

9.2

## SM3 Exponents Review &amp; Solving by Changing Base 2018-19

35

Key

Name \_\_\_\_\_

Date \_\_\_\_\_

Period \_\_\_\_\_

Simplify without using a calculator. Show all work.

1.  $3^2 = 9$

2.  $5^{-2} = \frac{1}{5^2} = \frac{1}{25}$

3.  $\frac{1}{6^{-3}} = 6^3 = 216$

4.  $\left(\frac{1}{5}\right)^3 = \frac{1^3}{5^3} = \frac{1}{125}$

5.  $\left(\frac{1}{7}\right)^{-2} = 7^2 = 49$

6.  $3x^2 = 3x^2$

7.  $(3x)^2 = 3^2x^2 = 9x^2$

8.  $x^4x^2 = x^6$

9.  $\frac{x^5}{x^3} = x^2$

10.  $64^{\frac{5}{3}} = \left(\sqrt[3]{64}\right)^5 = 4^5 = 1024$

11.  $\frac{1}{4^{-\frac{3}{2}}} = 4^{\frac{3}{2}} = \left(\sqrt{4}\right)^3 = 2^3 = 8$

12.  $(25)^{\frac{3}{2}} = \left(\sqrt{25}\right)^3 = 5^3 = 125$

13.  $(4x^2)(-2x^5) = -8x^7$

14.  $\frac{5^{-20}x^8}{x^3} = -5x^5$

15.  $\left(\frac{x^4}{x^3}\right)^2 = \frac{x^8}{x^6} = x^2$

16.  $7^{\frac{1}{2}} = \sqrt{7}$

17.  $8^{\frac{2}{3}} = \left(\sqrt[3]{8}\right)^2 = 2^2 = 4$

18.  $27^{\frac{1}{3}} = \sqrt[3]{27} = 3$

Solve each equation. Show your work!!

19.  $7^2 = 7^x$

$$x = 2$$

22.  $5^{2x} = \frac{1}{25}$

$$5^{2x} = 5^{-2}$$

$$2x = -2$$

$$x = -1$$

25.  $8^n = \frac{1}{2}$

$$2^{3n} = 2^{-1}$$

$$3n = -1$$

$$n = -1/3$$

28.  $4^{(1-2x)} = 2$

$$2^{2(1-2x)} = 2^1$$

$$2(1-2x) = 1$$

$$2 - 4x = 1$$

$$-4x = -1$$

$$x = 1/4$$

31.  $(\frac{1}{2})^{3-x} = 8^3$

$$2^{-1(3-x)} = 2^{3 \cdot 3}$$

$$-1(3-x) = 9$$

$$-3 + x = 9$$

$$x = 12$$

34.  $16^{x+1} = 4^3$

$$4^{2(x+1)} = 4^3$$

$$2(x+1) = 3$$

$$2x + 2 = 3$$

$$2x = 1$$

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

20.  $4^{-2x-2} = 4^{3x}$

$$-2x - 2 = 3x$$

$$-2 = 5x$$

$$\frac{-2}{5} = x$$

23.  $(\frac{1}{4})^{-2x-1} = 16$

$$(4)^{-1(-2x-1)} = 4^2$$

$$-1(-2x-1) = 2$$

$$2x + 1 = 2$$

$$2x = 1 \quad x = 1/2$$

26.  $2^{-x-3} = 2^{x-2}$

$$-x - 3 = x - 2$$

$$-1 = 2x$$

$$-1/2 = x$$

29.  $8^{(6+3x)} = 4$

$$2^{3(6+3x)} = 2^2$$

$$3(6+3x) = 2$$

$$18 + 9x = 2$$

$$9x = -16$$

$$x = -16/9$$

32.  $5^x = 25^{3-2x}$

$$5^x = 5^{2(3-2x)}$$

$$x = 2(3-2x)$$

$$x = 6 - 4x$$

$$\frac{-6}{-5} = \frac{-5x}{-5}$$

$$6/5 = x$$

35.  $\frac{1}{5^x} = 25$

$$5^{-x} = 5^2$$

$$-x = 2$$

$$x = -2$$

21.  $3^{-2x} = 27$

$$3^{-2x} = 3^3$$

$$-2x = 3$$

$$x = -3/2$$

24.  $81^{-x+3} = \frac{1}{3}$

$$3^{4(-x+3)} = 3^{-1}$$

$$4(-x+3) = -1$$

$$-4x + 12 = -1$$

$$-4x = -13$$

$$x = 13/4$$

27.  $81^{3x} = (\frac{1}{9})^{2-2x}$

$$9^{2(3x)} = 9^{-1(2-2x)}$$

$$2(3x) = -1(2-2x)$$

$$6x = -2 + 2x$$

$$4x = -2$$

$$x = -1/2$$

30.  $9^x = 3^{x-1}$

$$3^{2x} = 3^{x-1}$$

$$2x = x - 1$$

$$x = -1$$

33.  $(\frac{1}{9})^x = 27$

$$3^{2 \cdot -1x} = 3^3$$

$$-2x = 3$$

$$x = \frac{-3}{2}$$