Algebra 1   Bellwork   Monday, March 21, 2016

1. The distance from the earth to the sun is approximately 9.3×10^7 miles. The path the earth takes is an ellipse but for approximation we will use a circle. The formula for the circumference of a circle is $C = 2\pi r$. Use this formula to appriximate the distance the earth travels in one year. Round decimals to the nearest thousandth. Give your answer in both Scientific Notation and Standard Notation.

2. Evaluate the given expression for when $P = -4$, $R = 6$, and $Q = -2$. If your answer is a fraction reduce it. No decimals.

$$\left(\frac{P^2 R^{-1}}{Q^2} \right)^{-2}$$

3. Simplify each. Make sure your answers don't containt any exponents that are negative or zero. Give fractional answers in reduced form.

a) $\dfrac{5^{-2} a^{-4} b^5}{2 c^0 d^{-6}}$

b) $(2m^6 n^{-4} p)^3 (6^{-1} m^{-2} n^3 p^2)^{-2}$

c) $\left(\dfrac{3 e^5 g^{-3}}{e^{-2} g^6} \right)^3 \left(\dfrac{6 e^{-4} g}{e^{-9} g^{-7}} \right)^{-1}$

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$$2(\pi)(9.3 \times 10^7) = 584336233.6 \text{ miles} \longrightarrow 5.843 \times 10^8 \text{ miles}$$

2. Evaluate the given expression for when $P = -4$, $R = 6$, and $Q = -2$. If your answer is a fraction reduce it. No decimals.

$$\left(\frac{P^2 R^{-1}}{Q^2} \right)^{-2} = \left(\frac{P^2}{Q^2 R} \right)^{-2} = \left(\frac{Q^2 R}{P^2} \right)^2 = \frac{Q^4 R^2}{P^4} = \frac{(-2)^4 \cdot (6)^2}{(-4)^4} = \frac{16 \cdot 36}{256} = \frac{576}{256} = \frac{9}{4}$$

3. Simplify each. Make sure your answers don't containt any exponents that are negative or zero. Give fractional answers in reduced form.

a) $\dfrac{5^{-2} a^{-4} b^5}{2 c^0 d^{-6}}$

$$= \frac{b^5 d^6}{5^2 a^4 2} = \boxed{\frac{b^5 d^6}{50 a^4}}$$

b) $(2m^6 n^{-4} p)^3 (6^{-1} m^{-2} n^3 p^2)^{-2}$

$$\left(2^3 m^{18} n^{-12} p^3 \right) \left(6^2 m^4 n^{-6} p^{-4} \right)$$

$$8 m^{22} n^{-18} p^{-1} \, 36$$

$$= \boxed{\frac{288 m^{22}}{n^{18} p}}$$

c) $\left(\dfrac{3 e^5 g^{-3}}{e^{-2} g^6} \right)^3 \left(\dfrac{6 e^{-4} g}{e^{-9} g^{-7}} \right)^{-1}$

$$= \left(\frac{3 e^7}{g^9} \right)^3 \left(\frac{6 e^5 g^8}{1} \right)^{-1} = \frac{27 e^{16}}{6 \, g^{35}}$$

$$= \left(\frac{3^3 e^{21}}{g^{27}} \right) \left(\frac{1}{6 e^5 g^8} \right) = \boxed{\frac{9 e^{16}}{2 g^{35}}}$$

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