

6.9 Review

Simplify. Your answer should contain only positive exponents.

$$1) (a^{-3}b^2)^{-1} \cdot 2ba^{-3}$$

$$= b^{-2} \cdot 2ba^{-3}$$

$$a^0 b^{-1} = 2b^{-1} = \boxed{\frac{2}{b}}$$

$$2) \frac{(p^2q^2r^2)^4}{p^3q^{-4}} = \frac{p^8q^8r^8}{p^3q^{-4}} = \boxed{\frac{5 \ 12 \ 8}{p \ q \ r}}$$

$$3) \frac{-4yx^{-4}}{-3y^{-3} \cdot x^3y^0} = \frac{-4yx^{-4}}{-3x^3y^{-3}} =$$

$$y^4x^{-7} = \boxed{\frac{4y^4}{3x^7}}$$

$$4) \left(\frac{2y^0z^{-2}}{2x^{-1}z^3}\right)^4 = \frac{16y^0z^{-8}}{16x^{-4}z^{12}} = \frac{y^0z^{-20}}{x^{-4}}$$

$$= \boxed{\frac{x^4}{z^{20}}}$$

5) The population of New York was 300,000 in 1800. The population increases by 2.1% each year. Following this model, what is the projected population for New York in 2010?

$$f(t) = 300,000(1.021)^{210}$$

$$\approx 23,579,093 \text{ people.}$$

6) After taking medication, the concentration of medication in the bloodstream decreases by 20% each hour. If Charlotte takes 200 mg of the medication at 6:00 AM, how much remains in her bloodstream at 10:00 AM?

$$f(t) = 200(.8)^4$$

$$\approx 82 \text{ mg}$$

Simplify.

$$7) \sqrt{128}$$

$$= \sqrt{64 \cdot 2}$$

$$= \sqrt{64} \cdot \sqrt{2}$$

$$= \boxed{8\sqrt{2}}$$

$$8) -\sqrt{27} + 3\sqrt{12} = -\sqrt{9 \cdot 3} + 3\sqrt{4 \cdot 3}$$

$$= -3\sqrt{3} + 3 \cdot 2\sqrt{3}$$

$$= \boxed{3\sqrt{3}}$$

$$9) \sqrt{20} \cdot 2\sqrt{5}$$

$$= 2\sqrt{100}$$

$$= 2 \cdot 10 = \boxed{20}$$

$$10) -2\sqrt{15}(-2\sqrt{6} + 4)$$

$$= 4\sqrt{90} + -8\sqrt{15}$$

$$= 4\sqrt{9 \cdot 10} - 8\sqrt{15}$$

$$= 4 \cdot 3\sqrt{10} - 8\sqrt{15}$$

$$= \boxed{12\sqrt{10} - 8\sqrt{15}}$$

$$11) \frac{5\sqrt{4}}{5\sqrt{6}} = \frac{\sqrt{4}}{\sqrt{6}} \cdot \frac{\sqrt{3}}{\sqrt{3}} =$$

$$\boxed{\frac{\sqrt{6}}{3}}$$

$$12) 6\sqrt{18b^3}$$

$$= 6\sqrt{9 \cdot 2 \cdot b^2 \cdot b}$$

$$= 6\sqrt{9} \cdot \sqrt{2} \cdot \sqrt{b^2} \cdot \sqrt{b}$$

$$= 6 \cdot 3\sqrt{2} \cdot b \sqrt{b}$$

$$= \boxed{18b\sqrt{2b}}$$