

Directions: Calculators are not allowed.

A2-1 1) Solve for x. $|5 - 10x| = 25$

A2-2 2) Solve the system of equations shown below for y only.

$$\begin{cases} 2x + 3y + z = 5 \\ 3x + 3y - z = -1 \\ 3x + 2y - z = 0 \end{cases}$$

A2-2 3) A restaurant manager bought 10 packages of bagels. Some packages contained 6 bagels each, and the rest contained 8 bagels each. There were 68 bagels in all. How many packages of 8 bagels did the manager buy?

A2-2 4) Solve the system of inequalities:

$$\begin{cases} 3x + 2y > -6 \\ y \leq 2x - 1 \end{cases}$$

A2-6 5) If $i = \sqrt{-1}$, find $8i(5i)$.

A2-6 6) What is the product of the complex numbers $(4 + i)$ and $(4 - i)$?

A2-5 7) If $i = \sqrt{-1}$, what is the value of i^6 ?

A2-6 8) What is an equivalent form of $\frac{2}{4+i}$?

A2-5 9) Sketch a graph of the complex number $5 - 3i$.

A2-8 10) What are the solutions to the equation $x^2 + 2x + 10 = 0$?

A2-10 11) What are the x-intercepts of the graph of $y = 8x^2 - 2x - 1$?

A2-10 12) Which ordered pair is the vertex of $y = x^2 - 4x + 5$?

A2-8 13) There are two numbers with the following properties.
1) The second number is 3 more than the first number.
2) The product of the two numbers is 17 more than their sum.

Find the possible values of these two numbers?

A2-9 14) Describe the translation of the graph $y = (x - 4)^2 + 1$ to the graph of $y = (x + 6)^2 - 3$.

A2-9 15) Which of the following sentences is true about the graphs of $y = -3(x + 4)^2 - 1$ and $y = 2(x + 4)^2 - 1$?

- A) Their vertices are minimums.
- B) The graphs have the same shape with different vertices.
- C) The graphs have different shapes with different vertices.
- D) One graph has a vertex that is a maximum, while the other graph has a vertex that is a minimum.

A2-10 16) Cynthia is solving the equation $x^2 - 6x = 5$ by completing the square. What number should be added to both sides of the equation to complete the square?

A2-7 17) Simplify. $\frac{a^2b^5c^{-3}}{(ab^4c^{-2})^3}$

A2-7 18) Simplify. $\frac{30x^{-6}}{7y^3} \div \frac{5x^{-2}}{14y^{-1}}$

A2-12 19) If the equation $y = \left(\frac{1}{4}\right)^x$ is graphed, which of the following values of x would produce a point furthest from the x -axis?

- A) $\frac{1}{3}$ B) $\frac{7}{5}$ C) $\frac{9}{4}$ D) $\frac{11}{2}$

A2-10 20) Sketch a graph of $y = -3(x - 2)^2 + 4$.

A2-12 21) Suppose a certain radioactive element decays over time according to the equation $y = A\left(\frac{1}{2}\right)^{\frac{t}{300}}$, where A = number of grams present initially and t = time in years. If 1600 grams were present initially, how many grams will remain after 900 years?

A2-12 22) Bacteria in a culture are growing exponentially with time, as shown in the table below.

Bacteria Growth

- C) The mean will not change.
- D) The standard deviation will not change.

A2-18 30) Les wants to create a 5-character password. The first 3 characters must be a letter from his first name, and the last 2 characters must be a digit from the number 9381. How many different passwords are possible? Repetition of letters and digits is **NOT** allowed.

PS-1 31) A teacher is randomly handing out 8 graphing calculators and 6 scientific calculators. What is the probability that the first calculator he hands out will be a graphing calculator and the second calculator that he hands out will be a scientific calculator?

PS-7 32) There is a 60% chance that it will rain Friday and a 20% chance that it will rain on Saturday. What is the probability that it will **NOT** rain on either of the two days?

A2-11.1 33) Write the equation $\log_2 \frac{1}{16} = x$ in exponential form.

A2-11.2 34) Which is the first **incorrect** step in simplifying $\log_4 \frac{4}{64}$?

Step 1: $\log_4 \frac{4}{64} = \log_4 4 - \log_4 64$

Step 2: $= 1 - 16$

Step 3: $= -15$

A2-13 35) Express $\log_5 50$ as a quotient of common logarithms.

A2-14 36) What is the value of $\log_3 81$?

A2-14 37) If $\log 3 \approx 0.477$ and $\log 5 \approx 0.699$, what is the approximate value of $\log 75$?

A2-11.1 38) If $\log_2 x = -3$, what is the value of x ?

A2-13 39) What is the solution to the equation $8^x = 40$? Express your answer as a quotient of common logarithms.

A2-14 40) Condense the expression: $\log_3 40 - 3\log_3 2 + \log_3 x$

A2-3 41) Subtract: $(-3x^2 + 4x + 1) - 2(2x^2 - 5x + 2)$

- A2-3 42) Multiply: $(x-2)(-3x^2-4x+1)$
- A2-3 43) Multiply: $(5x^2+3)(5x-3)$
- A2-4 44) Factor completely: $27x^3-y^3$
- A2-4 45) The total area of a rectangle is $81x^4-25y^2$. Which factors could represent the length times width?
- A2-4 46) Which product of factors is equivalent to $(x+3)^2-25y^2$
- A2-24 47) If $f(x)=x^2-3$ and $g(x)=x+4$, which expression represents $f(g(x))$?
- A2-25 48) If $f(x)=x^2+3x+1$ and $g(x)=2(x-3)^2$, which is an equivalent form of $f(x)+g(x)$?
- A2-20 49) How many terms does the binomial expansion of $(x^5+3y^2)^{14}$ have?
- A2-20 50) Express $(3x-1)^4$ as a polynomial in standard form.
- A2-7 51) Find the quotient: $2x+3 \overline{) 2x^4-x^3+4x^2+3x-1}$
- A2-7 52) Simplify: $\frac{2x^2-32}{4-x}$
- A2-7 53) Simplify: $\frac{3x^3y^2-18x^2y^3+27xy^4}{3xy^2}$ [Express your answer as a binomial squared.]
- A2-7 54) Multiply and simplify: $\frac{(x+1)^2}{x^2-2x-3} \cdot \frac{x^2-x}{x^2-1}$
- A2-7 55) Divide and simplify: $\frac{x^2-3x-10}{3x^3+12x^2} \div \frac{x^2-5x}{x^2-16}$
- A2-7 56) Subtract and simplify: $\frac{x}{x^2-49} - \frac{2}{x+7}$
- A2-7 57) Add and simplify: $\frac{x+2}{x+3} + \frac{5}{x^2+4x+3}$
- A2-8 58) What are the solutions to the equation: $1 + \frac{1}{x^2} = \frac{5}{x}$

A2-15 59) If x is a real number, for what values of x is the equation $\frac{5x-15}{5} = x-3$ true?

- A) all values of x
- B) no values of x
- C) some values of x
- D) impossible to determine

A2-15 60) Which of the following statements is correct about the equation $\frac{x^2+7x+12}{x+3} = x+4$.

- A) The equation is always true.
- B) The equation is never true.
- C) The equation is sometimes true when $x = -3$.
- D) The equation is always true, except when $x = -3$.