Tennessee Comprehensive Assessment Program
TCAP

TNReady — Algebra II Part II
PRACTICE TEST

Student Name

Teacher Name

Tennessee Department of Education
Directions

Subtest 1 of this Practice Test booklet contains constructed-response items and selected-response items in Algebra II. For constructed-response items, write your answer in the space provided. For selected-response items, circle the correct answer(s).

You **MAY NOT** use a calculator in Subtest 1 of this test booklet.

Sample A: Constructed-Response

The sum of two consecutive odd integers is 72.

1. Write an algebraic equation to determine the two integers.
2. What are the two integers?

Write your answers in the spaces provided.

1. 
2. 

Sample B: Selected-Response

Factor the polynomial:

\[ s^2 + 12s + 32 \]

A. \((s + 4)(s - 8)\)
B. \((s - 2)(s + 16)\)
C. \((s + 4)(s + 8)\)
D. \((s + 16)(s + 2)\)

Sample Answers

A. 
1. \(x + x + 2 = 72\)
2. \(35, 37\)

B. ⚠️ ⚠️ ⚠️ ⚠️
1. Simplify the expression \((2 - 3i)(4 + 2i)\).

A. 14

B. 6i

C. 2 – 8i

D.* 14 –8i

2. Fannie is making a rectangular blanket. The length of the blanket is 10 inches greater than its width, \(w\), in inches.

Write the function, \(f(w)\), that describes the area, in square inches, of Fannie’s blanket as a function of the width, \(w\).

Write your answer in the space provided.

\[ f(w) = w(w + 10) \]

3. What is the remainder when \(f(x) = x^3 + 3x^2 - 10x - 14\) is divided by \((x – 3)\)?

Write your answer in the space provided.

10
4. Which is equivalent to \((4x + 6y)^2\)?

A. \(16x^2 + 36y^2\)
B. \(4x^2 + 2(4x)(6y) + 6y^2\)
C.* \((4x)^2 + 2(4x)(6y) + (6y)^2\)
D. \((4x)^2 + (4x)(6y) + (6y)^2\)

5. A sequence is given as 6, 18, 54, . . .

Write an expression that can be used to find the sum of the first twelve terms of the sequence.

Write your answer in the space provided.

\[
\frac{6(1-3^{12})}{-2}
\]

6. Which expression is the correct factorization of \(x^6 - y^6\)?

A. \((x + y)^3(x - y)^3\)
B. \((x^2 - y^2)(x^4 + 2xy + y^4)\)
C.* \((x - y)(x + y)(x^2 + xy + y^2)(x^2 - xy + y^2)\)
D. \((x - y)(x^2 + 2xy + y^2)(x + y)(x^2 - 2xy + y^2)\)
7. What value(s) of \( x \) makes the equation \( \frac{3}{x + 3} = \frac{9}{x^2 - 9} \) true? Enter your answer(s) in the space provided. If there is only one answer, leave the other space blank.

\[ 6 \]

8. Jamie deposits $627 into a savings account. The account has an interest rate of 3.5%, compounded quarterly.

Write the function that gives the amount of money in dollars, \( J(t) \), in Jamie’s account \( t \) years after the initial deposit.

Write your answer in the space provided.

\[ J(t) = 627(1 + \frac{0.035}{4})^t \]

9. Consider the equation \( \frac{x}{3} - \frac{x - 4}{4} = 2 \).

What is the resulting equivalent equation after multiplying both sides by 12?

A. \( 4x - 3x - 12 = 2 \)
B. \( 4x - 3x + 12 = 2 \)
C. \( 4x - 3x - 12 = 24 \)
D. \( ^* 4x - 3x + 12 = 24 \)
10. A scientist wants to find the water quality of a river. He collects 100 water samples and runs quality tests on the water.

Which method of water collection will give him the most accurate result?

A. collecting water from the same point in the river every Monday
B. collecting water on different days of the week from the same point in the river
C. collecting water from different parts of the river every Monday
D.* collecting water from different parts of the river on different days of the week

11. The 4th term of a sequence is 108. Each term after the first is three times the previous term.

Write an explicit function that models the general term of the sequence $f(n)$.

Write your answer in the space provided.

$$f(n) = 4(3^{n-1})$$
Directions

Subtest 2 of this Practice Test booklet contains constructed-response items and selected-response items in Algebra II. For constructed-response items, write your answer in the space provided. For selected-response items, circle the correct answer(s).

You **MAY** use a calculator in Subtest 2 of this test booklet.

12. A quadratic equation is given as $3x^2 + 4x + 8 = 0$. Write the solution(s) of the equation in simplest form. Enter one solution in each response box. If there is only one solution, leave one response box blank.

\[
\begin{array}{c}
\frac{-2+2i\sqrt{5}}{3} \\
\frac{-2-2i\sqrt{5}}{3}
\end{array}
\]

13. A system of functions is given.

\[
f(x) = -x^2 - 2x + 6 \\
g(x) = 2x^2 + 5x + 3
\]

Select all values of $x$, to the nearest tenth, for which $f(x) = g(x)$.

A. *–2.7*
B. –1.8
C. –0.6
D. *0.4*
E. 4.1
F. 5.1
G. 7.0
14. The focus of a parabola is (3, –5) and the equation of the directrix is y = 3. What is the equation of this parabola?

A. \((x + 1)^2 = -4(y + 4)\)

B.* \((x - 3)^2 = -16(y + 1)\)

C. \((x + 1)^2 = 24(y + 5)\)

D. \((x - 3)^2 = 32(y + 1)\)

15. What is \(\sin \theta\) if \(\theta\) is an angle in the third quadrant and \(\tan \theta = 1\)?

A. \(\frac{\sqrt{2}}{2}\)

B.* \(-\frac{\sqrt{2}}{2}\)

C. \(\frac{1}{2}\)

D. \(-\frac{1}{2}\)
16. The number of people, \( d \), in thousands, applying for medical benefits per week in a particular county can be modeled by the equation \( d(t) = 2.5 \sin(0.76t + 0.3) + 3.8 \), where \( t \) is the time, in years, since January 2004.

Based on the equation, what is the maximum number of people, in thousands, applying for medical benefits per year in this county?

Write your answer in the space provided.

6.3

17. The equation of the directrix of a parabola is \( y = 0 \), and the focus of the parabola is located at \((-3, 6)\).

What is the equation of the parabola?

A. \((x - 3)^2 = 4(y - 3)\)

B. \((x - 3)^2 = 12(y - 3)\)

C.* \((x + 3)^2 = 12(y - 3)\)

D. \((x - 3)^2 = 24(y - 3)\)
18. The function $f(x)$ is given by the equation $f(x) = 3(x^2 + 2)$. The values for the quadratic function $h(x)$ are shown in the table.

<table>
<thead>
<tr>
<th>$x$</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>$h(x)$</td>
<td>6</td>
<td>-3</td>
<td>-6</td>
<td>-3</td>
<td>6</td>
</tr>
</tbody>
</table>

Which statement is true?

A.* The $y$-intercept of $h(x)$ is 12 units below the $y$-intercept of $f(x)$.

B. The $y$-intercept of $f(x)$ is 12 units below the $y$-intercept of $h(x)$.

C. The $y$-intercept of $f(x)$ is 4 units above the $y$-intercept of $h(x)$.

D. The $y$-intercept of $f(x)$ is 6 units above the $y$-intercept of $h(x)$.

19. The probability of rolling $N$ on a 6-sided number cube is $\frac{1}{6}$. Which result is not consistent with this model for getting $N$?

A. The student gets $N$ 4 times in a row.

B. The student does not get $N$ in 4 throws.

C. The student gets $N$ 12 times in 60 throws.

D.* The student gets $N$ 12 times in 200 throws.
20. A researcher wants to find if the behavior of children is affected by playing video games that have violent content. He asks the parents of 100 children in a day care center how often each child plays video games and whether the video games they play have violent content. The children are then allowed to play in a controlled environment, such as the day care center’s playground. Any violent behaviors are then noted.

What type of study is the researcher conducting?

A. census  
B. experiment  
C.* observational study  
D. sample survey

21. A sample for a sociologist’s study is composed of people who were chosen randomly from shoppers at five different malls in a city. Which population can this group of people represent?

A. residents of the city who live near the mall  
B. residents of the state who live near the mall  
C.* residents of the city who like to shop at malls  
D. residents of the state who like to shop at malls
22. A survey asked whether students would eat food served in the school cafeteria. The results are recorded in the table shown.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>9th</td>
<td>67</td>
<td>33</td>
</tr>
<tr>
<td>10th</td>
<td>63</td>
<td>47</td>
</tr>
<tr>
<td>11th</td>
<td>32</td>
<td>68</td>
</tr>
<tr>
<td>12th</td>
<td>12</td>
<td>88</td>
</tr>
</tbody>
</table>

What is the probability that a tenth-grade student will not eat food served in the school cafeteria, rounded to the nearest hundredth?

Write your answer in the space provided.

0.43

23. A circuit has a resultant resistance of \( \frac{6x}{6+x} \) when two resistances are combined. A student wants to calculate the resistance \( x \) needed for the resultant resistance and needs to solve the equation \( 2 = \frac{6x}{6+x} \) where \( x \neq 6 \). The steps shown appear in the calculation.

Using the numerals 1–4, put the steps in the order in which they should be performed to solve for \( x \).

___*4___ Divide both sides of equation by 4.
___*2___ Distribute the term \( 2(6 + x) \).
___*1___ Multiply both sides of equation by \( 6 + x \).
___*3___ Subtract \( 2x \) from both sides of the equation.