

Simplify. Write the answer with positive exponents.

$$1) \left(\frac{9x^3y^5}{18x^{-3}y^{-3}} \right)^{-2}$$

Simplify the radical expression. Assume that all variables represent positive real numbers.

$$2) \sqrt[3]{729x^5y^7}$$

Rationalize the denominator and simplify. Assume that all variables represent positive real numbers.

$$3) \frac{\sqrt{15}}{\sqrt{10} - \sqrt{6}}$$

Perform the indicated operation. Simplify if possible.

$$4) \frac{5x}{x+1} + \frac{6}{x-1} - \frac{10}{x^2-1}$$

$$5) (-3x^3 - 9x^2 - 1x + 22) \div (x + 2) \text{ (Use synthetic division)}$$

Factor the polynomial completely.

$$6) (7x + y)^2 - 9$$

$$7) 512x^3 + y^3$$

Solve the equation.

$$8) \frac{4}{x+4} - \frac{2}{x-4} = \frac{10}{x^2-16}$$

$$9) 2x^{2/3} - 2x^{1/3} - 12 = 0$$

$$10) 32x = \sqrt{1 - 48x}$$

Solve the system of equations.

$$11) \begin{cases} x + y = 1 \\ -2x + 4y + 5z = 48 \\ x - z = -8 \end{cases}$$

$$12) \begin{cases} 4x^2 - 2y^2 = 28 \\ 2x^2 + 5y^2 = 38 \end{cases}$$

Solve the inequality. Write the solution set in interval notation and graph the solution set.

$$13) \left| \frac{11y + 44}{4} \right| > 11$$

$$14) 4x^2 - 3x \geq 7$$

Find an equation of the line. Write the equation in standard form.

15) Slope $-\frac{5}{6}$; through (2, 4)

16) Through (4, 2); perpendicular to $4x - 7y = 4$

Solve the problem.

17) A boat moves 6 kilometers upstream in the same amount of time it moves 18 kilometers downstream. If the rate of the current is 8 kilometers per hour, find the rate of the boat in still water.

18) A chemist needs 90 milliliters of a 56% solution but has only 35% and 62% solutions available. Find how many milliliters of each that should be mixed to get the desired solution.

19) The size of the beaver population at a national park increases at the rate of 5% per year. If the size of the current population is 182, find how many beavers there should be in 5 years. Use $y = y_0e^{0.05t}$ and round to the nearest whole number.

Sketch the graph of the equation. If the graph is a parabola, find its vertex. If the graph is a circle, find its center and radius. If the graph is an ellipse or hyperbola, find the center and the values of a and b.

20) $\frac{(x-2)^2}{4} - \frac{(y-2)^2}{36} = 1$

Graph the system.

21)
$$\begin{cases} x^2 + y^2 \leq 25 \\ \frac{x^2}{9} + \frac{y^2}{64} \geq 1 \end{cases}$$

Find the indicated term of the sequence.

22) The fifteenth term of the arithmetic sequence $-3, -7, -11, \dots$

23) The sixth term of the geometric sequence $\frac{1}{8}, \frac{5}{8}, \frac{25}{8}, \dots$

Evaluate the expression.

24) $\sum_{i=1}^4 (4i - 3)$

Find the sum of the terms of the infinite geometric sequence.

25) $2, \frac{2}{3}, \frac{2}{9}, \dots$

Answer Key

Testname: 125PREFINGWTST

1) $\frac{4}{x^{12}y^{16}}$

2) $9xy^2\sqrt[3]{yx^2}$

3) $\frac{5\sqrt{6} + 3\sqrt{10}}{4}$

4) $\frac{5x - 4}{x - 1}$

5) $-3x^2 - 3x + 5 + \frac{12}{x + 2}$

6) $(7x + y + 3)(7x + y - 3)$

7) $(8x + y)(64x^2 - 8xy + y^2)$

8) $x = 17$

9) $27, -8$

10) $\frac{1}{64}$

11) $(-4, 5, 4)$

12) $(3, 2), (-3, 2), (3, -2), (-3, -2)$

13) $(-\infty, -8) \cup (0, \infty)$

14) $(-\infty, -1] \cup [\frac{7}{4}, \infty)$

15) $5x + 6y = 34$

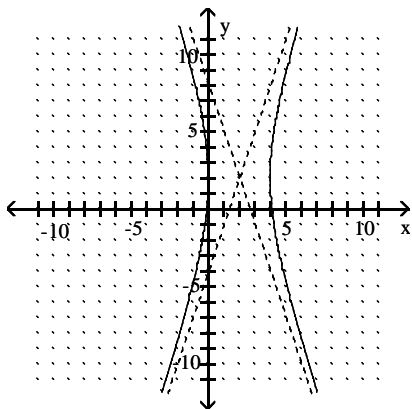
16) $7x + 4y = 36$

17) 16 kilometers per hour

18) 20 ml of 35%; 70 ml of 62%

19) 234 beavers

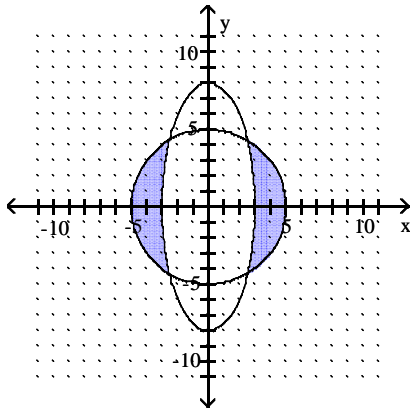
20)



Answer Key

Testname: 125PREFINGWTST

21)



22) $a_{15} = -59$

23) $a_6 = \frac{3125}{8}$

24) 28

25) 3