

1. Simplify. Use positive exponents for any variables.

$$\frac{5a^{-7}b^4}{15a^3b^{-2}}$$

$$\frac{5a^{-7}b^4}{15a^3b^{-2}} = \square$$

(Use integers or fractions for any numbers in the expression. Type exponential notation with positive exponents.)

2. Find an equation of the line. Write the equation using function notation.

Through $(6, -1)$; perpendicular to $4y = x - 8$

The equation of the line is $f(x) = \square$.

3. Solve the equation.

$$\frac{4t^2}{5} = \frac{-3t}{5} + \frac{9}{10}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution(s) is/are $t = \square$.
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)
- B. There is no solution.

4. Use the quadratic formula to solve the equation.

$$(m + 3)(5m + 1) = 3(m - 4) + 7$$

$$m = \square$$

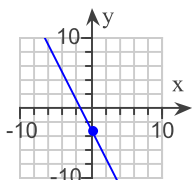
(Simplify your answer. Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)

5. Match the following equation with its graph.

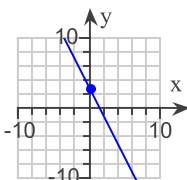
$$y = -2x + 3$$

Choose the correct graph below.

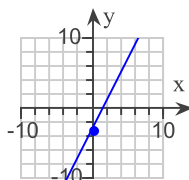
A.



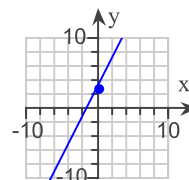
B.



C.



D.



6. Perform the indicated operation.

$$(-8x^3 - 12x^2 + 2x - 11) - (-3x^3 - 8x^2 + 7x - 12)$$

$$(-8x^3 - 12x^2 + 2x - 11) - (-3x^3 - 8x^2 + 7x - 12) = \square$$

(Simplify your answer. Do not factor.)

7. Find the slope and y-intercept of the line.

$$7x - 5y = -35$$

Find the slope. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The slope of the line is . (Simplify your answer. Type an integer or a fraction.)

B. The slope of the line is undefined.

Find the y-intercept. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The y-intercept is . (Simplify your answer. Type an ordered pair.)

B. There is no y-intercept.

8. Solve the equation.

$$2(x - 6) + x = 3(x - 5) + 3$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $x = \square$ (Simplify your answer.)
- B. The solution is all real numbers.
- C. There is no solution.

9. Find the domain of the rational function.

$$R(x) = \frac{-6 + 7x}{x^3 - 5x^2 + 6x}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain is $\{x \mid x \text{ is a real number and } x \neq \square\}$.
(Simplify your answer. Type an integer or a fraction. Use a comma to separate answers as needed.)
- B. The domain is $\{x \mid x \text{ is a real number}\}$.

10. A spotlight is mounted on the eaves of a house 40 feet above the ground. A flower bed runs between the house and the sidewalk, so the closest the ladder can be placed to the house is 9 feet. How long a ladder is needed so that an electrician can reach the place where the light is mounted?

The length of the ladder needs to be ft.

11. In 2006, the population of a country was 48.6 million people. From 2006 to 2050, the country's population is expected to decrease by 7.4%. Find the expected population of the country in 2050. Round to the nearest tenth of a million.

The population in 2050 will be million. (Round to the nearest tenth of a million.)

12. Solve the equation.

$$\frac{x^2 - 13}{2x^2 - 13x + 20} + \frac{-1}{x - 4} = \frac{-1}{2x - 5}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $x = \square$ (Use a comma to separate answers as needed.)
- B. There is no solution.

13. The amount P of pollution varies directly with the population N of people. City A has a population of 442,000 and produces 260,000 tons of pollutants. Find how many tons of pollution we should expect City B to produce, if we know that its population is 350,000.

City B produces tons of pollution.

(Do not round until the final answer. Then round to the nearest ton as needed.)

14. A principal of \$7000 is invested in an account paying an annual rate of 4%. Find the amount in the account after 3 years if the account is compounded semiannually, quarterly, and monthly.

(a) The amount in the account after 3 years if the account is compounded semiannually is \$.

(Round to the nearest cent.)

(b) The amount in the account after 3 years if the account is compounded quarterly is \$.

(Round to the nearest cent.)

(c) The amount in the account after 3 years if the account is compounded monthly is \$.

(Round to the nearest cent.)

15. Find the product.

$$(2x + 6)^2$$

$$(2x + 6)^2 = \text{}$$

16. Solve the equation.

$$\frac{m - 31}{6} - \frac{6m - 19}{7} = 1$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $m = \text{}$ (Simplify your answer.)
- B. The solution is all real numbers.
- C. There is no solution.

17. Use the quotient rule to simplify.

$$\frac{-15a^7b^5c^9}{3a^4b^2c^7}$$

$$\frac{-15a^7b^5c^9}{3a^4b^2c^7} = \square$$

(Type your answer using exponential notation.)

18. Use the product rule to simplify the expression.

$$(-4x^4p^3)(6y^6x^4)$$

$$(-4x^4p^3)(6y^6x^4) = \square$$

19. The average annual number of cigarettes smoked by an adult in some country continues to decline. For the years 1997-2006, the equation $y = -49.5x + 1756.4$ approximates this data. Here, x is the number of years after 1997 and y is the average annual number of cigarettes smoked. If this trend continues, find the year in which the average annual number of cigarettes smoked is zero. To do this, let $y = 0$ and solve for x .

In \square , the average annual number of cigarettes smoked will be 0.

(Round down to the nearest year.)

20. Simplify by factoring. Assume that all variables under radicals represent nonnegative numbers.

$$\sqrt{49x^6}$$

Select the correct choice below and, if necessary, fill in the answer box that completes your choice.

A. $\sqrt{49x^6} = \square$

(Type an exact answer, using radicals as needed.)

B. The square root is not a real number.

21. Simplify.

$$\left(\frac{2x^{-4}}{y^{-2}}\right)^{-3}$$

$$\left(\frac{2x^{-4}}{y^{-2}}\right)^{-3} = \square \text{ (Use positive exponents only.)}$$

22. Solve the compound inequality.

$$-3 \leq \frac{-2x + 3}{5} \leq 4$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set is .
(Type your answer in interval notation. Simplify your answer. Use integers or fractions for any numbers in the expression.)
- B. The solution set is \emptyset .

23. In 2006, the median price of an existing home in some country was approximately \$230,600. In 2001, the median price of an existing home was \$159,100. Let y be the median price of an existing home in the year x , where $x = 0$ represents 2001.

a. Write a linear equation that models the median existing home price in terms of the year x . [Hint: The line must pass through the points $(0, 159100)$ and $(5, 230600)$.]

$$y = \square$$

(Type your answer in slope-intercept form.)

b. Use this equation to predict the median existing home price for the year 2010.

$$y = \$\square$$

c. Interpret the slope of the equation found in part a.

Choose the correct answer below.

- A. Every year, the median price of a home increases by \$159,100.
- B. Every year, the median price of a home decreases by \$14,300.
- C. Every year, the median price of a home increases by \$14,300.
- D. Every year, the median price of a home decreases by \$159,100.

24. Simplify the rational expression.

$$\frac{x^2 - 3x - 18}{x - 6}$$

$$\frac{x^2 - 3x - 18}{x - 6} = \square$$

25. Solve.

$$\sqrt{7-x} = x - 1$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $x =$
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)
- B. There is no real solution.
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