Name: _____ Date: _____ Start: _____ Stop: _____

Answer each question. Simplify ALL answers. Use only positive exponents in your answer. Report ALL answers descending order. Show ALL necessary work to receive full credit.

Simplify each expression using the properties of exponents. Use only positive exponents in your answer.

1. $a^{-3} \cdot a^{7}$ 1. _____

2. $a^{-5} \cdot a^{-3}$ 2. _____

3. $a^{2} \cdot a^{7}$ 3. _____

4. $\frac{1}{a^{4} \cdot a^{2}}$ 4. _____

5. $(a^{2})^{-2}$ 5. _____

6. $a^{0} \cdot a^{-3}$ 6. _____

7. $\frac{a^{5}}{a^{-3}}$ 7. _____

8. $\left(\frac{a^{2}}{b^{3}}\right)^{4}$ 8. _____

9. $(-5x^3y^0z^{-2})^2$ 9. _____

10. $\dfrac{9a^4b^2}{-27a^{-5}b^5}$ 10. _____

11. $\dfrac{-20x^{-4}}{-4x^2}$ 11. _____

12. $(10a^{-2}b^4)(-2a^{-4}b^3)$ 12. _____

13. $(-3a^4b^{-5})^3$ 13. _____

14. $\left(\dfrac{-3a^{-2}b^{3}}{9a^{4}b^{-4}}\right)^{-2}$ 14. _____

15. $\left(\dfrac{x^{2}}{y^{4}}\right)\left(\dfrac{3y^{-2}}{5x^{-5}}\right)^{2}$ 15. _____

16. Find the value of the polynomial $-3a^3 - 4a^2 - a$ when $a = -2$. 16. _____

17. Find the value of the polynomial $-2a^3 + 2a^2 - 3a$ when $a = 3$. 17. _____

18. Which of the following are polynomials. There may be more than one correct answer. (Circle your answers.)

    A. $2a^2 - 4b^3$ B. $\frac{1}{3}a^2 - 8a - 15$ C. $-2a^3 + 2 - \frac{3}{b}$ D. $2a^2 + 3b$ E. $3a^{-3}b^5$

19. List the coefficient of each term seperated by commas.

    (a) $3x^2 + 4x - 5$ 19(a) _____

    (b) $-2a^5 - 6a^3 + 8$ 19(b) _____

20. Arrange each polynomial in descending order.

    (a) $-2a^4 - 3a^5 - 8 - 4a^7$ 20(a) _____

    (b) $-8 + 5b^4 - b^3 - 5b^2$ 20(b) _____

21. Give the degree of each polynomial.

    (a) $20a^8 - 10a^4 - 3 + 3a^6$ 21(a) _____

    (b) $-5 + 3b^5 + b^3 + 5b^2$ 21(b) _____

Perform the following operations. Simplify all expressions, and put all answer in descending order.

22. Add $-4b^2 - 6b$ and $15b^2 - 5b$ 22. _____

23. Add $4x^2 + 3x - 2$ and $5x^2 - 6x + 7$ 23. _____

24. Subtract $-2x^2 + 4x - 2$ from $2x^2 + 4x + 16$ 24. _____

25. Subtract $8x - 3$ from the sum of $2x + 7$ and $4x - 8$ 25. _____

26. $(3a^3b^2)(4a^2b^2) - 12a^5b^4$ 26. _____

27. $(4x^2)(-6x^5)$ 27. _____

28. $3x(2x^2 - 5)$ 28. _____

29. $-4a(2a^2 - 3a)$ 29. _____

30. $(x + 2)(x - 5)$ 30. _____

31. $(2x + 7)(3x - 3)$ 31. _____

32. $(x+4)^2$ 32. _____

33. $(x-2)^2$ 33. _____

34. $\frac{36a^4+3a^7}{9a^2}$ 34. _____

35. $\frac{50a^3b^3-15a^5b^2+5a^2b^{-3}}{5a^2b}$ 35. _____

36. Convert the following numbers in scientific notation to standard notation:

(a) 2.45×10^5 36(a) _____

(b) 1.33×10^{-4} 36(b) _____

37. Convert the following numbers in standard notation to scientific notation:

(a) $250,000,000,000$ 37(a) _____

(b) 0.000 000 015 37(b) _____

38. Perform the indicated calculations. Write your answer in scientific notation.

(a) $(4.0 \times 10^5)(2.0 \times 10^4)$ 38(a) _____

(b) $\frac{6\times10^{-4}}{2\times10^{-7}}$ 38(b) _____