

NAME: \_\_\_\_\_ Score \_\_\_\_\_ /100  
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SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

Circle T or F, whichever is correct. (2 pts each)

1. T F A trinomial is a polynomial.
2. T F A binomial polynomial may be a quadratic polynomial.
3. T F If  $x$  and  $y$  are real numbers and  $xy = 0$ , then  $x = 0$  or  $y = 0$ .
4. T F The degree of a polynomial is its leading term.
5. T F  $-3^2 = 9$ .
6. T F To solve  $(x - 3)(x + 5) = 15$ , solve  $x - 3 = 15$  and  $x + 5 = 15$ .
7. T F The number  $13.783 \times 10^{23}$  is written in scientific notation.
8. T F  $(a^m)^n = a^{m+n}$ .
9. T F A term is a polynomial.
10. T F Two polynomials are equal if they have the same degree.

Fill in each of the blanks to make the statements true. (2 pts each)

11. The **opposite** of a polynomial is a polynomial obtained by changing the sign of each term of the polynomial.
12. The sum of two polynomials is a **polynomial** obtained by adding like terms of the two polynomials.
13. A first degree polynomial is called a **linear** polynomial.
14. The degree of a polynomial is the degree of the **leading** term.
15. The **leading** term of a polynomial is the term with largest degree.
16. A term is a **number**, a **letter**, or a product of **numbers** and **letters**.
17. Factoring a polynomial is a **trial** and **error** procedure.
18. To factor a number or algebraic expression means to write the number or expression as a **product**.
19.  $(a + b)^2 = a^2 + 2ab + b^2$ .
20.  $a^2 - b^2 = (a + b)(a - b)$ .

a)  $x^3$

b)  $3x^2 - 8x + 5$

c) 9

d)  $4x + 5 = 9$

e)  $\sqrt{3}x^5 + 2x^3 - \frac{3}{2}x^2 - x + 28$

f)  $3x^{-5} + 5x^2 + 3$

g)  $3^{-2}x^2 + 5x + \frac{2}{3}$

h)  $x^4 + x^3 + 5$

j)  $(x + 4)(x + 3)$

k)  $\sqrt{x^4 + x^2 + 16}$

21. (10 points) For this question refer to the list a – k above. In each case circle the correct response.

a. Which items in the above list are polynomials?

**a b c** d e f **g h j** k

b. Which items in the above list are trinomials?

a **b c** d e f **g h j** k

c. Which items in the above list are quadratic polynomials?

a **b c** d e f **g h j** k

d. Which items in the above list are polynomials with all natural number coefficients?

**a** b c d e f g **h j** k

e. Which items in the above list are terms?

**a b c** d e f g h j k

22. (5 points) Evaluate each of the following:

a)  $7^0 = 1$

b)  $-7^0 = -1$

c)  $(-4)^2 = 16$

d)  $3x^0 = 3$

e) What is the base in the exponential expression  $-3^4$  ? **-3**

23. (10 points) Rewrite each expression as directed.

a. Write  $64^{-1}y^6x^{-5}$  with positive exponents only.

$$64^{-1}y^6x^{-5} = \frac{y^6}{64x^5}$$

$$\frac{5^{37}x^{-3}}{y^4}$$

b. Write  $\frac{5^{37}x^{-3}}{y^4}$  with negative exponents only.

$$\frac{5^{37}x^{-3}}{y^4} = \frac{x^{-3}y^{-4}}{5^{-37}}$$

c. Simplify and write your answer with positive exponents only  $(-2^{-2}y)^3$

$$(-2^{-2}y)^3 = \left(\frac{-y}{2^2}\right)^3 = \frac{-y^3}{2^6}$$

d. Write  $2.853 \times 10^{-7}$  in standard notation **0.0000002853**

e. Write 47,850,000 in scientific notation  **$4.785 \times 10^7$**

24. **(5 points)** Write the sum of  $3x^5$  and  $-8x^5$

$$3x^5 + (-8x^5) = -5x^5$$

25. **(5 points)** Compute the product  $(x + y)^2$ .

$$(x + y)^2 = x^2 + 2xy + y^2$$

26. **(5 points)** Compute the product. Write the product in scientific notation.  $(33 \times 10^{-12})(4 \times 10^{-8})$

$$(33 \times 10^{-12})(4 \times 10^{-8}) = (33)(4) \times 10^{-12+(-8)} = 132 \times 10^{-20} = 1.32 \times 10^{-18}$$

27. **(5 points)** Perform the division and write your result in scientific notation.  $\frac{1.2 \times 10^9}{0.6 \times 10^{-5}}$

$$\frac{1.2 \times 10^9}{0.6 \times 10^{-5}} = \frac{1.2}{0.6} \times 10^{9-(-5)} = 2 \times 10^{14}$$

28. **(5 points)** Factor  $4x^2 - 25 = (2x + 5)(2x - 5)$

29. (5 points) Factor  $x^2 + 10x + 16 = (x + 8)(x + 2)$

30. (5 points) Factor  $5x^2 + 16x + 3 = (5x + 1)(x + 3)$

31. (5 points) Factor  $6x^2 - 13x - 8 = (2x + 1)(3x - 8)$

32. (5 points) Factor  $x^2 - 2xy + y^2 = (x - y)^2$

33. (5 points) Multiply  $(5x^3 + 7)(2x^2 - 2x + 1)$ . Add (combine) all like terms. Write your answer in descending order of exponents.

$$(5x^3 + 7)(2x^2 - 2x + 1) = 10x^5 - 10x^4 + 5x^3 + 14x^2 - 14x + 7$$

34. (5 points) Use long division for polynomials to divide  $6x^3 - 16x^2 + 17x - 6$  by  $3x - 2$

$$\begin{array}{r} 2x^2 - 4x + 3 \\ 3x - 2 \overline{) 6x^3 - 16x^2 + 17x - 6} \\ \underline{6x^3 - 4x^2} \phantom{+ 17x - 6} \\ -12x^2 + 17x - 6 \\ \underline{-12x^2 + 8x} \phantom{- 6} \\ 9x - 6 \\ \underline{9x - 6} \\ 0 \end{array}$$