Unit 3: Exponents Day 5

Math 9 Principles

3-4: I can convert a negative power to a positive power and evaluate a zero power with integer and fraction bases.

Simplify each using exponent laws. Keep your answer in exponential form.

1) $2^8 \cdot 2^2$	2) $2^{-7} \cdot 2^{15}$	3) $(2^5)^3$
4) $(2^7)^3 \cdot (2^4)^2$	5) $\frac{3^8}{3^3}$	6) $\frac{5^8 \cdot 5^3}{5^5}$
7) 7^0	8) $\frac{(7^4)^3}{(7^6)^2}$	9) $\frac{(6^2)^3(6^{-4})^5}{(6^3)^{-4}}$
10) $\frac{(6^3)^4}{(6^2)^3}$	11) $\frac{512^3 \cdot 256^{-4}}{32^{-3}}$	12) $\frac{(15^2)^4}{15^3}$
13) $\left(\frac{1}{2}\right)^{-2}$	14) $\left(\frac{2}{3}\right)^{-3}$	15) $\left(\frac{3}{4}\right)^{-2}$

16) $\left(\frac{1}{4}\right)^{-3}$	17) $\left(\frac{3}{5}\right)^{-2}$	18) $\frac{2^{-4}}{5^{-2}}$
19) $\frac{3^{-2}}{4^{-1}}$	20) $\frac{2^{-3}}{5^{-2}}$	21) $\left(\frac{4^{-3}}{3^{-2}}\right)^{-2}$

Simplify where necessary using exponent laws. Rewrite all solutions as integers or fractions

22) 3^{-2}	23) $(-2)^{-3}$	24) $-(-3)^{-2}$
25) $\frac{1}{2^{-4}}$	26) $\frac{(2^2)^3 \cdot (2^3)^4}{(2^5)^{-3}}$	27) $\frac{1024^{-2} \cdot 64^{-3}}{16^{-8}}$
28) $-(-2)^{-5}$	29) $\frac{3^8}{3^{11}}$	30) $\frac{1}{5^{-2}}$
31) $(2^3)^{-3}$	32) $\frac{2^{-4} \cdot 2^{-2}}{2^{-3} \cdot 2^{-6}}$	33) $\frac{1024^{-2} \cdot 128^{-3}}{512^{-2} \cdot 64^{-3}}$

Problem Solving. Answer in exponential form.

34) In biology, cells can grow according to a doubling pattern. If they begin with 1 cell on day 1 and double every day, how many cells would there be on:

a) Day 3	b) Day 4
c) Day 5	d) Day 6
e) Day 10	f) Day 25
g) Day 50	h) Day 100

35) How many times great is 10^{15} than 10^{12}?

36) If a planet can orbit through a distance of 10^{12} km in 10^{3} hours, give its rate of speed in km/h.

37) A square chip has side lengths of 10^{-6} metres. What is its area in square meters?

38) How long (in hours) would it take a meteor travelling at 10^{6} km/h to travel a distance of
10^{15} km?