to 9
   (B) 10 to 9
   (C) 9 to 10
   (D) 9 to 11
   (E) 5 to 9

Numeric Entry

For Questions 12 and 13, enter your answer in the answer box(es) below the question.

- **Your answer may be an integer, a decimal, or a fraction, and it may be negative.**
- **If a question asks for a fraction, there will be two boxes—one for the numerator and one for the denominator.**
- **Equivalent forms of the correct answer, such as 2.5 and 2.50, are all correct. Fractions do not need to be reduced to lowest terms.**
- **Enter the exact answer unless the question asks you to round your answer.**



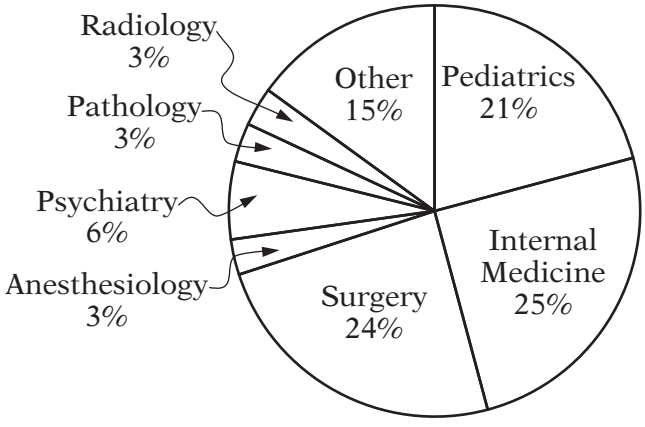
12. In the rectangular solid above, $TU = 3$, $UV = 4$, and $VR = 2$. What is the area of the shaded rectangular region?

13. A list of numbers has a mean of 8 and a standard deviation of 2.5. If x is a number in the list that is 2 standard deviations above the mean, what is the value of x ?

$x =$

Multiple-choice Questions—Select One or More Answer Choices

For Question 14, select all the answer choices that apply.



14. The circle graph above shows the distribution of 200,000 physicians by specialty. Which of the following sectors of the circle graph represent more than 40,000 physicians?

Indicate all such sectors.

- A Pediatrics
- B Internal Medicine
- C Surgery
- D Anesthesiology
- E Psychiatry

SET 2. Discrete Questions: Medium

Quantitative Comparison

For Questions 1 to 5, compare Quantity A and Quantity B, using additional information centered above the two quantities if such information is given. Select one of the following four answer choices and fill in the corresponding oval to the right of the question.

(A) Quantity A is greater.
(B) Quantity B is greater.
(C) The two quantities are equal.
(D) The relationship cannot be determined from the information given.

A symbol that appears more than once in a question has the same meaning throughout the question.

Machine R, working alone at a constant rate, produces x units of a product in 30 minutes, and machine S, working alone at a constant rate, produces x units of the product in 48 minutes, where x is a positive integer.

	Quantity A	Quantity B	
1.	The number of units of the product that machine R, working alone at its constant rate, produces in 3 hours	The number of units of the product that machine S, working alone at its constant rate, produces in 4 hours	(A) (B) (C) (D)

Frequency Distribution for List X

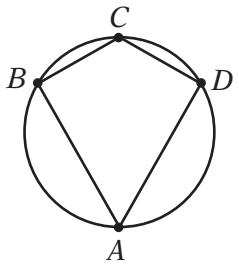
Number	1	2	3	5
Frequency	10	20	18	12

Frequency Distribution for List Y

Number	6	7	8	9
Frequency	24	17	10	9

List X and list Y each contain 60 numbers. Frequency distributions for each list are given above. The average (arithmetic mean) of the numbers in list X is 2.7, and the average of the numbers in list Y is 7.1. List Z contains 120 numbers: the 60 numbers in list X and the 60 numbers in list Y.

	Quantity A	Quantity B	
2.	The average of the 120 numbers in list Z	The median of the 120 numbers in list Z	(A) (B) (C) (D)



In the figure above, the diameter of the circle is 10.

	Quantity A	Quantity B	
3.	The area of quadrilateral $ABCD$	40	Ⓐ Ⓑ Ⓒ Ⓓ

$$x^2y > 0$$
$$xy^2 < 0$$

	Quantity A	Quantity B	
4.	x	y	Ⓐ Ⓑ Ⓒ Ⓓ

Among the 9,000 people attending a football game at College C, there were x students from College C and y students who were not from College C.

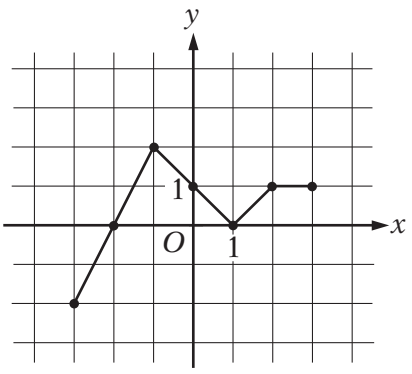
	Quantity A	Quantity B	
5.	The number of people attending the game who were not students	$9{,}000 - x - y$	Ⓐ Ⓑ Ⓒ Ⓓ

Multiple-choice Questions—Select One Answer Choice

For Questions 6 to 10, select a single answer choice.

6. If $x \neq 0$, which of the following is equivalent to $\frac{x(x^2)^3}{x^2}$?

Ⓐ x^2
Ⓑ x^3
Ⓒ x^4
Ⓓ x^5
Ⓔ x^6



7. The figure above shows the graph of the function f in the xy-plane. What is the value of $f(f(-1))$?

Ⓐ -2
Ⓑ -1
Ⓒ 0
Ⓓ 1
Ⓔ 2

8. If $\frac{d-3n}{7n-d}=1$, which of the following statements describes d in terms of n?

Ⓐ d is 4 less than n.
Ⓑ d is 4 more than n.
Ⓒ d is $\frac{3}{7}$ of n.
Ⓓ d is 2 times n.
Ⓔ d is 5 times n.

9. By weight, liquid A makes up 8 percent of solution R and 18 percent of solution S. If 3 grams of solution R are mixed with 7 grams of solution S, then liquid A accounts for what percent of the weight of the resulting solution?

Ⓐ 10%
Ⓑ 13%
Ⓒ 15%
Ⓓ 19%
Ⓔ 26%

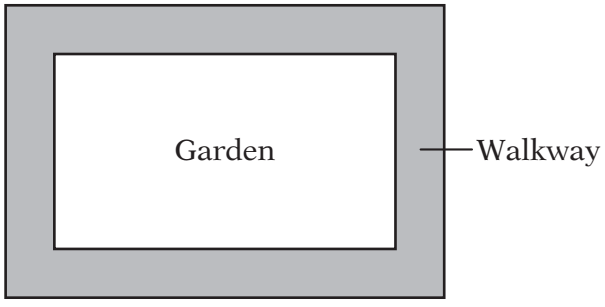
10. Of the 700 members of a certain organization, 120 are lawyers. Two members of the organization will be selected at random. Which of the following is closest to the probability that neither of the members selected will be a lawyer?

Ⓐ 0.5
Ⓑ 0.6
Ⓒ 0.7
Ⓓ 0.8
Ⓔ 0.9

Numeric Entry

For Questions 11 and 12, enter your answer in the answer box(es) below the question.

- **Your answer may be an integer, a decimal, or a fraction, and it may be negative.**
- **If a question asks for a fraction, there will be two boxes—one for the numerator and one for the denominator.**
- **Equivalent forms of the correct answer, such as 2.5 and 2.50, are all correct. Fractions do not need to be reduced to lowest terms.**
- **Enter the exact answer unless the question asks you to round your answer.**



11. The figure above represents a rectangular garden with a walkway around it. The garden is 18 feet long and 12 feet wide. The walkway is uniformly 3 feet wide, and its edges meet at right angles. What is the area of the walkway?

square feet

12. Line k lies in the xy-plane. The x-intercept of line k is -4, and line k passes through the midpoint of the line segment whose endpoints are $(2, 9)$ and $(2, 0)$. What is the slope of line k ?

Give your answer as a fraction.

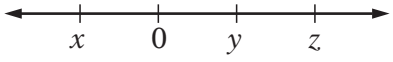
Multiple-choice Questions—Select One or More Answer Choices

For Questions 13 and 14, select all the answer choices that apply.

13. If the lengths of two sides of a triangle are 5 and 9, respectively, which of the following could be the length of the third side of the triangle?

Indicate all such lengths.

A 3
B 5
C 8
D 15



14. On the number line shown above, the tick marks are equally spaced. Which of the following statements about the numbers x, y, and z must be true?

Indicate all such statements.

A $xyz < 0$
B $x + z = y$
C $z(y - x) > 0$

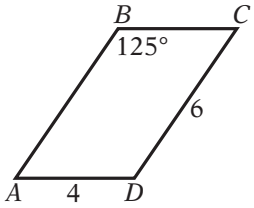
SET 3. Discrete Questions: Hard

Quantitative Comparison

For Questions 1 to 6, compare Quantity A and Quantity B, using additional information centered above the two quantities if such information is given. Select one of the following four answer choices and fill in the corresponding oval to the right of the question.

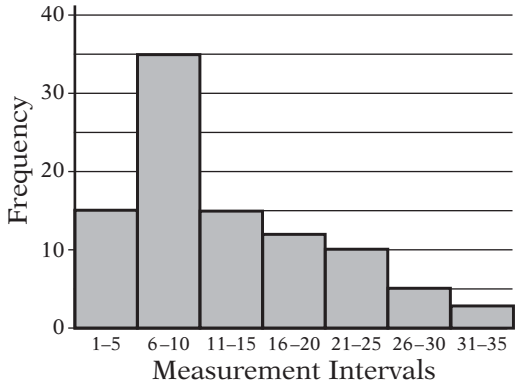
Ⓐ Quantity A is greater.
Ⓑ Quantity B is greater.
Ⓒ The two quantities are equal.
Ⓓ The relationship cannot be determined from the information given.

A symbol that appears more than once in a question has the same meaning throughout the question.



In the figure above, *ABCD* is a parallelogram.

	Quantity A	Quantity B	
1.	The area of *ABCD*	24	Ⓐ Ⓑ Ⓒ Ⓓ



In the course of an experiment, 95 measurements were recorded, and all of the measurements were integers. The 95 measurements were then grouped into 7 measurement intervals. The graph above shows the frequency distribution of the 95 measurements by measurement interval.

	Quantity A	Quantity B	
2.	The average (arithmetic mean) of the 95 measurements	The median of the 95 measurements	Ⓐ Ⓑ Ⓒ Ⓓ

x is an integer greater than 1.

	Quantity A	Quantity B				
3.	3^{x+1}	4^x	(A)	(B)	(C)	(D)

A, B, and C are three rectangles. The length and width of rectangle A are 10 percent greater and 10 percent less, respectively, than the length and width of rectangle C. The length and width of rectangle B are 20 percent greater and 20 percent less, respectively, than the length and width of rectangle C.

	Quantity A	Quantity B				
4.	The area of rectangle A	The area of rectangle B	(A)	(B)	(C)	(D)

The random variable X is normally distributed. The values 650 and 850 are at the 60th and 90th percentiles of the distribution of X, respectively.

	Quantity A	Quantity B				
5.	The value at the 75th percentile of the distribution of X	750	(A)	(B)	(C)	(D)

Set S consists of all positive integers less than 81 that are not equal to the square of an integer.

	Quantity A	Quantity B				
6.	The number of integers in set S	72	(A)	(B)	(C)	(D)

Multiple-choice Questions—Select One Answer Choice

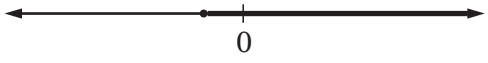
For Questions 7 to 12, select a single answer choice.

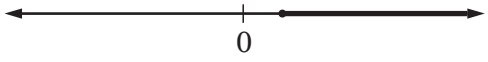
7. A manager is forming a 6-person team to work on a certain project. From the 11 candidates available for the team, the manager has already chosen 3 to be on the team. In selecting the other 3 team members, how many different combinations of 3 of the remaining candidates does the manager have to choose from?

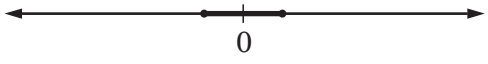
   (A) 6
   (B) 24
   (C) 56
   (D) 120
   (E) 462

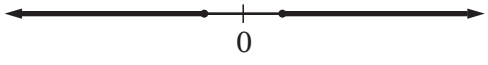
8. Which of the following could be the graph of all values of x that satisfy the inequality $2 - 5x \leq -\frac{6x - 5}{3}$?

   (A) 

   (B) 

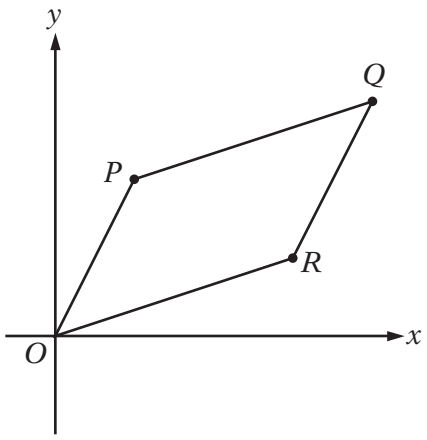
   (C) 

   (D) 

   (E) 

9. If $1 + x + x^2 + x^3 = 60$, then the average (arithmetic mean) of x, x^2, x^3, and x^4 is equal to which of the following?

   (A) $12x$
   (B) $15x$
   (C) $20x$
   (D) $30x$
   (E) $60x$



10. Parallelogram $OPQR$ lies in the xy-plane, as shown in the figure above. The coordinates of point P are $(2, 4)$ and the coordinates of point Q are $(8, 6)$. What are the coordinates of point R ?

(A) $(3, 2)$
(B) $(3, 3)$
(C) $(4, 4)$
(D) $(5, 2)$
(E) $(6, 2)$

11. The relationship between the area A of a circle and its circumference C is given by the formula $A = kC^2$, where k is a constant. What is the value of k ?

(A) $\frac{1}{4\pi}$
(B) $\frac{1}{2\pi}$
(C) $\frac{1}{4}$
(D) 2π
(E) $4\pi^2$

12. The sequence of numbers $a_1, a_2, a_3, \ldots, a_n, \ldots$ is defined by $a_n = \frac{1}{n} - \frac{1}{n+2}$ for each integer $n \geq 1$. What is the sum of the first 20 terms of this sequence?

(A) $\left(1 + \frac{1}{2}\right) - \frac{1}{20}$
(B) $\left(1 + \frac{1}{2}\right) - \left(\frac{1}{21} + \frac{1}{22}\right)$
(C) $1 - \left(\frac{1}{20} + \frac{1}{22}\right)$
(D) $1 - \frac{1}{22}$
(E) $\frac{1}{20} - \frac{1}{22}$

Numeric Entry

For Question 13, enter your answer in the answer box(es) below the question.

- **Your answer may be an integer, a decimal, or a fraction, and it may be negative.**
- **If a question asks for a fraction, there will be two boxes—one for the numerator and one for the denominator.**
- **Equivalent forms of the correct answer, such as 2.5 and 2.50, are all correct. Fractions do not need to be reduced to lowest terms.**
- **Enter the exact answer unless the question asks you to round your answer.**

Y	Frequency
$\frac{1}{2}$	2
$\frac{3}{4}$	7
$\frac{5}{4}$	8
$\frac{3}{2}$	8
$\frac{7}{4}$	9

13. The table above shows the frequency distribution of the values of a variable Y. What is the mean of the distribution?

    Give your answer to the nearest 0.01.

Multiple-choice Questions—Select One or More Answer Choices

For Questions 14 and 15, select all the answer choices that apply.

14. Let S be the set of all positive integers n such that n^2 is a multiple of both 24 and 108. Which of the following integers are divisors of every integer n in S ?

    Indicate all such integers.

    A 12
    B 24
    C 36
    D 72

15. The range of the heights of the female students in a certain class is 13.2 inches, and the range of the heights of the male students in the class is 15.4 inches.

Which of the following statements individually provide(s) sufficient additional information to determine the range of the heights of all the students in the class?

Indicate all such statements.

A The tallest male student in the class is 5.8 inches taller than the tallest female student in the class.

B The median height of the male students in the class is 1.1 inches greater than the median height of the female students in the class.

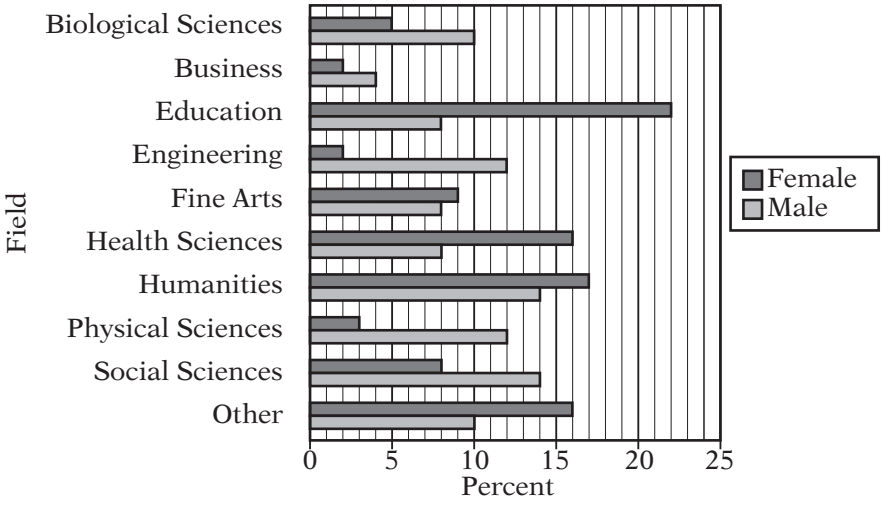
C The average (arithmetic mean) height of the male students in the class is 4.6 inches greater than the average height of the female students in the class.

SET 4. Data Interpretation Sets

For Questions 1 to 7, select a single answer choice unless otherwise directed.

Questions 1 to 3 are based on the following data.

PERCENT OF FEMALE FACULTY AND PERCENT OF MALE FACULTY
AT UNIVERSITY *X*, BY FIELD
Total female faculty: 200
Total male faculty: 250



Medium Question

1. There are 275 students in the field of engineering at University *X*. Approximately what is the ratio of the number of students in engineering to the number of faculty in engineering?

   (A) 8 to 1
   (B) 10 to 1
   (C) 12 to 1
   (D) 14 to 1
   (E) 20 to 1

Medium Question

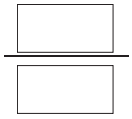
2. Approximately what percent of the faculty in humanities are male?

   (A) 35%
   (B) 38%
   (C) 41%
   (D) 45%
   (E) 51%

For Question 3, use the directions for Numeric Entry questions.

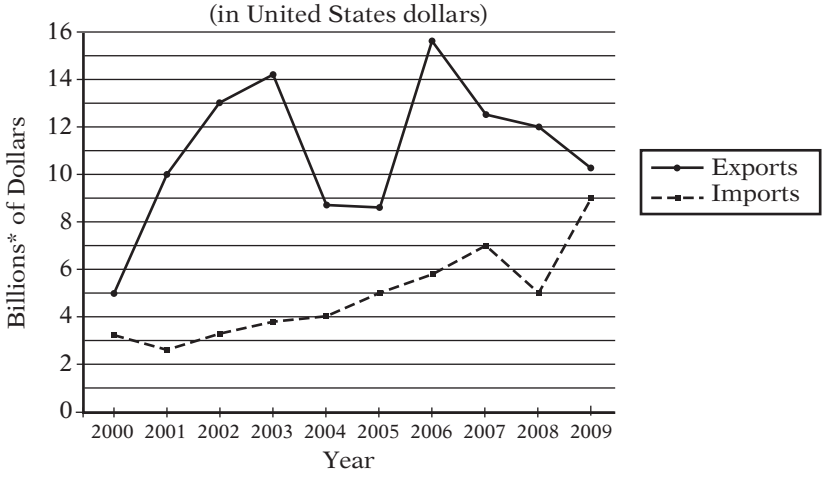
Hard Question

3. For the biological sciences and health sciences faculty combined, $\frac{1}{3}$ of the female and $\frac{2}{9}$ of the male faculty members are tenured professors. What fraction of all the faculty members in those two fields combined are tenured professors?



Questions 4 to 7 are based on the following data.

VALUE OF IMPORTS TO AND EXPORTS FROM COUNTRY *T*, 2000–2009
(in United States dollars)



*1 billion = 1,000,000,000

For Question 4, select all the answer choices that apply.

Easy Question

4. For which of the eight years from 2001 to 2008 did exports exceed imports by more than $5 billion?

Indicate all such years.

- A 2001
- B 2002
- C 2003
- D 2004
- E 2005
- F 2006
- G 2007
- H 2008

Medium Question

5. Which of the following is closest to the average (arithmetic mean) of the 9 changes in the value of imports between consecutive years from 2000 to 2009 ?

Ⓐ $260 million
Ⓑ $320 million
Ⓒ $400 million
Ⓓ $480 million
Ⓔ $640 million

Medium Question

6. In 2008 the value of exports was approximately what percent greater than the value of imports?

Ⓐ 40%
Ⓑ 60%
Ⓒ 70%
Ⓓ 120%
Ⓔ 140%

Hard Question

7. If it were discovered that the value of imports shown for 2007 was incorrect and should have been $5 billion instead, then the average (arithmetic mean) value of imports per year for the 10 years shown would have been approximately how much less?

Ⓐ $200 million
Ⓑ $50 million
Ⓒ $20 million
Ⓓ $7 million
Ⓔ $5 million

ANSWER KEY

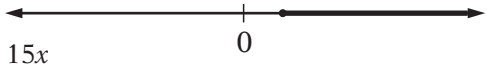
SET 1. Discrete Questions: Easy

1. **Choice A**: Quantity A is greater.
2. **Choice C**: The two quantities are equal.
3. **Choice A**: Quantity A is greater.
4. **Choice D**: The relationship cannot be determined from the information given.
5. **Choice B**: Quantity B is greater.
6. **Choice A**: Quantity A is greater.
7. **Choice C**: 4
8. **Choice D**: 12
9. **Choice A**: $10x$
10. **Choice C**: \$2.50
11. **Choice A**: 11 to 9
12. **10**
13. **13**
14. **Choice A**: Pediatrics
    AND
    Choice B: Internal Medicine
    AND
    Choice C: Surgery

SET 2. Discrete Questions: Medium

1. **Choice A**: Quantity A is greater.
2. **Choice B**: Quantity B is greater.
3. **Choice D**: The relationship cannot be determined from the information given.
4. **Choice B**: Quantity B is greater.
5. **Choice C**: The two quantities are equal.
6. **Choice D**: x^5
7. **Choice D**: 1
8. **Choice E**: d is 5 times n.
9. **Choice C**: 15%
10. **Choice C**: 0.7
11. **216**
12. $\mathbf{\frac{3}{4}}$ (or any equivalent fraction)
13. **Choice B**: 5
    AND
    Choice C: 8
14. **Choice A**: $xyz < 0$
    AND
    Choice B: $x + z = y$
    AND
    Choice C: $z(y - x) > 0$

SET 3. Discrete Questions: Hard

1. **Choice B**: Quantity B is greater.
2. **Choice A**: Quantity A is greater.
3. **Choice D**: The relationship cannot be determined from the information given.
4. **Choice A**: Quantity A is greater.
5. **Choice B**: Quantity B is greater.
6. **Choice C**: The two quantities are equal.
7. **Choice C**: 56
8. **Choice C**: 

9. **Choice B**: $15x$
10. **Choice E**: $(6, 2)$
11. **Choice A**: $\frac{1}{4\pi}$
12. **Choice B**: $\left(1+\frac{1}{2}\right)-\left(\frac{1}{21}+\frac{1}{22}\right)$
13. **1.29**
14. **Choice A**: 12
    AND
    Choice C: 36
15. **Choice A**: The tallest male student in the class is 5.8 inches taller than the tallest female student in the class.

SET 4. Data Interpretation Sets

1. **Choice A**: 8 to 1
2. **Choice E**: 51%
3. $\frac{\mathbf{24}}{\mathbf{87}}$ (or any equivalent fraction)
4. **Choice A**: 2001
   AND
   Choice B: 2002
   AND
   Choice C: 2003
   AND
   Choice F: 2006
   AND
   Choice G: 2007
   AND
   Choice H: 2008
5. **Choice E**: $640 million
6. **Choice E**: 140%
7. **Choice A**: $200 million