

Algebra 2 Midterm Exam

Algebra II Midterm Exam

Name: _____

Score: _____ / _____

Answer the questions below. Make sure to show your work and justify all of your answers

1. Simplify: $\frac{\sqrt[4]{400}}{\sqrt[4]{5}}$ Show your work.

2. For the given quadratic equation convert into vertex form, find the vertex, and find the value for $x = 6$. Show your work.

$$y = -2x^2 + 2x + 2$$

3. A manufacturer of shipping boxes has a box shaped like a cube. The side length is $(5a + 4b)$. What is the volume of the box in terms of a and b ? Show your work.

Algebra 2 Midterm Exam

4. If a function, $f(x)$ is shifted to the left four units, what will the transformed function look like?
5. Solve the problem by writing an inequality. A club decides to sell T-shirts for \$12 as a fund-raiser. It costs \$20 plus \$8 per T-shirt to make the T-shirts. Write and solve an equation to find how many T-shirts the club needs to make and sell in order to profit at least \$100. **Show your work.**
6. The velocity of sound in air is given by the equation $v = 20\sqrt{273 + t}$, where v is the velocity in meters per second and t is the temperature in degrees Celsius. Find the temperature when the velocity is 329 meters per second by graphing the equation. Round the answer to the nearest degree. **Show your work.**
7. The volume in cubic feet of a box can be expressed as $V(x) = x^3 - 6x^2 + 8x$, or as the product of three linear factors with integer coefficients. The width of the box is $x - 2$. Factor the polynomial to find linear expressions for the height and the length. **Show your work.**
8. What is the solution to the equation $\sqrt{2x + 8} - 6 = 4$. **Show your work.**

Algebra 2 Midterm Exam

9. Solve the equation. Check for extraneous solutions. Type your answers in the blanks.
Show your work.

$$|4x + 3| = 9 + 2x$$

x = _____ or _____

10. Write an expression for the volume of a cylinder with a height 7in. greater than the radius.

11. What is the value of $\log_{81} 3$? **Show your work.**

12. In an experiment, a petri dish with a colony of bacteria is exposed to cold temperatures and then warmed again.

Time (hours)	0	1	2	3	4	5	6
Population (1000s)	5.1	3.03	1.72	1.17	1.38	2.35	4.08

Find a quadratic model for the data in the table. Type your answer below. **Show your work.**

13. Use the model from problem 12 to estimate the population of bacteria at 9 hours.

Type your answer below. **Show your work.**

Algebra 2 Midterm Exam

14. Evaluate the expression for the given value of the variable(s). **Show your work.**

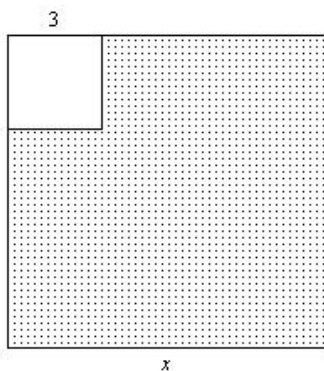
$$\frac{4(3h - 6)}{1 + h}; h = -2:$$

15. Find a quadratic model for the set of values: $(-2, -20)$, $(0, -4)$, $(4, -20)$. **Show your work.**

16. Simplify the expression. Type your answer in the blank.

$$-|-13| = \underline{\hspace{2cm}}$$

17. Suppose you cut a small square from a square of fabric as shown in the diagram. Write an expression for the remaining shaded area. **Factor the expression.** Type your answer below.



Algebra 2 Midterm Exam

18. Is the relation $\{(3, 5), (-4, 5), (-5, 0), (1, 1), (4, 0)\}$ a function? **Explain.** Type your answer below.

19. Evaluate $\sqrt{7x}(\sqrt{x} - 7\sqrt{7})$ **Show your work.**

20. Consider the leading term of the polynomial function. What is the end behavior of the graph? Describe the end behavior and provide the leading term.

$$-3x^5 + 9x^4 + 5x^3 + 3$$