CP – Algebra 1
Chapter 8 Student Targets

Name Key
Teacher _____ Pd ____

8 I can use previous skills learned as they apply to Chapter 8 topics.

8.1A I can multiply exponential expressions.

Ex 1a: Multiply the following expressions:

a. $5^4 \cdot 5^8$ $5^{12} = 244{,}140{,}625$

b. $(3^5)(3^1)$ $3^6 = 729$

c. $x^5 \cdot x^3$ x^8

8.1B I can raise exponential expressions to a power.

Ex 1b: Simplify the following expressions:

a. $(b^2)^7$ b^{14}

b. $(-3x)^4$ $(-3)^4x^4 = 81x^4$

c. $(3m^7)^4 \cdot m^3$ $(3)^4 m^{28} \cdot m^3 = 81m^{31}$

8.1C I can raise a product to a power.

Ex 1c: Simplify the following expressions:

a. $(2 \cdot 3)^3$ $= 2^3 \cdot 3^3$ $= 8 \cdot 27 = 216$

b. $(x \cdot y)^8$ x^8y^8

c. $(x^2 \cdot u^4)^6$ $x^{12}u^{24}$

8.1D I can apply the concepts learned to solve word problems.

Ex 1d: You are designing a wall mural that will be composed of squares of different sizes. One of the requirements of your design is that the side length of each square is itself a perfect square.

a. *If you represent the side length of a square as x^2, write an expression for the area of a mural square.*

$A = s^2$, if $s = x^2$ then ... $A = (x^2)^2 \Rightarrow A = x^4$

b. *Find the area of a mural square when $x = 5$*

$A = x^4 \Rightarrow A = 5^4 \Rightarrow A = 625\,u^2$

8.2A I can divide exponential expressions with the same base.

Ex 2a: Simplify: $\frac{1}{y^6} \cdot y^{15}$ $= \frac{y^{15}}{y^6} = y^{15-6} = y^9$

8.2B I can raise a quotient to a power.

Ex 2b: Simplify each of the following expressions:

a. $\left(\frac{a}{b}\right)^8$ $= \frac{a^8}{b^8}$

b. $\left(\frac{a^3}{2b^5}\right)^4$ $= \frac{a^{12}}{2^4b^{20}}$ $= \frac{a^{12}}{16b^{20}}$

c. $\frac{1}{4x^5} \cdot \left(\frac{2x^2}{y^3}\right)^5$ $= \frac{1}{4x^5} \cdot \frac{2^5x^{10}}{y^{15}}$ $= \frac{32x^{10}}{4x^5y^{15}} = \frac{8x^5}{y^{15}}$

8.2C I can apply the concepts learned to solve word problems

Ex 2b: The distance from the Earth to the nearest galaxy is about 10^{22} meters. The distance from the Earth to the North Star is about 10^{19} meters. How many times further from Earth is the nearest galaxy than the North Star?

$\frac{10^{22}}{10^{19}} = 10^3 = 1000$

8.3 A I can simplify expressions using exponents that are zero or negative numbers.

Ex 3a: 1. Evaluate each expression:

a. 10^{-3} $\frac{1}{10^3} = \frac{1}{1000}$

b. $\left(\frac{4}{3}\right)^0$ 1

c. $4^{-6} \cdot 4^3$ $4^{-3} = \frac{1}{4^3} = \frac{1}{64}$

d. $\frac{1}{5^{-4}}$ $= 5^4 = 625$

2. Simplify each expression:

a. $6y^{-4}$ $\frac{6}{y^4}$

b. a^2b^{-4} $\frac{a^2}{b^4}$

c. $(4x^{-3}y^2)^{-3}$ $4^{-3}x^9y^{-6} = \frac{x^9}{4^3y^6} = \frac{x^9}{64y^6}$

d. $(8mn^3)^0$ 1

e. $\frac{x^{-6}}{4y^5}$ $\frac{1}{4x^6y^5}$

8.3B I can apply the concepts learned to solve word problems

Ex 3b: A hole punch makes holes in your paper that have a diameter of 4^{-1} inch.

a. Write an expression for the area of one punched hole.

Use the formula $A = \pi r^2$

$d = 4^{-1} = \frac{1}{4}$

$r = \frac{1}{4}/2 = \frac{1}{8}$

$A = \pi\left(\frac{1}{8}\right)^2 \rightarrow A = \frac{\pi}{64}$

b. Your hole punch makes 3 holes in a page. Write an expression for the total area punch out of one sheet of paper.

$A = 3\left(\frac{\pi}{64}\right) \Rightarrow A = \frac{3\pi}{64}$

8.4A I can read and write values in scientific notation.

Ex 4a

a) Write each number in scientific notation: 85.2, 0.00095, 630,000

8.52×10^1 ; 9.5×10^{-4} ; 6.3×10^5

b) Write each number is standard notation: 9.1×10^8, 4.7×10^{-3}, 6.05×10^2

91,000,000 ; .0047 ; 605

8.4B I can simplify expressions using scientific notations.

Ex 4b: Evaluate each expression:

a. $(5.7\times10^{3})(2.2\times10^{-6})$ 12.54×10^{-3} 1.254×10^{-2}

b. $\dfrac{6.5\times10^{-7}}{1.3\times10^{-3}}$ 5×10^{-4} 5.0×10^{-4}

c. $(3\times10^{-9})^{4}$ $3^{4}\times(10^{-9})^{4}$ 81×10^{-36} 8.1×10^{-35}

8.4C I can compare numbers in standard decimal notation with numbers presented in scientific notation as well as comparing two numbers both of which are presented in scientific notation.

Ex 4c: Order the numbers from least to greatest:

$1.305\times10^{-3}, 0.000526, 2.018\times10^{-3}, 0.00205$

5.26×10^{-4} 2.05×10^{-3}

(2) (1) (3) (4)

$.000526$; 1.305×10^{-3} ; 2.018×10^{-3} ; $.00205$

8.4D I can apply the concepts learned to solve word problems

Ex 4d: Texas has an area of approximately 4.11×10^{5} square kilometers. In 2000, the population of Texas was approximately 3.39×10^{7} people. How many people were there per square kilometer in Texas in 2000?

$\dfrac{3.39\times10^{7}}{4.11\times10^{5}} \approx 0.8248175\ldots\times10^{2}$

$= 8.248\times10^{1}$ people per km^{2}

8.5A I can write and graph exponential growth models.

Ex 5a: Graph each function and identify its domain and range.

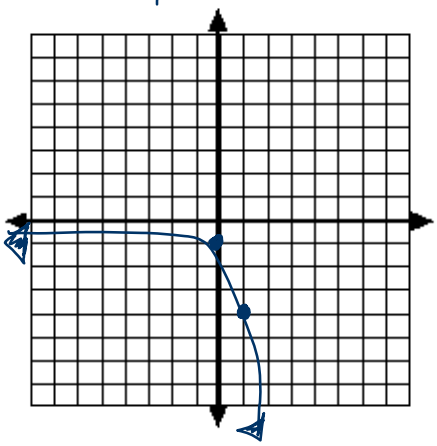
1. $y=-4^{x}$

$x=0 \rightarrow -4^{0}=-1$, point = $(0,-1)$

$x=1 \rightarrow -4^{1}=-4$, point = $(1,-4)$

Domain: All real #'s

Range: $y<0$



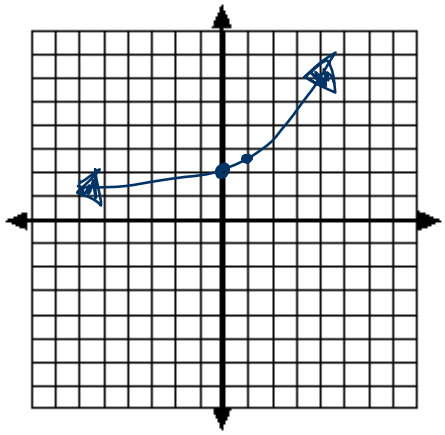
2. $y=2\cdot\left(\dfrac{4}{3}\right)^{x}$

$x=0 \rightarrow 2\cdot\left(\frac{4}{3}\right)^{0}=2$, point = $(0,2)$

$x=1 \rightarrow (2)\left(\frac{4}{3}\right)^{1}=\frac{8}{3}$ point = $\left(1,\frac{8}{3}\right)$

Domain: All real #'s

Range: $y>0$



8.5B I can apply the concepts learned to solve word problems.

Ex 5b: You deposit $200 in a savings account that earns 3% interest compounded yearly. Find the balance in the account after 5 years.

$y = a(1+r)^t$

$y = 200(1+.03)^5$ → $y = 200(1.159274\ldots)$

$y = \$231.85$

8.6A I can write and graph exponential decay models.

Ex 6a: Graph each function.

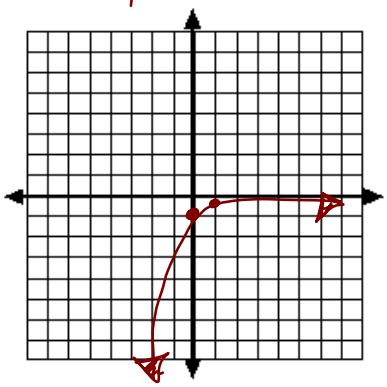
1. $y = -\left(\frac{1}{8}\right)^x$

$x = 0 \rightarrow -(\frac{1}{8})^0 = -1$, point = $(0, -1)$

$x = 1 \rightarrow -(\frac{1}{8})^1 = -\frac{1}{8}$ point = $(1, -\frac{1}{8})$

Domain: All real #'s

Range: $y < 0$



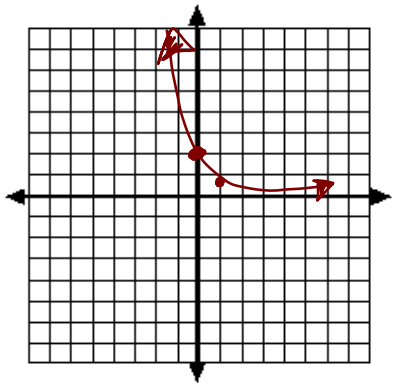
2. $y = 2 \cdot (0.25)^x$

$x = 0 \rightarrow 2 \cdot (.25)^0 = 2$, point = $(0, 2)$

$x = 1 \rightarrow 2 \cdot (.25)^1 = \frac{1}{2}$ point = $(1, \frac{1}{2})$

Domain: All real #'s

Range: $y > 0$



8.6B I can use exponential decay models to solve problems.

Ex 6b: A school district bought a bus in 1990 for $54,000. The value of the tractor has been decreasing at a rate of 3% per year.

a. Use the information to write an exponential decay model

$y = a(1-r)^t$ → $y = 54{,}000(1-.03)^t$ → $y = 54{,}000(.97)^t$

b. What was the approximate value of the bus in 1998?

$y = 54000(.97)^8$ → $y = 54000(.783743\ldots)$

$y = \$42{,}322.14$

8.6C I can distinguish between exponential growth and exponential decay

Ex 6c: For a and b, determine whether each situation is exponential growth or exponential decay – you do not have to solve!

a. You deposit $5,800 into an account that pays 3% interest compounded annually.

growth

b. A car collector bought a car in 1998 for $25,000. The value of the car has been decreasing at a rate of 12% per year.

decay