CHAPTER 9

Chapter Standardized Test

TEST-TAKING STRATEGY During a test, draw graphs and figures in your test booklet to help you solve problems. Even though you must keep your answer sheet neat, you can make any kind of mark you want in your test booklet.

1. **MULTIPLE CHOICE** The variable x varies inversely with y. When $x = 6$, $y = 6.5$. Which equation relates x and y?

   (A) $xy = 39$ (B) $xy = 11.5$ (C) $xy = \frac{1}{2}$

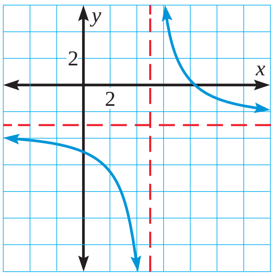
   (D) $y = \frac{1}{2}x$ (E) $y = 39x$

2. **MULTIPLE CHOICE** The variable z varies jointly with x and y. When $x = 6$ and $y = \frac{1}{3}$, $z = 30$. Which equation relates x, y, and z?

   (A) $z = 30xy$ (B) $30 = xyz$ (C) $z = 15xy$

   (D) $z = \frac{1}{30}xy$ (E) $z = \frac{1}{15}xy$

3. **MULTIPLE CHOICE** Which function is graphed?



   (A) $y = \frac{10}{x+5} - 3$ (B) $y = \frac{10}{x-5} - 3$

   (C) $y = \frac{10}{x+5} + 3$ (D) $y = \frac{10}{x-5} + 3$

   (E) $y = \frac{10}{x-5}$

4. **MULTIPLE CHOICE** What is the quotient $(x + 2) \div \frac{x^2 - 9x - 22}{x^2 - 121}$?

   (A) $x + 11$ (B) $\frac{x+11}{x+2}$ (C) $\frac{x+2}{x+11}$

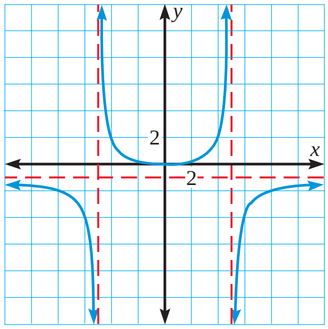
   (D) $\frac{x+2}{x-11}$ (E) $x + 2$

5. **MULTIPLE CHOICE** What are all the solutions of the equation $\frac{-10}{x-9} = \frac{x}{2}$?

   (A) $-4, -5$ (B) $4, -5$ (C) 4

   (D) 5 (E) $4, 5$

6. **MULTIPLE CHOICE** Which function is graphed?



   (A) $y = \frac{-x^2}{x^2 - 25}$ (B) $y = \frac{-3x^2}{x^2 - 16}$

   (C) $y = \frac{-3x^2}{x^2 - 25}$ (D) $y = \frac{3x^2}{x^2 - 25}$

   (E) $y = \frac{-3x^2}{x^2 + 25}$

7. **MULTIPLE CHOICE** What is the difference $\frac{8x-3}{x^2+2x-35} - \frac{7}{x^2-25}$?

   (A) $\frac{2(4x^2 + 15x - 17)}{(x^2 + 2x - 35)(x + 5)}$

   (B) $\frac{2(4x^2 + 15x + 32)}{(x^2 + 2x - 35)(x + 5)}$

   (C) $\frac{2(4x^2 + 15x + 17)}{(x^2 + 2x - 35)(x + 5)}$

   (D) $\frac{2(4x^2 + 15x - 32)}{(x^2 + 2x - 35)(x + 5)}$

   (E) $\frac{2(4x^2 + 15x - 32)}{(x^2 + 2x - 35)(x^2 - 25)}$

8. **MULTIPLE CHOICE** What is the simplified form of the following complex fraction?

$$\frac{\frac{10}{x+1}}{\frac{1}{2} + \frac{3}{x+1}}$$

   (A) $\frac{20x}{x+7}$ (B) $\frac{20}{x+7}$ (C) $\frac{10}{x+7}$

   (D) $\frac{10(x+7)}{x+1}$ (E) 20

9. QUANTITATIVE COMPARISON Choose the statement that is true about the given quantities.

Ⓐ The quantity in column A is greater.

Ⓑ The quantity in column B is greater.

Ⓒ The two quantities are equal.

Ⓓ The relationship cannot be determined from the given information.

Column A	Column B
The solution of $\frac{x-4}{x+1} = \frac{7}{2}$	The solution of $\frac{5}{x} - \frac{8}{3} = \frac{1}{12x}$

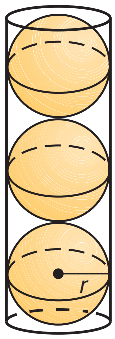
10. MULTI-STEP PROBLEM For parts (a)–(d), graph the function and identify the point at which the horizontal and vertical asymptotes intersect.

a. $y = \frac{2}{x}$ **b.** $y = \frac{2}{x-1} + 3$ **c.** $y = \frac{2}{x-1} - 3$ **d.** $y = \frac{2}{x+1} + 3$

e. Use your answers to parts (a)–(d) to predict the point of intersection of the asymptotes of the graph of $y = \frac{2}{x+1} - 3$. Check your prediction by graphing.

f. CRITICAL THINKING Generalize your results for any function of the form $y = \frac{a}{x-h} + k$.

11. MULTI-STEP PROBLEM Three tennis balls fit tightly in a can as shown. Recall that the formula for the volume of a cylinder is $V = \pi r^2 h$ and the formula for the volume of a sphere is $V = \frac{4}{3}\pi r^3$.



a. Write an expression for the height of the can, h, in terms of r. Rewrite the formula for the volume of a cylinder with r as the only variable.

b. Find the ratio of the volume of the three tennis balls to the volume of the can.

c. *Writing* Do you think using a cylindrical can is an efficient way of packaging tennis balls? Explain your reasoning.

12. MULTI-STEP PROBLEM The length l and width w of a *golden rectangle* satisfy the equation $\frac{l}{w} = \frac{l+w}{l}$. The ratio $\frac{l}{w}$ is called the *golden ratio*. For centuries, golden rectangles have been known to be very pleasing to the human eye.

a. Rewrite the right side of the equation as a complex fraction by dividing each term of the numerator and denominator by w.

b. Let g represent the golden ratio, so $g = \frac{l}{w}$. Substitute g for each occurrence of $\frac{l}{w}$ in the equation from part (a) and simplify the equation.

c. Solve the equation from part (b) for g. (*Hint:* Use the quadratic formula.) Write an exact value and an approximate value for the golden ratio.

d. **GEOMETRY CONNECTION** Use a ruler or graph paper to draw an accurate golden rectangle of any size. Label the dimensions of your rectangle.