Unit 3: Exponents Day 2

Math 9 Principles

3-2: I can use the exponent laws for products and quotients.

(add exponents for products of same bases, subtract for quotients)

A) Simplify each into a single power.

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

16) Rewrite each number with a base 2, then simplify. $\frac{1024 \cdot 512}{32 \cdot 8}$

17) Rewrite each number with a base 3, then simplify. $\frac{59049 \cdot 19683}{729}$

18) If there are estimated to be 10^{11} galaxies in the known universe and 10^{11} stars in each galaxy, how many stars are estimated to be in the universe?

19) If a spaceship can travel at a rate of about 10^5 km per second, how long, in seconds, would it take to reach a star that is 10^{13} km away?

20) Suppose a computer storage array was divided into 2^8 partitions and that each partition could store 2^{26} bytes of data. How many bytes of data could the entire storage array hold, in total?

21) A space probe can travel at 10^{12} km in 10^9 hours. How far can it travel (in km) in 10^{27} hours? (Hint: First convert its speed to km/h.)

22) A (very) successful business person calculated that she earned 2^8 dollars in each minute of each day. If there are roughly 2^{19} minutes in a year, how much, in total, was earned that year?

23) Suppose a comet can travel 10^8 km in 10^3 hours. Calculate how far it can travel in 10^{12} hours.

24) If an object has a speed of 10^9 km/h, how many hours would it take to travel 10^{32} km?