Name:_____ Date:_____

Mr. Croom's Physics Chapter 1: Scientific Tool Box

Scientific Notation

Part 1

Place the following values into scientific notation

Example: 150 = 1.5 x 10^2

1. 3500 = _____
2. 0.0032 = _____
3. 0.000 348 = _____
4. 852,000, 000 = _____
5. 480 = _____
6. 0.000 002 = _____

Part 2

Place the following values into standard notation

Example: 1.5 x 10^2 = 150

7. 3.6 x 10^2 = _____
8. 4.5 x 10^{-2} = _____
9. 5.7 x 10^{-4} = _____
10. 5.4 x 10^{-3} = _____
11. 9.78 x 10^0 = _____
12. 3.35 x 10^{-1} = _____

Scientific Notation Operations

Multiplying and Dividing

Multiply the following values *without* the use of a calculator

Example: 4 x 10^2 * 5 x 10^4 = (4*5) x 10^{2+4} = 20 x 10^6 = 2.0 x 10^7

13. 2 x 10^3 * 3 x 10^4 = _____
14. 6 x 10^6 * 5 x 10^5 = _____
15. 2 x 10^9 * 7 x 10^1 = _____
16. 7 x 10^2 * 8 x 10^6 = _____

Divide the following values *without* the use of a calculator

Example: 8 x 10^7 / 4 x 10^3 = (8/4) x 10^{7-3} = 2 x 10^4

17. 6 x 10^7 / 3 x 10^4 = _____
18. 8 x 10^6 / 2 x 10^4 = _____
19. 9 x 10^9 / 3 x 10^3 = _____
20. 8 x 10^2 / 8 x 10^6 = _____

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Adding and Subtracting

Add the following values *without* the use of a calculator

Example: $4 \times 10^2 + 5 \times 10^4 = 4 \times 10^2 + 500 \times 10^2 = 504 \times 10^2 = 5.04 \times 10^4$

21. $8 \times 10^3 + 5 \times 10^4 =$ _____

22. $2 \times 10^6 + 4 \times 10^5 =$ _____

23. $9 \times 10^9 + 8 \times 10^1 =$ _____

24. $5 \times 10^2 + 7 \times 10^4 =$ _____

Subtract the following values *without* the use of a calculator

Example: $8 \times 10^5 - 4 \times 10^3 = 800 \times 10^3 - 4 \times 10^3 = 796 \times 10^3 = 7.96 \times 10^5$

25. $9 \times 10^7 - 3 \times 10^6 =$ _____

26. $8 \times 10^6 - 5 \times 10^4 =$ _____

27. $4 \times 10^8 - 3 \times 10^7 =$ _____

28. $8 \times 10^2 - 8 \times 10^2 =$ _____

Raising to a Power

Calculate the following values *without* the use of a calculator

Example: $(8 \times 10^6)^2 = (8^2) \times 10^{6x2} = 64 \times 10^{12} = 6.4 \times 10^{13}$

29. $(2 \times 10^3)^2 =$ _____

30. $(3 \times 10^7)^2 =$ _____

31. $(3.6 \times 10^8)^{1/2} =$ _____

32. $(1.6 \times 10^{12})^{1/2} =$ _____

Simplify the following using the rules of algebra! (don't use a calculator!)

33. $\sqrt{x^5} =$

36. $\dfrac{x^{12}}{x^7} =$

34. $x^4 x^5 =$

37. $(x^5)^3 =$

35. $\dfrac{1}{\sqrt[3]{x^5}} =$

38. $\dfrac{x^9}{x^5} =$