1. Q Real numbers $\mathbb{R}$
2. M Conditional equation
3. F Additive identity
4. R Rational numbers $\mathbb{Q}$
5. I Integers $\mathbb{Z}$
6. S Irrational numbers
7. B Simple interest formula
8. J Union of sets $A \cup B$
9. G Multiplicative identity
10. P Natural Numbers $\mathbb{N}$
11. H Additive inverse of a number a
12. A Motion formula
13. C Commutative Property
14. H Multiplicative inverse of a number a
15. N Identity equation
16. K Intersection of sets $A \cap B$
17. L Relative complement of sets A/B or $A - B$
18. O Contradiction equation
19. D Associative Property
20. E Distributive Property

A. Distance = rate x time
B. Interest earned = principal investment x interest rate
C. $a + b = b + a$
D. $a + (b + c) = (a + b) + c$
E. $a(b + c) = ab + ac$
F. 0
G. 1
H. $-a$
I. $1/a$
J. The set of all elements that are in either A or B
K. The set of all elements that are in both A and B
L. The set of all elements that are in A but not in B
M. True for only some instances of the variable
N. Always true for all instances of the variable
O. Never true for any instance of the variable
P. The set of counting numbers
Q. The set of all numbers that can be written as a decimal
R. The set of all numbers that can be written as fractions
S. The set of all non-terminating, non-repeating decimals
T. The set of all positive, zero, and negative whole numbers

II. Translate the verbal expression into a variable expression in terms of a single variable. Do not simplify.

21. The total of twelve times a number and three less than the number.

$12n + n - 3$

22. Twice the difference between four more than twice a number and one more than the number.

$2[4 + 2n - (n + 1)]$

III. Write a linear (single variable) equation to describe the word problem. Do not solve.

23. Find three consecutive odd integers such that twice the difference between the first and third is 19 less than the second.

$x, x+2, x+4$

$2[x - (x+4)] = x + 2 - 19$

24. 50 pounds of delicious Jamaican Blue Mountain coffee that costs $28 per pound are mixed with Fakin' Blue Discount Coffee that costs $4 per pound. How much Fakin' Blue is needed to make a coffee blend that costs $15 per pound?

JBM	50	$28	50(28)
FB	x	$4	4x
blend	50+x	$15	15(50+x)

$50(28) + 4x = 15(50 + x)$

IV. Simplify the expression.

25. $5-[2n-2(3n+1)]$

$5-[2n-6n-2] = 5-[-4n-2]$

$= 5+4n+2 = \boxed{4n+7}$

26. $|-5+3|-|-1|+(-4)(5)$

$= |-2|-|-1|+(-20)$

$= 2-1-20 = \boxed{-19}$

V. Solve the linear equation.

27. $5(2-x)=1-2[x-3(x+2)]$

$10-5x = 1-2[x-3x-6]$

$10-5x = 1-2[-2x-6]$

$10-5x = 1+4x+12$

$10-5x = 4x+13$

$\frac{-3}{9} = \frac{9x}{9}$

$\boxed{-\frac{1}{3} = x}$

28. $-(-8r+1) = -(-3-5r)-6r$

$8r-1 = 3+5r-6r$

$8r-1 = 3-r$

$\frac{9r}{9} = \frac{4}{9}$

$\boxed{r = \frac{4}{9}}$

$5-x$

$= 5+(-x)$

VI. Given the sets A, B, and C (and all the usual sets listed on the first page), determine the following unions, intersections, and relative complements. Give the answer in the simplest form possible.

$A = \{1,2,3,4,5\}, B = \left\{-2,-1,\frac{1}{2},\frac{5}{6},3,5,6\right\}, C = \{-\sqrt{5},\pi\}$

29. $A \cup \mathbb{N} = \mathbb{N}$

30. $C \cap \mathbb{Q} = \emptyset$

31. $A - B = \{1,2,4\}$

32. $B \cup \mathbb{R} = \mathbb{R}$

VII. Solve the linear inequality. Give the solution in your choice of interval or set-builder notation.

33. $3x+5 > 5x+9$

$3x-5x > 9-5$

$-2x > 4$

$x < -2$

$\{x \mid x < -2\}$

$(-\infty, -2)$

34. $10x-10 \le 7x+5$

$3x \le 15$

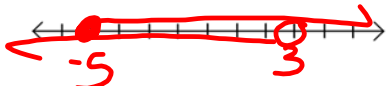
$x \le 5$

$\{x \mid x \le 5\}$

$(-\infty, -5]$

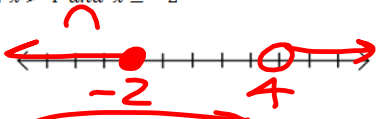
VIII. Graph the compound inequality on the number line, and give the solution in your choice of notation.

35. $x < 3$ *and* $x \geq -5$



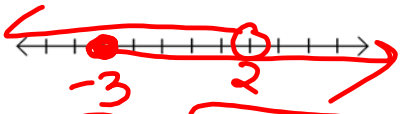
$[-5, 3)$ $\{x \mid -5 \leq x < 3\}$

36. $x > 4$ *and* $x \leq -2$



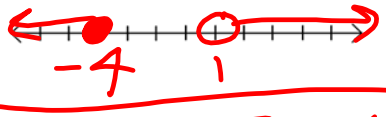
$\emptyset$

37. $x < 2$ *or* $x \geq -3$



$\mathbb{R} = (-\infty, \infty)$

38. $x > 1$ *or* $x \leq -4$



$(-\infty, -4] \cup (1, \infty)$

$\{x \mid x \leq -4 \text{ or } x > 1\}$