Algebra 1 Bellwork Monday, April 11, 2016

Simplify each. Write the answer without zero or negative exponents. Give fractional answers in reduced form, no decimals.

1. $\frac{-5^2a^{-4}b^9}{2^{-3}c^2d^{-7}}$

2. $\frac{8x^{-8}y^5z^7}{32x^{-6}y^9z^{-3}}$

3. $(-10P^{-4}Q^3R)^2(2P^{-6}Q^{-4}R^2)^{-3}$

4. $\left(\frac{6g^{-5}h^2}{4g^6h^{-1}}\right)^{-4}$

5. Evaluate each expression for $X = -6$ $Y = 4$ $Z = 12$

Give fractional answers in reduced form. No decimals.

a. $-2X^2Y^{-3}$

b. $\frac{X^{-1}Z^2}{Y^{-2}}$

6. Write the growth/decay factor that this % change represents: 13.9% increase

$b =$

7. Give the % change this exponential equation represents and state if it is an increase or decrease.

$y = 2025(0.0901)^x$ %change = inc or dec?

8. The half-life of a certain radioactive material is 40 minutes. You have 625 grams of this material at 9:00 am.

a) Model this situation with an exponential equation.

b) Find the amount of material remaining at 5:30pm the same day. Round to the nearest hundredth.

9. The population in a city has been decreasing 2.71% each year. The population in 2005 was 145,080.

a) Model this situation with an exponential equation.

b) Find the population in 1999.

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Answers

Simplify each. Write the answer without zero or negative exponents. Give fractional answers in reduced form, no decimals.

1. $\frac{-5^2a^{-4}b^9}{2^{-3}c^2d^{-7}}$ $= \frac{-25\,b^9\,8\,d^7}{a^4c^2}$ $= \frac{-200b^9d^7}{a^4c^2}$

2. $\frac{8x^{-8}y^5z^7}{32x^{-6}y^9z^{-3}}$ $= \frac{z^{10}}{4x^2y^4}$

3. $(-10P^{-4}Q^3R)^2(2P^{-6}Q^{-4}R^2)^{-3}$

$(100\,p^{-8}q^6R^2)(2^{-3}p^{18}q^{12}R^{-6})$

$\frac{100\,p^{10}q^{18}}{8\,R^4} = \frac{25P^{10}q^{18}}{2R^4}$

4. $\left(\frac{6g^{-5}h^2}{4g^6h^{-1}}\right)^{-4} = \left(\frac{3\,h^3}{2\,g^{11}}\right)^{-4} = \left(\frac{2g^{11}}{3\,h^3}\right)^4 = \frac{16g^{44}}{81h^{12}}$

5. Evaluate each expression for $X = -6$ $Y = 4$ $Z = 12$

Give fractional answers in reduced form. No decimals.

a. $-2X^2Y^{-3}$ $-9/8$

$= \frac{-2X^2}{Y^3} = \frac{-2(-6)^2}{4^3} = \frac{-2(36)}{64}$

$= -72/64 = -9/8$

b. $\frac{X^{-1}Z^2}{Y^{-2}} = \frac{Y^2Z^2}{X}$

$= \frac{(4)^2(12)^2}{-6} = \frac{16\cdot144}{-6} = -384$

6. Write the growth/decay factor that this % change represents: 13.9% increase

$b = 1.139$ $100 + 13.9 = 113.9\,\%$

7. Give the % change this exponential equation represents and state if it is an increase or decrease.

$y = 2025(0.0901)^x$ %change = $-90.99\,\%$ inc or dec? DEC

$\frac{\times 100}{9.01 - 100 = -90.99}$

8. The half-life of a certain radioactive material is 40 minutes. You have 625 grams of this material at 9:00 am.

a) Model this situation with an exponential equation. $y = 625(.5)^x$

b) Find the amount of material remaining at 5:30pm the same day. Round to the nearest hundredth.

9:00am to 5:30pm = 8.5hrs

$X = 8.5\text{hrs} \times 60 = 510\text{min} \div = 12.75$

$y = 625(.5)^{12.75}$

$y = 0.099$

9. The population in a city has been decreasing 2.71% each year. The population in 2005 was 145,080.

a) Model this situation with an exponential equation. $100 - 2.71 = 97.29\,\%$

$y = 145{,}080(.9729)^x$

b) Find the population in 1999.

$X = 1999 - 2005 = -6$ $y = 145{,}080(.9729)^{-6} = 171{,}080$