Name: Date:
Scarsdale Middle School Popham House Mr. Weiss

Unit 5 Review – Levels Two and Three

(1 – 36) Simplify. No answer may contain negative exponents, and no fraction may contain a decimal or another fraction.

1) 3^2 2) -4^2 3) $(-5)^2$ 4) 2^{-3}

5) -5^{-3} 6) $(-4)^{-3}$ 7) 6^0 8) -8^0

9) $(\frac{3}{4})^3$ 10) $(\frac{2}{5})^{-2}$ 11) $(.5)^{-4}$ 12) $(3\frac{1}{3})^{-3}$

13) $x^5 + x^5 + x^5$ 14) $(a^3)(a^5)$ 15) $(-5y^2)(4y^3)$

16) $(5m)(4m^5) + (6m^2)(2m^4)$ 17) $(w^5)^4$ 18) $(-3q^3)^4$

19) $(-5df^4)^3$ 20) $\left(\frac{1}{3}a^{-3}b^7\right)^{-3}$ 21) $\left(-4x^3y^{-2}\right)\left(\frac{1}{2}xy^{-3}\right)^{-5}$

22) $2^{-3}x^2y^{-7}$

23) $(-2)^3 - (.2)^{-2}$

24) $(4^{2x})(4^{x-3})(4^{2-3x})$

25) $(32{,}467)^{-1}(32467)$

26) $(-4x)^2 + 4x^2$

27) $\dfrac{b^{10}}{b^2}$

28) $\dfrac{24x^3}{8x^5}$

29) $\dfrac{-18mn^5p}{12mn^2p^8}$

30) $\left(\dfrac{2a^5b}{4a^2b^5}\right)^{-3}$

31) $\dfrac{\left(\frac{1}{3}\right)^3}{\left(\frac{1}{6}\right)^2}$

32) $\dfrac{(2x^4)^3(3x^2)}{(5x)(4x^7)}$

33) $\dfrac{8x^0y^{-4}}{3^{-1}z^3}$

34) $\dfrac{(5^3)^6}{(5^{-4})(5^{24})}$

35) $\dfrac{4^{-3}x}{2^{-5}x^{-3}}$

36) $\dfrac{7^{x+5}}{7^{x+3}}$

Write each in scientific notation:

37) 65,400,000

38) 0.000067

Perform the indicated operation. Express your answer in scientific notation:

39) $(6.7 \times 10^{8})(4.5 \times 10^{3})$

40) $\dfrac{.48 \times 10^{12}}{.8 \times 10^{-4}}$

41) $(3 \times 10^{9}) + (4 \times 10^{12})$

(41-44) Solve for x:

*42) $9^{x} = 27^{x-2}$

*43) $125^{x-3} = 25^{x+2}$

*44) $16^{4x} = 32^{2x-6}$

*45) $5ax - 3a^{4} = 2ax + 6a^{4}$ *(express your answer in terms of a)*

*46) $(x)(5^{7})(11^{6}) = 55^{8}$

*47) If $8^{x} = 10$, what is the value of 8^{3x+2}?

*48) When written in standard form, what is the number of digits in the number $(2^{68})(5^{64})$?

49) Find the 5th term of the geometric sequence:

$a_n = 8 \cdot (\frac{1}{4})^{n-1}$

50) Find the 4th term of the geometric sequence:

$a_n = \frac{1}{9} \bullet (3)^{n-1}$

51) In a geometric sequence, if $a_{12} = -4$ and $r = -2$, Find a_{10}.

52) In a geometric sequence, if $a_{28} = 50$ and $r = ½$, Find a_{30}.

53) Find the explicit formula for the nth term of the geometric sequence: 4, 6, 9, 13.5, …

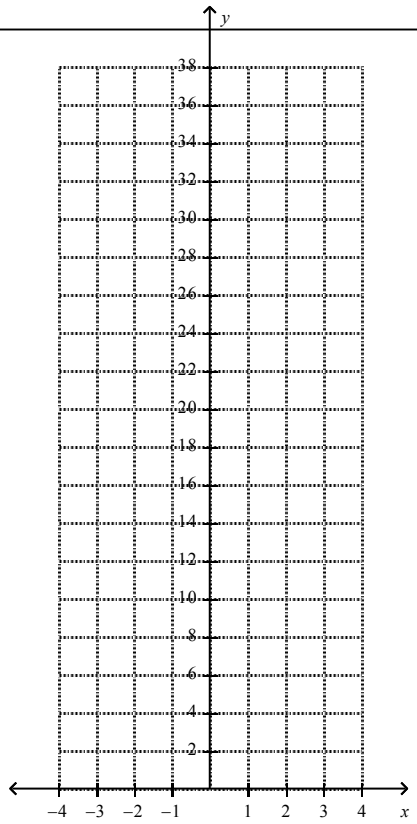
54) Find the explicit formula for the nth term of the geometric sequence below: 64, 16, 4, 1, …

55) In a geometric sequence, $a_5 = 768$ and $a_2 = 12$, find the explicit formula for the nth term.

56) In a geometric sequence, $a_5 = 3888$ and $a_3 = 108$, find the explicit formula for the nth term.

57) Graph the exponential function:

$y = \frac{1}{2} \bullet (4)^x$



58) The half-life of Uranium 234 is 2.5 x 10^5 years and the half-life of Plutonium is 8.0 x 10^7 years. How many times greater is the half-life of Plutonium than Uranium 234? Express your answer in scientific notation.

59) Potassium-42 has a half-life of 12.4 hours. How much of an 848 g sample will remain after 62 hours?

60) In 1995, there were 85 rabbits in a park. The population increased 12% each year. How many rabbits were in the park in 2005?

61) In 1990, the cost of tuition at a private university was $12,000. If tuition increased 7.2% per year, what is the cost of the tuition in 2015?

62) A heavy piece of equipment was purchased for $200,000. If it depreciates at 15% per year, what is the value of the equipment after 6 years?

63) $25,000 was deposited in an account, and earns 4.8% annual interest. Find the value of the account after 30 years if the interest was compounded:

a. Annually b. Quarterly c. Monthly

64) Write the equation of the exponential function that passes through each pair of points.

a. (3, –40) and (5, –160) b. (2, 1) and (–2, 81)

Answers

1) 9
2) –16
3) 25
4) 1/8
5) –1/125
6) –1/64
7) 1
8) –1
9) 27/64
10) 25/4
11) 16
12) 27/1000
13) $3x^5$
14) a^8
15) $-20y^5$
16) $32m^6$
17) w^{20}
18) $81q^{12}$
19) $-125d^3f^{12}$
20) $27a^9/b^{21}$
21) $-128y^{13}/x^2$
22) $x^2/8y^7$
23) –33
24) ¼
25) 1
26) $20x^2$
27) b^8
28) $3/x^2$
29) $-3n^3/2p^7$
30) $8b^{12}/a^9$
31) 4/3
32) $6x^6/5$
33) $24/y^4z^3$
34) 1/25
35) $x^4/2$
36) 49
37) 6.54×10^7
38) 6.7×10^{-5}
39) 3.015×10^{12}
40) 6×10^{15}
41) 4.003×10^{12}
42) 6
43) 13
44) –5
45) $3a^3$
46) 605
47) 64,000
48) 66
49) 1/32
50) 3
51) –1
52) 12.5
53) $a_n = 4(1.5)^{n-1}$
54) $a_n = 64(1/4)^{n-1}$
55) $a_n = 3(4)^{n-1}$
56) $a_n = 3(6)^{n-1}$
58) 3.2×10^2
59) 26.5 g
60) 264
61) $68,242
62) $75,430
63) a. $102,042
b. $104, 617
c. $105,215

64) a. $y = -5(2)^x$
b. $y = 9(1/3)^x$