UNIT 1 TEST REVIEW **Name:** _____

Dimensional Analysis, Polynomials, Square Roots and Rational and Irrational Numbers

Part 1: Use conversions from the table above to answer the following questions:

1. A mass of 0.15 ounces is equal to how many grams?

$0.15\text{oz} \times 28.35 = 4.2525$

4.25 grams

- **Converting Metric to English and English to Metric**

			Conversion Factor
fl oz	⟷	mL	29.58
gal	⟷	L	3.79
in	⟷	cm	2.54
m	⟷	ft	3.28
mi	⟷	km	1.61
oz	⟷	g	28.35
kg	⟷	lb	2.20

2. 21 gallons is equal to how many ounces?

$21 \text{ gallons} \times \frac{4 \text{ qt}}{1 \text{ gal}} \times \frac{32 \text{ oz}}{1 \text{ qt}} = 2688$

2,688 oz

3. A 10. Km race is how many miles?

$10 \text{ km} \div 1.61 = 6.211$

6.21 miles

4. In 1976 an airplane was flown at a speed of 2,193 miles per hour. What was the speed in feet per second?

$\frac{2193 \text{ mi}}{1 \text{ hour}} \times \frac{5280 \text{ ft}}{1 \text{ mi}} \times \frac{1 \text{ hour}}{60 \text{ min}} \times \frac{1 \text{ min}}{60 \text{ sec}} = \frac{11579040}{3600} = 3216.4$

3,216.4 ft per sec

Part 2: Classify each as either a **M** (monomial), **B** (binomial), or **T** (trinomial).
Classify each as either a constant, linear, or quadratic.

5. M -130 — Constant

6. T $4a^2 + 7a - 10$ — Quadratic

7. B $10x - 2$ — Linear

Part 3: Add these polynomials.

8. $(19x^2+12x+12)+(7x^2+10x+13)$

$+7x^2+10x+13$

$26x^2+22x+25$

9. $(4x^2-6x+7)+(-19x^2-15x-18)$

$-19x^2-15x-18$

$-15x^2-21x-11$

10. $(20x^2+15x+13)+(-19x^2+17x+5)$

$-19x^2+17x+5$

$x^2+32x+18$

11. $(9x^6-4x^5)+(10x^5-15x^4+14)$

$9x^6-4x^5$

$+10x^5-15x^4+14$

$9x^6+6x^5-15x^4+14$

Part 4: Subtract these polynomials.

12. $(6x+14)-(9x+5)$

$-9x-5$

$-3x+9$

13. $(19x^2+9x+16)-(5x^2+12x+7)$

$-5x^2-12x-7$

$14x^2-3x+9$

14. $(17x^2+7x-14)-(-6x^2-5x-18)$

$+6x^2+5x+18$

$23x^2+12x+4$

15. $(-18x^2+4x-16)-(15x^2+4x-1)$

$-15x^2-4x+1$

$-33x^2+15$

Part 5: Multiply the following monomials and polynomials.

16. $6(x^2+2x+7)$

$6x^2+12x+42$

17. $4x(1-x)$

$4x-4x^2$

$=-4x^2+4x$

18. $-x^2(x+5)$

$-x^3-5x^2$

19. $3x^2(4x^3-5x+10)$

$12x^5-15x^3+30x^2$

20. $3x(-x^2+2x-12)$

$-3x^3+6x^2-36x$

Part 6: Multiply the following binomials.

21. $(x-3)(x+4)$

$x^2+4x-3x-12$

x^2+x-12

22. $(2x-4)^2$ $(2x-4)(2x-4)$

$4x^2-8x-8x+16$

$4x^2-16x+16$

23. $(x-7)(x-6)$

$x^2-6x-7x+42$

$x^2-13x+42$

24. $(3x-1)(x+5)$

$3x^2+15x-x-5$

$3x^2+14x-5$

Part 7: Multiply the following binomials and trinomials.

25. $(x+5)(x^2-6x+3)$

	x^2	$-6x$	3
x	x^3	$-6x^2$	$3x$
5	$5x^2$	$-30x$	15

$x^3-x^2-27x+15$

26. $(2x-3)(4x^2+8x-2)$

	$4x^2$	$8x$	-2
$2x$	$8x^3$	$16x^2$	$-4x$
-3	$-12x^2$	$-24x$	$+6$

$8x^3+4x^2-28x+6$

Part 8: Simplify each square root.

27. $\sqrt{18}$

$\sqrt{9\cdot 2}$

$\sqrt{3\cdot 3\cdot 2}$

$3\sqrt{2}$

28. $\sqrt{125}$

$\sqrt{25\cdot 5}$

$\sqrt{5\cdot 5\cdot 5}$

$5\sqrt{5}$

29. $3\sqrt{72}$

$3\sqrt{2\cdot 36}$

$3\sqrt{2\cdot 6\cdot 6}$

$3\cdot 6\sqrt{2}$

$18\sqrt{2}$

30. $2\sqrt{729}$

$2\sqrt{3\cdot 243}$

$2\sqrt{3\cdot 3\cdot 81}$

$2\sqrt{3\cdot 3\cdot 9\cdot 9}$

$2\cdot 3\cdot 9=54$

31. $4\sqrt{180}$

$4\sqrt{2\cdot 90}$

$4\sqrt{2\cdot 9\cdot 10}$

$4\sqrt{2\cdot 3\cdot 3\cdot 2\cdot 5}$

$4\cdot 2\cdot 3\sqrt{5}$

$24\sqrt{5}$

32. $\sqrt{x^{10}}$

$\frac{10}{2}=5$

x^5

33. $\sqrt{y^{17}}$

$\sqrt{y\cdot y^{16}}$

$\frac{16}{2}=8$

$y^8\sqrt{y}$

34. $x\,y^2\sqrt{x^4y^3}$

$x\cdot y^2\sqrt{x^4\cdot y\cdot y^2}$

$\frac{4}{2}=2$ $\frac{2}{2}=1$

$x\cdot x^2\cdot y^2\cdot y\sqrt{y}$

$x^3y^3\sqrt{y}$

35. $2\sqrt{8x^5}$

$2\sqrt{2\cdot 4\cdot x\cdot x^4}$

$2\sqrt{2\cdot 2\cdot 2\cdot x\cdot x^4}$

$\frac{4}{2}=2$

$2\cdot 2\cdot x^2\sqrt{2x}$

$4x^2\sqrt{2x}$

Part 9: Simplify each square root expression.

$\sqrt{8} = \sqrt{2 \cdot 2 \cdot 2}$

$= 2\sqrt{2}$

36. $2\sqrt{11} + 7\sqrt{11} - 4\sqrt{11}$

$(2+7-4)\sqrt{11}$

$5\sqrt{11}$

37. $7\sqrt{6} + 4\sqrt{3} - 3\sqrt{6} + 2\sqrt{2}$

$(7-3)\sqrt{6} + 4\sqrt{3} + 2\sqrt{2}$

$4\sqrt{6} + 4\sqrt{3} + 2\sqrt{2}$

38. $14\sqrt{8} - 5\sqrt{8}$

$14 \cdot 2\sqrt{2} - 5 \cdot 2\sqrt{2}$

$28\sqrt{2} - 10\sqrt{2}$

$18\sqrt{2}$

39. $(\sqrt{2})(\sqrt{5})$

$\sqrt{2 \cdot 5}$

$\sqrt{10}$

40. $(2\sqrt{15})(3\sqrt{30})$

$2 \cdot 3\sqrt{15 \cdot 30}$

$6\sqrt{15 \cdot 15 \cdot 2}$

$6 \cdot 15\sqrt{2}$

$90\sqrt{2}$

41. $\sqrt{27} + \sqrt{48} - 2\sqrt{3}$

$\sqrt{27} = \sqrt{3 \cdot 3 \cdot 3} = 3\sqrt{3}$

$\sqrt{48} = \sqrt{3 \cdot 16}$

$= \sqrt{3 \cdot 4 \cdot 4} = 4\sqrt{3}$

$3\sqrt{3} + 4\sqrt{3} - 2\sqrt{3}$

$(3+4-2)\sqrt{3}$

$5\sqrt{3}$

42. $(6\sqrt{2})(6\sqrt{18})$

$6 \cdot 6\sqrt{2 \cdot 18}$

$36\sqrt{2 \cdot 2 \cdot 9}$

$36\sqrt{2 \cdot 2 \cdot 3 \cdot 3}$

$36 \cdot 2 \cdot 3$

216

Part 10: Identify whether the following statements are true ALWAYS, NEVER, or SOMETIMES.

- 43. The sum of a rational number and a rational number is rational. Always
- 44. The sum of a rational number and an irrational number is irrational. Always
- 45. The sum of an irrational number and an irrational number is rational. Sometimes
- 46. The product of a rational number and a rational number is rational. Always
- 47. The product of a rational number and an irrational number is irrational. Sometimes
- 48. The product of an irrational number and an irrational number is irrational. Sometimes