**SUMMATIVE QUIZ IN MATHEMATICS 10**
**School Year 2025 - 2026**

Name: _____     Date: _____

Grade & Section: _____     Teacher: _____

## I. MULTIPLE CHOICE (1-20)

Directions: Read each question carefully. Choose the letter of the correct answer by typing the letter of your choice in the space provided before the number. Type E if the answer is not among the options.

_____1. It is an expression in the form $a_n x^n + a_{n-1} x^{n-1} + \cdots + a_2 x^2 + a_1 x + a_0$ consisting of one or more terms containing variables with nonnegative integer exponents.
   A. Algebraic Expression        C. Logarithmic Expression
   B. Polynomial Expression       D. Trigonometric Expression

_____2. What is the degree of the polynomial $4x^5 - 2x^3 + 7x - 9$?
   A. $1^{st}$            C. $5^{th}$
   B. $3^{rd}$           D. $9^{th}$

_____3. What is the leading coefficient of the polynomial $3x^4 - 5x^2 + 2x + 1$?
   A. $-5$           C. 2
   B. 1             D. 3

_____4. When the polynomial $P(x) = x^3 - 4x^2 + 3x - 12$ is divided by $x - 4$, which part of the division algorithm represents the remainder?
   A. The Divisor          C. The Degree of the Quotient
   B. The Quotient        D. A constant term

_____5. When performing polynomial long division, which step is crucial to ensure accuracy?
   A. Write terms in ascending order.
   B. Multiply the divisor by a term to eliminate the constant term of the dividend.
   C. Multiply the divisor by a term to eliminate the leading term of the current dividend.
   D. Only divide the first term of the dividend.

_____6. Which statement is true about synthetic division?
   A. It can be used to divide by any polynomial divisor.
   B. It only works when the divisor is of the form x−a.
   C. It provides both the quotient and remainder, but only for cubic dividends.
   D. It is a method used to find the degree of a polynomial.

_____7. If the remainder when dividing a polynomial $P(x)$ by $x + 4$ is 0, which of the following is true?
   A. $P(4) = 0$           C. $P(-4) = 0$
   B. $P(0) = 4$           D. The degree of $P(x)$ is 4.

_____8. Which of the following best describes the Factor Theorem?
   A. If $P(a) = 0$, then $x - a$ is a factor of $P(x)$.    C. It finds the remainder of any division.
   B. If $x - a$ is a factor, then $P(a) = 1$.        D. It is used to determine the leading coefficient.

_____9. If $P(x)$ is divisible by $(x + 2)$, which of the following must be true?
   A. $P(2) = 0$           C. $P(0) = -2$
   B. $P(-2) = 0$          D. The sum of the coefficients is 0

_____10. Which of the following is a factor of $x^3 - 2x^2 - 5x + 6$?
   A. $x - 1$           C. $x - 4$
   B. $x + 2$           D. $x + 5$

_____11. A polynomial function has roots/zeros at –3, 1, 2. Which of the following could be the polynomial?
A. $x(x - 3)(x + 2)$         C. $(x + 3)(x)(x + 2)$
B. $(x + 3)(x - 1)(x - 2)$     D. $(x - 3)(x + 1)(x + 2)$

_____12. According to the Rational Root Theorem, the possible rational roots of $P(x) = 3x^3 - 4x^2 + 2x - 9$ are of the forms:
A. $\pm\frac{p}{q}$ where $p$ is a factor of 9 and $q$ is a factor of 3.
B. $\pm\frac{p}{q}$ where $p$ is a factor of 3 and $q$ is a factor of 9.
C. $\pm1, \pm3, \pm9$
D. $\pm1, \pm2, \pm3, \pm9$

_____13. What are the possible rational roots of $P(x) = 2x^3 - x^2 - 4x + 2$?
A. $\pm1, \pm2$             C. $\pm1, \pm\frac{1}{2}$
B. $\pm1, \pm2, \pm\frac{1}{2}$      D. $\pm2, \pm\frac{1}{2}$

_____14. Which number is a possible rational root of $6x^4 + 5x^3 - 3x^2 + 2x - 1 = 0$?
A. $-3$               C. $\frac{2}{5}$
B. $\frac{1}{3}$              D. $\frac{3}{2}$

_____15. A student uses synthetic division to test if $x = 2$ is a root of $P(x) = x^3 - 6x^2 + 11x - 6$. Using synthetic division, the last number in the bottom row is zero. What is the correct conclusion?
A. $x = 2$ is not a root.         C. The polynomial has no real roots.
B. $x = 2$ is a zero, and $x - 2$ is a factor    D. The student must use long division instead.

For item 16-20, consider the synthetic division setup below.

| 2 | 1 | −2 | −5 | 6 |
|---|---|----|----|---|
| + |   | 2  | 0  | −10 |
|   | 1 | 0  | −5 | −4 |

_____16. Which expression represents the dividend?
A. $x^4 - 2x^3 - 5x^2 + 6x$      C. $x^3 - 2x^2 - 5x + 6$
B. $x^2 - 5$               D. $-\frac{4}{x-2}$

_____17. What is the divisor used?
A. $x + 2$            C. $x^3 - 2x^2 - 5x + 6$
B. $x - 2$            D. $x^2 - 5$

_____18. What is the remainder?
A. 1               C. $-5$
B. 2               D. $-4$

_____19. What is the degree of the quotient?
A. 1               C. 3
B. 2               D. 4

_____20. What is the quotient?
A. $x^4 - 2x^3 - 5x^2 + 6x$      C. $x^3 - 2x^2 - 5x + 6$
B. $x^2 - 5$               D. $-\frac{4}{x-2}$

## II. FILL IN THE BLANKS (20 points)

A. Directions: Fill in the missing parts to complete the solution for each division problem.

**Division Algorithm (6 points)**

$P(x) = 2x^3 + 3x^2 - 5x - 7$
$D(x) = x + 1$

$$
\begin{array}{r}
2x^2 + \boxed{\phantom{x}} - \boxed{\phantom{x}} \\
x+1 \enclose{longdiv}{2x^3 + 3x^2 - 5x - 7} \\
-\ 2x^3 + \boxed{\phantom{x}}\,x^2 \\
\hline
-\ x^2 - \boxed{\phantom{x}} \\
x^2 + x \\
\hline
-\ \boxed{\phantom{x}}\,x - 7 \\
-6x - 6 \\
\hline
\boxed{\phantom{x}}
\end{array}
$$

**Synthetic Division (6 points)**

$P(x) = x^2 - 5x^3 + 7$
$D(x) = x + 2$

| $-2$ | | 1 | | 7 |
|------|------|------|------|------|
| $+$ | | | $-22$ | |
| | | 11 | | 51 |

B. Directions: Use the Rational Root Theorem to complete the step-by-step process. Fill in all missing values.

Using the Rational Root Theorem, list all possible rational roots of the polynomial $P(x) = x^3 - x^2 - 10x - 8$.

a) The Constant Term $a_0$: _____

b) The Leading Coefficient $a_n$: _____

c) Possible Rational Roots:

| q \ p | $\pm 1$ | $\pm$ | $\pm$ | $\pm 8$ |
|-------|---------|-------|-------|---------|
| $\pm 1$ | $\pm 1$ | $\pm$ | $\pm 4$ | $\pm$ |

d) Actual Roots/ Zeros: _____ , _____ , _____

*Note, arrange the roots in increasing order to avoid being flagged as incorrect.*