

TEST NAME: Fall SOY Checkpoint Algebra II Content
TEST ID: 34
GRADE: 08 - 12
SUBJECT: Mathematics
TEST CATEGORY: Start of Year Checkpoint

08/10/20, Fall SOY Checkpoint Algebra II Content

Student: _____

Class: _____

Date: _____

Instructions

The Algebra II test has two subparts. Each subpart contains different types of questions. To begin the test, click the "Next" arrow button at the top.

Read the passage - 'VH939065_directions' - and answer the question below:

VH939065_directions

Subpart 1 of this test contains different types of assessment questions in Algebra II. You may make notes on scratch paper or use the Notepad tool within the online test. Make sure you answer all the questions. You MAY NOT use a calculator in Subpart 1 of this test.



1. What is the value of x in the following equation?

$$\sqrt{x-4} = 9$$

- A. $x = 7$
- B. $x = 10$
- C. $x = 85$
- D. $x = 169$
-
2. Which of these is a formula that can be used to determine the n th term of the arithmetic sequence $15, 27, 39, 51, \dots$?

- A. $a_n = 3n + 12$
- B. $a_n = 12n + 3$
- C. $a_n = 12n + 15$
- D. $a_n = 15n + 12$

3. Which property was used to rewrite the equation $2^x - 7 = 1$ as $2^x = 8$?
- A. Addition Property of Equality
 - B. Commutative Property
 - C. Multiplicative Inverse
 - D. Substitution Property of Equality
4. Which number, when raised to the power of 5, equals 2?
- A. $\frac{1}{5}$
 - B. $\frac{2}{5}$
 - C. $2^{\frac{1}{5}}$
 - D. $32^{\frac{1}{5}}$
5. Which expression shows $(\sqrt[3]{8x})^2$ rewritten with rational exponents?
- A. $3(8x)^{\frac{1}{2}}$
 - B. $2\left(8x^{\frac{1}{3}}\right)$
 - C. $\left(8x^{\frac{1}{2}}\right)^3$
 - D. $(8x)^{\frac{2}{3}}$

6. Select **all** expressions that are equivalent to $3x^5 - 6x^4y + 3x^3y^2$.

Pick up to 5 answers.

- A. $3x^3(x-y)^2$
- B. $3x^3(x^2 - 2xy + y^2)$
- C. $3x^3(x+y)^2$
- D. $3x^3(x-y)(x+y)$
- E. $3x^3(x-y)(x-y)$

Read the passage - 'VH938994_directions' - and answer the question below:

VH938994_directions

Subpart 2 of this test contains different types of assessment questions in Algebra II. You may make notes on scratch paper or use the Notepad tool within the online test. Make sure you answer all the questions. You MAY use a calculator in Subpart 2 of this test.



7. Every year Beth doubles the amount of money she donates to charity. She donated \$1 to charity at age 10.

How much money will she donate at age 20?

- A. \$21
- B. \$41
- C. \$512
- D. \$1,024

8. A post is being driven into the ground. The first strike drives the post 25 inches into the ground. Each additional strike drives the stake $\frac{4}{5}$ the distance farther into the ground than the previous strike (20 inches, 16 inches, . . .).

What is the total distance (to the nearest inch) that the post is driven into the ground after 7 strikes?

- A. 79
- B. 92
- C. 99
- D. 104
9. Joyce deposited \$5000 in an account with an annual interest rate of 6%, compounded annually. How much money will be in the account 10 years later?

- A. \$3954.24
- B. \$5600.00
- C. \$8000.00
- D. \$8954.24

10. The functions $f(x) = (x - 2)^2$ and $g(x) = 4 - x^2$ are graphed on a coordinate plane.

What is the relationship between the graphs and the solutions of the equation

$$(x - 2)^2 = 4 - x^2 ?$$

- A. $x = 0$ and $x = 2$ are solutions because $f(0) = g(0)$ and $f(2) = g(2)$.
- B. The ordered pair $(0, 4)$ is the solution because $f(0) = 4$ and $g(0) = 4$.
- C. $x = -2$ and $x = 2$ are solutions because they are the x -intercepts of both functions.
- D. The ordered pair $(2, 0)$ is the solution because it is the only point where the graphs of both $f(x)$ and $g(x)$ cross the x -axis.

11. A decorative fence surrounds a rectangular flower garden that is 2 yards long and 3 yards wide. The area of the garden is increased by 20% .

If the width remains the same, what is the new length of the garden?

- A. 1.6 yards
- B. 2.4 yards
- C. 3.6 yards
- D. 7.2 yards

12. Consider the functions shown.

$$f(x) = |x + 2|$$

$$g(x) = x + 8$$

What is the solution to $f(x) = g(x)$?

- A. $(-5, 3)$
- B. $(-3, 1)$
- C. $(-2, -8)$
- D. $(0, 8)$

13. A polynomial, $f(x)$, is divided by four different linear expressions, as listed in the table. The resulting remainders after the division by each linear expression are as shown in the table.

Linear Expression	Remainder
$x - 1$	0
$x + 1$	-4
$x - 3$	2
$x + 3$	0

Which must be a root of the polynomial equation?

- A. -3
- B. -1
- C. 2
- D. 3
14. A craft store sells wooden boxes shaped like rectangular prisms. They come in heights from 5 inches to 10 inches. The table represents the function $f(x)$, which gives the volume of a box as a function of its height.

Height (in.)	5	6	7	8	9	10
Volume (in. ³)	210	336	504	720	990	1,320

Which statements accurately describe the function $f(x)$?

Select **all** that apply.

Pick up to 5 answers.

- A. The function is increasing.
- B. The volume increases by a common factor of 1.6.
- C. The function is decreasing.
- D. The function is **not** linear.
- E. The maximum value of the function is 1,320.

15. Four students rewrote the function $y = 6x^2 + 27x - 15$ in factored form and stated the zeros.

Which solution correctly shows the function in factored form and identifies the zeros of the function?

A. $y = (6x - 3)(x + 5)$
zeros: 2 and -5

B. $y = (6x - 3)(x + 5)$
zeros: -2 and 5

C. $y = 3(2x - 1)(x + 5)$
zeros: -0.5 and 5

D. $y = 3(2x - 1)(x + 5)$
zeros: 0.5 and -5

16. Which system of equations has only **one** solution?

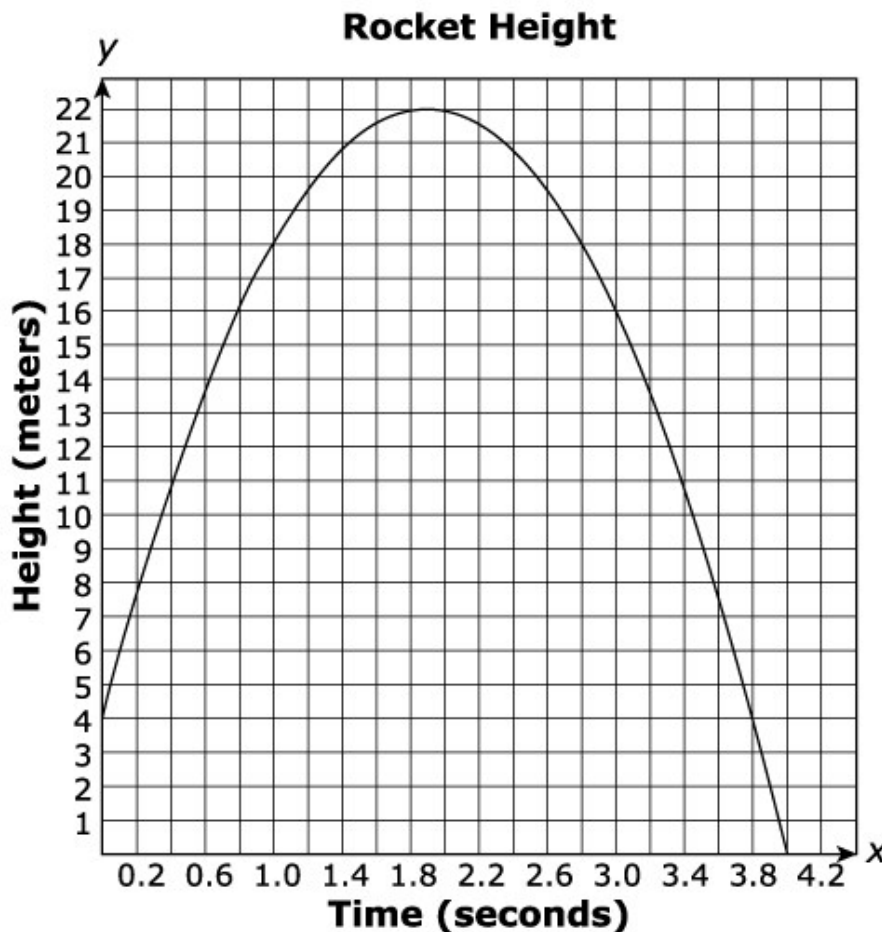
A. $y = x + 5$ and $y = -3x + 6$

B. $y = x - 2$ and $y = x + 4$

C. $y = |x - 5|$ and $y = 0.2x + 1$

D. $y = x^2 - 1$ and $y = 1.5x + 1$

17. The graph of $h(x)$ shows the height, in meters, of a rocket x seconds after it was launched from a platform.



Which statements accurately describe the function $h(x)$?

Select **all** that apply.

Pick up to 5 answers.

- A. The graph changes from increasing to decreasing.
- B. The range is $4 \leq y \leq 22$.
- C. The rocket is in the air for 4 seconds.
- D. The rocket reaches a maximum height of 22 meters.
- E. The rocket has a greater distance to travel upward than downward.

18. What are the real zeros of the function $f(x) = x^4 - 3x^3 + 2x^2 - 6x$?

- A. $x = 0$ and $x = 3$
- B. $x = 0$ and $x = -3$
- C. $x = -\sqrt{2}$, $x = 0$, $x = \sqrt{2}$, and $x = -3$
- D. $x = -\sqrt{2}$, $x = 0$, $x = \sqrt{2}$, and $x = 3$

19. Which expressions are equivalent to $27^{\frac{4}{3}}$?

Select **three** correct answers.

Pick up to 6 answers.

- A. 4^3
- B. $(27^{\frac{1}{3}})^4$
- C. $3^{\frac{1}{4}}$
- D. 81
- E. $3\sqrt{4}$
- F. $(\sqrt[3]{27})^4$

20. The value of a motorcycle each year follows the sequence \$12,000, \$9,600, \$7,680, \$6,144, ...

Which formula represents the recursive definition of the sequence where n represents the number of years?

- A. $a_n = a_{n-1}(0.8)$
- B. $a_n = a_{n-1} - 2,400$
- C. $a_n = a_{n+1}(0.8)$
- D. $a_n = a_{n-1}\left(\frac{5}{4}\right)$

21. Consider the following studies:

- Study 1: Researchers want to know if a certain type of plant grows larger in soil treated with a supplement compared to soil that is not treated.
- Study 2: Researchers want to know what percent of people approve of the president's decisions.
- Study 3: Researchers want to know the relationship between attending private or public school and attendance rates.

Mark the boxes in the table that match each study to the **most** appropriate study design.

	Survey	Experiment	Observational study
Study 1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Study 2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Study 3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. A circle is cut in half. Then one of the halves is cut in half again. This repeats a number of times. The area of the original circle was 144π square centimeters.

Which function $f(x)$ represents the area of the smallest piece of the circle after x cuts?

- A. $f(x) = 144\pi(0.5)x$
- B. $f(x) = 144\pi - (0.5)x$
- C. $f(x) = 144\pi(0.5)^x$
- D. $f(x) = 144\pi - (0.5)^x$