# Section 2
# Quantitative Reasoning

**37 Questions** | **Time: 35 minutes**

This section is divided into two parts that contain two different types of questions. As soon as you have completed Part One, answer the questions in Part Two. You may write in your test booklet. For each answer you select, remember to fill in the corresponding circle on your answer document.

Any figures that accompany the questions in this section may be assumed to be drawn as accurately as possible EXCEPT when it is stated that a particular figure is not drawn to scale. Letters such as *x*, *y*, and *n* stand for real numbers.

## PART ONE — WORD PROBLEMS

Each question in Part One consists of a word problem followed by four answer choices. You may write in your test booklet; however, you may be able to solve many of these problems in your head. Next, look at the four answer choices given and select the best answer.

EXAMPLE 1:

Sample Answer

Ⓐ Ⓑ ● Ⓓ

What is the value of the expression $3 + 7 \times (6 - 4)^2 - 8 \div 2$?

(A) 14

(B) 16

(C) 27

(D) 32

The correct answer is 27, so circle C is darkened.

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## PART TWO — QUANTITATIVE COMPARISONS

All questions in Part Two are quantitative comparisons between the quantities shown in Column A and Column B. Using the information given in each question, compare the quantity in Column A to the quantity in Column B, and choose one of these four answer choices:

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

EXAMPLE 2:

| Column A | Column B | Sample Answer |
|---|---|---|
| 5 | $\sqrt{25}$ | Ⓐ Ⓑ ● Ⓓ |

The quantity in Column A (5) is the same as the quantity in Column B (5), so circle C is darkened.

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EXAMPLE 3: $x = 6^2 - 3 \times 4$

| Column A | Column B | Sample Answer |
|---|---|---|
| $x$ | 22 | ● Ⓑ Ⓒ Ⓓ |

The quantity in Column A (24) is greater than the quantity in Column B (22), so circle A is darkened.

**STOP. Do not go on until told to do so.**

## PART ONE – WORD PROBLEMS

**Directions:** Choose the best answer from the four choices given.

1. If the average of three consecutive even numbers is 24, what is the smallest of the three numbers?

   (A) 16
   (B) 22
   (C) 24
   (D) 30

2. In the quadrilateral in Figure 3, $x$ =

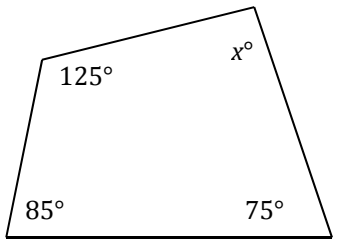


Figure 3

   (A) 255
   (B) 105
   (C) 85
   (D) 75

3. If $a❖b = a - 3b$, what is the value of $2❖4$?

   (A) 10
   (B) -2
   (C) -4
   (D) -10

4. A small town has two rectangular parks. The first park is 80 feet wide and 90 feet long, and the second park is 150 feet long and 200 feet wide. What is the average area of the two parks in square feet?

   (A) 260
   (B) 15,000
   (C) 18,600
   (D) 40,000

5. At a bike store, the number of bicycles in stock is equal to the number of tricycles in stock. If the total number of bicycle and tricycle wheels is 55, how many tricycles are there?

   (A) 9
   (B) 10
   (C) 11
   (D) 22

6. If the perimeter of a square is increased by 20%, what is the percent increase in the area of the square?

   (A) 20%
   (B) 44%
   (C) 56%
   (D) 80%

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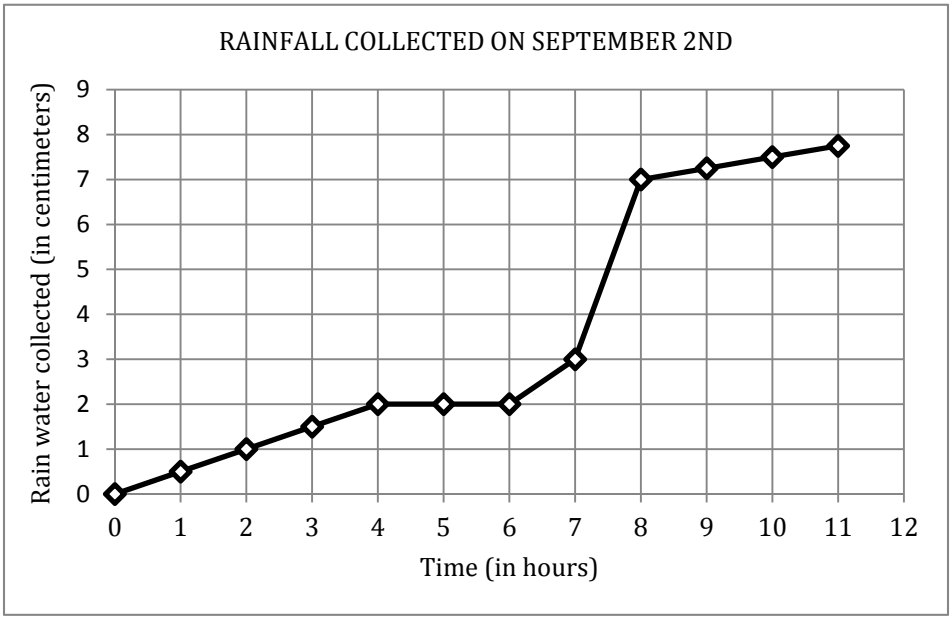
7. Natalia set up a rain gauge in her backyard to measure the amount of rainfall over a very rainy afternoon. She checked the gauge once every hour and recorded the amount of rain present inside the tube, measured in centimeters. The graph below shows the amount of rainfall collected in the tube as a function of time.




Over which time period did it rain the most?

(A) Between hours 0 – 4.
(B) Between hours 4 – 6.
(C) Between hours 6 – 7.
(D) Between hours 7 – 8.

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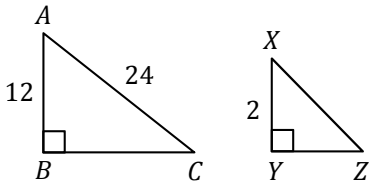
8. If $y = \frac{x}{2} - 1$, for $4 \leq x + 4 \leq 8$, which of the following is NOT a possible value for $y$?

(A) 0
(B) 0.5
(C) 1
(D) 2

9. Triangle *ABC* is similar to triangle *XYZ*. *Note: figures not drawn to scale.*




What is the value of angle *XZY*?

(A) 20º
(B) sin(1/2)
(C) tan(2/12)
(D) sin(2)

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10. If $x\Delta y = (x2 - y2)$, then $x\Delta 3 =$

    (A) $(x + 3)(x - 3)$

    (B) $(x - 3)(x - 3)$

    (C) $x2 - 3x$

    (D) $9 - y2$

11. A cubic box has a side length of 2 cm. How many of these boxes could fit inside a larger cubic box whose base has a perimeter of 24 cm?

    (A) 12

    (B) 23

    (C) 27

    (D) 36

12. If $x + y$ is divisible by 9, which of the following expressions MUST also be divisible by 9?

    (A) $2x + 2y$

    (B) $\frac{x}{y} + 9$

    (C) $(9x) + y$

    (D) $xy + 9$

13. Every person who has a certain genetic mutation *x* has a 30% likelihood of developing a particular disease. If two people with the genetic mutation *x* are randomly chosen out of the population, what is the probability that both will develop the disease?

    (A) 6%

    (B) 9%

    (C) 30%

    (D) 60%

14. James has *x* dimes, 3 quarters, and *y* ten dollar bills. Which of the following expressions represents the total amount of money he has, in dollars?

    (A) $^{x}/_{10} + 0.75 + 10y$

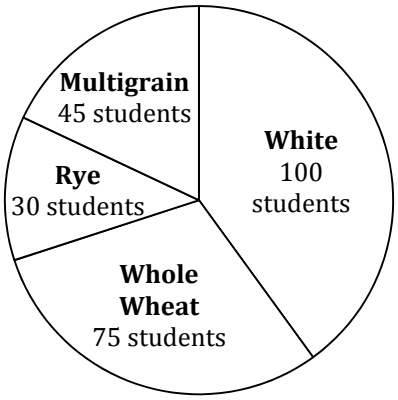
    (B) $x + y + 3(0.25)$

    (C) $^{10}/_{x} + 75 + 10y$

    (D) $10x + 0.75 + 10y$

15. Based on the pie chart showing students' cafeteria bread preferences, what percent of the students prefer whole wheat

CAFETERIA BREAD PREFERENCES




    (A) 75%

    (B) 40%

    (C) 30%

    (D) 25%

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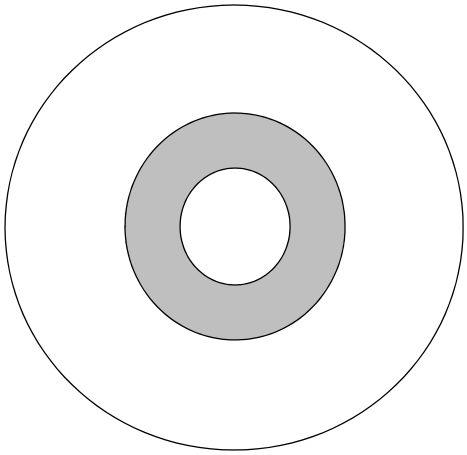
16. The circular target in the figure below is made up of three concentric circles. The entire target has a diameter of 16 inches, and the radius of each concentric circle is half as large as the next largest circle. If Sacha throws a dart at random and it hits the target, what is the chance that it lands in the shaded region?



(A) $^{1}/_{3}$

(B) $^{2}/_{9}$

(C) $^{3}/_{16}$

(D) $^{1}/_{64}$

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17. If $a - {}^{b}/_{2} = 8$, then which expression is equal to b?

(A) $2a - 16$

(B) $2(a - 2)$

(C) $^{a}/_{2} + 8$

(D) $8 + {}^{b}/_{2}$

18. Sonja has five coins, each with a "heads" side and a "tails" side. If she flips all five coins at once, what is the chance that all of the coins will land with the "heads" side facing up?

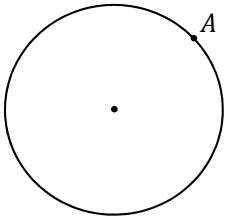
(A) $^{1}/_{2}$

(B) $^{1}/_{4}$

(C) $^{1}/_{25}$

(D) $^{1}/_{32}$

19. The figure below shows a small carousel rotating around its center. Lucy is seated on the edge of the carousel at point *A*, and travels at a rate of 4π feet per minute as the carousel spins. It takes Lucy 5 minutes to travel all the way around the carousel. What is the radius of the carousel, in feet?




(A) 5

(B) 10

(C) 15

(D) 20

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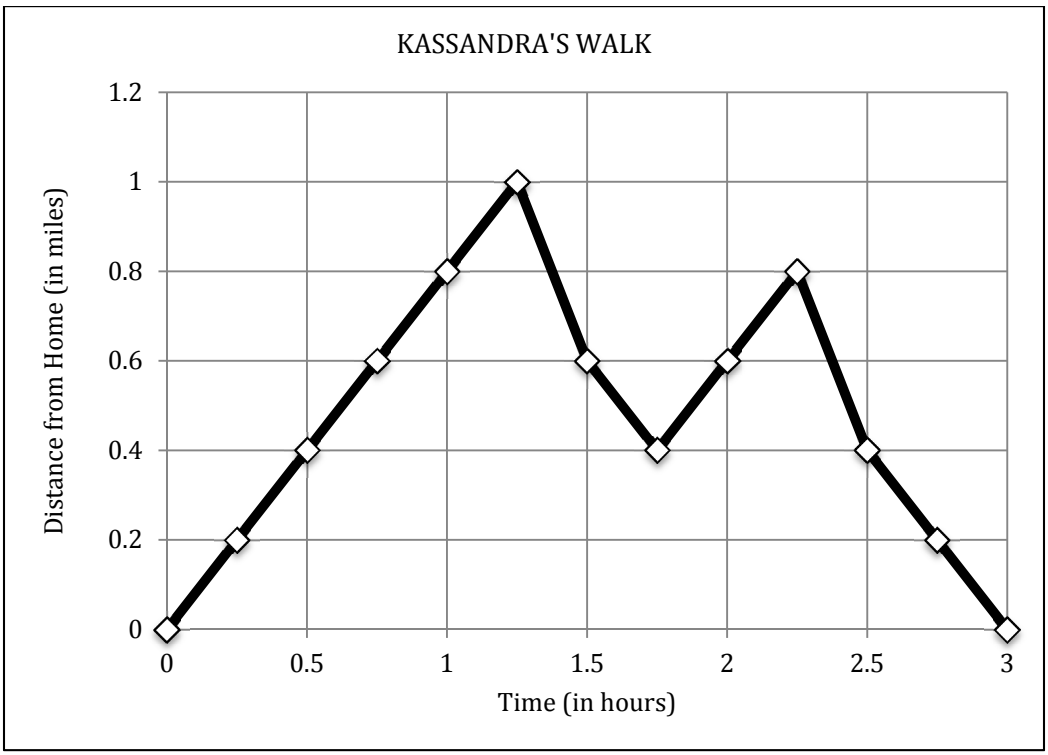
20. The graph below shows Kassandra's distance from home as a function of time during a walk.




How many miles did Kassandra walk in total?

(A) 1

(B) 1.8

(C) 2.8

(D) 3

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## PART TWO – QUANTITATIVE COMPARISONS

**Directions:** Using the information given in each question, compare the quantity in column A to the quantity in Column B. All questions in Part Two have these answer choices:

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

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| | Column A | Column B |
|---|---|---|
| 21. | $5(x+1)+3(x-2)$ | $2(4x-1)$ |

The sum of three consecutive even integers is 60.

| | Column A | Column B |
|---|---|---|
| 22. | The greatest of the three integers | 20 |

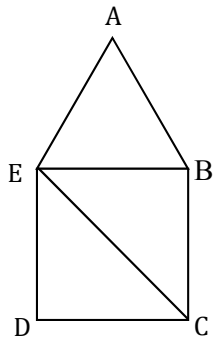
| | Column A | Column B |
|---|---|---|
| 23. | $x$ | $\sqrt{x^2}$ |

| | Column A | Column B |
|---|---|---|
| 24. | The area of a circle in units squared | The circumference of the same circle in units |

| | Column A | Column B |
|---|---|---|
| 25. | $1+(6+2)\times 8$ | 72 |

| | Column A | Column B |
|---|---|---|
| 26. | $5^0$ | $\left(-\frac{1}{2}\right)^2$ |

| | Column A | Column B |
|---|---|---|
| 27. | $a^2-b^2$ | $(a-b)^2$ |




Triangle $ABE$ is equilateral. It shares side $BE$ with square $BCDE$.

| | Column A | Column B |
|---|---|---|
| 28. | The area of triangle $ABE$ | The area of triangle $EBC$ |

$$f(x)=4x^2+9$$

| | Column A | Column B |
|---|---|---|
| 29. | $f(-5)$ | $f(5)$ |

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Harriet is holding candies in her hand: 40% of the candies in her hand are red, 20% of the candies are green, 30% of the candies are yellow, and 10% of the candies are purple. Harriet accidentally drops two candies, one after the other.

| | Column A | Column B |
|---|---|---|
| 30. | The probability that she drops a green candy and then a red candy. | The probability that she drops a red candy and then a green candy. |

The stem-and-leaf-plot below shows the scores students received on an English test.

| Stem | Leaf |
|---|---|
| 5 | 9 |
| 6 | 1 5 7 9 |
| 7 | 0 2 3 3 3 5 7 |
| 8 | 2 3 5 6 8 |
| 9 | 1 3 3 7 |

| | Column A | Column B |
|---|---|---|
| 31. | The median score on the test | The range of scores on the test |

The original price of a lamp is $50.

| | Column A | Column B |
|---|---|---|
| 32. | The price of the lamp after a 10% discount is taken off and then a 10% tax is added | $50 |

The area of a rectangle is $100cm^2$.

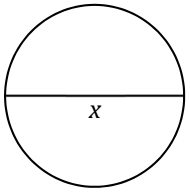
| | Column A | Column B |
|---|---|---|
| 33. | The perimeter of the rectangle | 30 cm |

| | Column A | Column B |
|---|---|---|
| 34. | The slope of the line with equation $y = 6x - 3$ | The slope of a line perpendicular to that line |

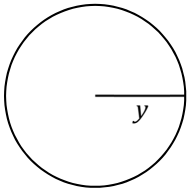
Christine runs twice as fast as Lucy. Combined, the two of them ran a total of 15 miles.

| | Column A | Column B |
|---|---|---|
| 35. | The number of miles Lucy ran | 10 |

Circle A




Circle B




*Note: Figures not drawn to scale.*

The area of Circle A is $9\pi$ cm$^2$. The circumference of Circle B is $10\pi$ cm.

| | Column A | Column B |
|---|---|---|
| 36. | $x$ | $y$ |

| | Column A | Column B |
|---|---|---|
| 37. | The slope of the line connecting the points $(0, 7)$ and $(-3, 5)$ | The slope of the line connecting the points $(2, 8)$ and $(8, 2)$ |

**STOP. Do not go on until told to do so.**