Algebra II: Review 6.1-6.3
Date:

Name: Key
Period:

Evaluate the expression without a calculator.

1. $36^{3/2} = (\sqrt{36})^3$
$= 6^3$
$= 216$

2. $64^{-2/3} = \left(\frac{1}{\sqrt[3]{64}}\right)^2$
$= \frac{1}{4^2}$
$= \frac{1}{16}$

3. $-625^{3/4} = -\left(\sqrt[4]{625}\right)^3$
$= -5^3$
$= -125$

4. $(-32)^{2/5} = \left(\sqrt[5]{-32}\right)^2$
$= (-2)^2$
$= 4$

Solve the equation. Round your answers to two decimal places when appropriate.

5. $x^4 = 20$
$x = \pm\sqrt[4]{20}$
$x \approx \pm 2.11$

6. $x^5 = -10$
$x = \sqrt[5]{-10}$
$x = -\sqrt[5]{10}$
$x \approx -1.58$

7. $x^6 + 5 = 26$
$x^6 = 21$
$x = \pm\sqrt[6]{21}$
$x \approx \pm 1.66$

8. $(x + 3)^3 = -16$
$x + 3 = \sqrt[3]{-16}$
$x = -3 - \sqrt[3]{16}$
$x \approx -5.52$

Simplify the expression. Assume all variables are positive.

9. $\sqrt[4]{32} \cdot \sqrt[4]{8}$
$= 2\sqrt[4]{2} \cdot \sqrt[4]{8}$
$= 4$

10. $\left(\sqrt{10} \cdot \sqrt[3]{10}\right)^{12}$
$= 10^{\frac{12}{2}} \cdot 10^{\frac{12}{3}}$
$= 10^6 \cdot 10^4$
$= 10^{10}$
$= 10{,}000{,}000{,}000$

11. $(x^{4}y^{3})^{1/6} + 2(x^{1/3}y^{1/4})^{2}$

$= x^{\frac{2}{3}}y^{\frac{1}{2}} + 2(x^{\frac{2}{3}}y^{\frac{1}{2}})$

$= 3x^{\frac{2}{3}}y^{\frac{1}{2}}$

12. $\dfrac{3\sqrt{7^3} + 4\sqrt{7^3}}{\sqrt{7^5}}$

$\cdot \dfrac{7\sqrt{7^3}}{\sqrt{7^5}}$

$= \dfrac{49\sqrt{7}}{49\sqrt{7}}$

$= 1$

13. $\dfrac{2\sqrt{x}\ \sqrt{x^3}}{\sqrt{64x^{15}}}$

$= \dfrac{2x^2}{8x^7\sqrt{x}} \cdot \dfrac{\sqrt{x}}{\sqrt{x}}$

$= \dfrac{2x^2\sqrt{x}}{8x^8} = \dfrac{\sqrt{x}}{4x^6}$

14. $y^2\sqrt[5]{64x^6} - 6\sqrt[5]{2x^6y^{10}}$

$= 2xy^2\sqrt[5]{2x} - 6xy^2\sqrt[5]{2x}$

$= -4xy^2\sqrt[5]{2x}$

Let $f(x) = 4x^2 - x$ and $g(x) = 2x^2$. Perform the indicated operation and state the domain.

15. $f(x) + g(x)$

$= 4x^2 - x + 2x^2$

$= 6x^2 - x$

domain: $\mathbb{R}$

16. $f(x) - g(x)$

$= 4x^2 - x - 2x^2$

$= 2x^2 - x$

domain: $\mathbb{R}$

17. $f(x) \cdot g(x)$

$= (4x^2 - x)2x^2$

$= 8x^4 - 2x^3$

domain: $\mathbb{R}$

18. $\dfrac{f(x)}{g(x)} = \dfrac{4x^2 - x}{2x^2}$

$= 2 - \dfrac{1}{2x}$

domain: $\mathbb{R}$ except 0

19. $f(g(x))$

$= 4(2x^2)^2 - 2x^2$

$= 4(4x^4) - 2x^2$

$= 16x^4 - 2x^2$

domain: $\mathbb{R}$

20. $g(f(x))$

$= 2(4x^2 - x)^2$

$= 2(16x^4 - 8x^3 + x^2)$

$= 32x^4 - 16x^3 + 2x^2$

domain: $\mathbb{R}$