Name _____

6-1 Additional Practice

Rational Exponents and Properties of Exponents

Write each radical using a rational exponent.

1. $\sqrt[4]{7}$

2. $\sqrt[9]{10^5}$

3. $\sqrt{a^{-3}}$

4. $\sqrt[3]{b^a}$

Solve each equation.

5. $(4^{\frac{x}{2}})(4^{\frac{x}{5}}) = 4^{14}$

6. $(2^{2x+2})(2^{3x-7}) = 2^{25}$

7. $\frac{8^{\frac{x}{2}}}{4^{\frac{x}{3}}} = 2^{-\frac{5}{2}}$

8. $\left(\frac{1}{64}\right)^{\frac{x}{2}+1} = \left(\frac{1}{16}\right)^{\frac{x}{3}-3}$

9. $3 = (5^{\frac{1}{3}})(x^{\frac{1}{3}})$

10. $36^{2x-7} = 6^{x-5}$

11. Explain how to solve an equation of the form $x^{\frac{p}{q}} = a$ for nonzero integers x, p, q, and a. What is x in terms of a, p, and q?

12. A triangle has a base of $x^{\frac{1}{2}}$ m and a height of $x^{\frac{3}{4}}$ m. If the area of the triangle is 16 m^2, what are the base and the height of the triangle?

Name _____

6-1 Additional Practice

Rational Exponents and Properties of Exponents

Write each radical using a rational exponent.

1. $\sqrt[4]{7}$
   $7^{\frac{1}{4}}$

2. $\sqrt[9]{10^5}$
   $10^{\frac{5}{9}}$

3. $\sqrt{a^{-3}}$
   $a^{-\frac{3}{2}}$

4. $\sqrt[3]{b^a}$
   $b^{\frac{a}{3}}$

Solve each equation.

5. $(4^{\frac{x}{2}})(4^{\frac{x}{5}}) = 4^{14}$
   20

6. $(2^{2x+2})(2^{3x-7}) = 2^{25}$
   6

7. $\frac{8^{\frac{x}{2}}}{4^{\frac{x}{3}}} = 2^{-\frac{5}{2}}$
   -3

8. $\left(\frac{1}{64}\right)^{\frac{x}{2}+1} = \left(\frac{1}{16}\right)^{\frac{x}{3}-3}$
   $-\frac{54}{5}$

9. $3 = (5^{\frac{1}{3}})(x^{\frac{1}{3}})$
   $\frac{27}{5}$

10. $36^{2x-7} = 6^{x-5}$
    3

11. Explain how to solve an equation of the form $x^{\frac{p}{q}} = a$ for nonzero integers x, p, q, and a. What is x in terms of a, p, and q?
    Sample answer: First, raise each side to the $\left(\frac{q}{p}\right)$ power. By the Power of a Power Property, $\left(\frac{p}{q}\right)\left(\frac{q}{p}\right) = 1$, and x to the first power is x. So $x = a^{\frac{q}{p}}$.

12. A triangle has a base of $x^{\frac{1}{2}}$ m and a height of $x^{\frac{3}{4}}$ m. If the area of the triangle is 16 m^2, what are the base and the height of the triangle?
    base = 4 m, height = 8 m