Date Completed: _____
Mentor Initials: _____

Strategy Quiz - Choose Values

1. For all nonzero values a and b, the value of which of the following expressions is always positive?

A. $-|a| + |b|$
B. $|a| - |b|$
C. $-3|a| + |b|$
D. $-a - b$
E. $(ab)^4$

2. If $a, b,$ and c are positive integers such that $a^b = x$ and $c^b = y$, then which of the following is equivalent to $\frac{x}{y}$?

A. 0
B. $\left(\frac{a}{c}\right)^b$
C. $\frac{a}{c}$
D. $\left(\frac{a}{c}\right)^{2b}$
E. 1

3. If a and b are odd integers, then which of the following also produces an odd integer?

A. $a + b$
B. $a - b$
C. $2ab$
D. ab
E. $3a - b$

4. Which of the following expressions, if any, are equal for all real numbers x?

I. $\sqrt{x^4}$
II. $(-x)^2$
III. $(-|x|)^2$

A. I and II only
B. I and III only
C. II and III only
D. I, II, and III
E. None of the expressions are equivalent

5. Clara's personal record for the high jump increased by 10% during her first year on the track team and then increased by 25% during her second year after she began a new training regimen. By what percent did her personal record for the high jump increase over those two years?

A. 37.5%
B. 35%
C. 25%
D. 15%
E. 2%

6. Let a equal $3b + 2c - 7$. What happens to the value of a if the values of b and c both increase by 2?

A. It increases by 4
B. It increases by 6
C. It increases by 10
D. It remains the same.
E. Cannot be determined from the given information.

7. Which of the following expressions is equivalent to $\frac{a^2+11a+18}{a+5}$?

A. $a + 6 - \frac{12}{a+5}$
B. $a + 6 + \frac{48}{a+5}$
C. $a + 16 - \frac{12}{a+5}$
D. $a + 16 + \frac{48}{a+5}$
E. $a^2 + 10a + 13$

8. If x is an integer less than -1, which of the following orders the expressions $-|x|$, x^2, and $\frac{1}{x}$ from greatest value to least value?

A. $x^2 > -|x| > \frac{1}{x}$
B. $x^2 > \frac{1}{x} > -|x|$
C. $-|x| > \frac{1}{x} > x^2$
D. $\frac{1}{x} > x^2 > -|x|$
E. $\frac{1}{x} > -|x| > x^2$

9. Which of the following inequalities is false for all positive integers n?

A. $n \geq n^2$
B. $n \leq \sqrt{n}$
C. $n \leq \frac{1}{n}$
D. $n \geq (n+1)^3$
E. $n \geq \sqrt{n+1}$

10. The set of all values of y that satisfies $|y+3| < 6$ is the same as the set of all values of y that satisfies:

A. $0 < y < 3$
B. $0 < y < 9$
C. $-3 < y < 3$
D. $-9 < y < 3$
E. $-9 < y < 9$

11. For every pair of real numbers w and z such that $wz = 0$ and $\frac{w}{z} = 0$, which of the following statements is true?

A. $w \neq 0$ and $z \neq 0$
B. $w = 0$ and $z \neq 0$
C. $w \neq 0$ and $z = 0$
D. $w = 0$ and $z = 0$
E. None of the statements is true for every such pair of real numbers w and z.

12. $$B(h) = 30(3)^h$$

The function $B(h)$ models the number of gallons of a fluid in a tank after h hours. Which of the following models the number of gallons of the fluid in the tank after m minutes?

A. $B(m) = 30(3)^m$
B. $B(m) = 30(3)^{\frac{m}{60}}$
C. $B(m) = 30(3)^{60m}$
D. $B(m) = 30(3)^{\frac{60}{m}}$
E. $B(m) = 30(180)^m$

13. Which of the following represents the positive number q increased by 7%?

A. $.07q$
B. $.93q$
C. $1.07q$
D. $7q$
E. $100q$

14. $x^4 - 18x^2 + 81$

Which of the following is equivalent to the expression above?

A. $(x-3)^4$
B. $(x-9)^4$
C. $(x^2+9)(x+3)(x-3)$
D. $(x-3)^2(x+3)^2$
E. $(x^2+9)^2$

15. During an ice age, the average annual global temperature was at least 40 degrees Fahrenheit lower than the modern average. If the average annual temperature of an ice age is a degrees Fahrenheit and the modern average annual temperature is b degrees Fahrenheit, which of the following must be true?

A. $a \leq b - 40$
B. $a \geq b - 40$
C. $a = b - 40$
D. $a \geq b + 40$
E. $a \leq b + 40$

16. As x continually increases in value without bound, the value of $\frac{x}{x+5}$ most closely approaches:

A. 0
B. $\frac{1}{5}$
C. 1
D. 5
E. ∞

17. For all real values of x, which of the following equations is true?

A. $\sin(3x) + \cos(3x) = 1$
B. $\sin(3x) + \cos(3x) = 3$
C. $3\sin(3x) + 3\sin(3x) = 6$
D. $\sin^2(3x) + \cos^2(3x) = 1$
E. $\sin^2(3x) + \cos^2(3x) = 3$