

Practice Quiz - 6.1-6.4

Simplify. Your answer should contain only positive exponents.

$$1) \frac{2}{2^2 \cdot (2^{-2})^0} = \frac{2}{2^2(2^0)} = \frac{2}{2^2} = 2^{-1} = \frac{1}{2}$$

$$2) \frac{2 \cdot 2^{-4}}{(2^{-4})^{-3}} = \frac{2^1 \cdot 2^{-4}}{2^{12}} = \frac{2^{-3}}{2^{12}} = 2^{-15} = \frac{1}{2^{15}}$$

↑
multiply exponents

Simplify.

$$3) n^{\frac{3}{2}} \cdot (n^{\frac{3}{2}})^2 = n^{\frac{3}{2}} \cdot n^3 = n^{\frac{9}{2}}$$

add exponents
 $\frac{3}{2} + 3 = \frac{3}{2} + \frac{6}{2} = \frac{9}{2}$

$$4) n^{\frac{1}{2}} n^2 = n^{\frac{5}{2}}$$

add exponents
 $\frac{1}{2} + 2 = \frac{1}{2} + \frac{4}{2} = \frac{5}{2}$

Write each expression in radical form.

$$5) 5^{\frac{5}{4}} = \sqrt[4]{5^5}$$

$$6) 7^{\frac{1}{2}} = \sqrt{7}$$

Write each expression in exponential form.

$$7) (\sqrt[5]{3})^8 = 3^{\frac{8}{5}}$$

$$8) (\sqrt[4]{2})^7 = 2^{\frac{7}{4}}$$

Simplify.

$$9) \sqrt{96u^2v^4} = \sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot u \cdot u \cdot v \cdot v \cdot v \cdot v} = 2 \cdot 2 \cdot u \cdot v \cdot v \sqrt{2 \cdot 3} = 4uv^2\sqrt{6}$$

(2) 48
(2) 24
(2) 12
(2) 6
(2) 3

Perform the indicated operation.

$$10) h(n) = 2n + 1$$

$$g(n) = n^2 + n$$

Find $h(n) + g(n)$

$$2n + 1 + n^2 + n$$

$$n^2 + 3n + 1$$

$$11) h(x) = 3x^3 + x$$

$$g(x) = x - 3$$

Find $5h(x) - 4g(x)$

$$5(3x^3 + x) - 4(x - 3)$$

$$15x^3 + 5x - 4x + 12$$

$$15x^3 + x + 12$$

12) $f(a) = a^2 - 5a$
 $g(a) = -3a - 3$
 Find $f(g(a)) = (-3a-3)^2 - 5(-3a-3)$
 $= (-3a-3)(-3a-3) - 5(-3a-3)$
 $= 9a^2 + 18a + 9 + 15a + 15$
 $= 9a^2 + 33a + 24$

13) $h(t) = 4t - 2$
 $g(t) = t^2 + 4$
 Find $h(g(t)) = 4(t^2+4) - 2$
 $= 4t^2 + 16 - 2$
 $= 4t^2 + 14$

14) $f(x) = x - 3$
 $g(x) = 2x^3 + 3x^2 - x$
 Find $f(g(-2))$
 $g(-2) = 2(-2)^3 + 3(-2)^2 - (-2)$
 $= 2(-8) + 3(4) + 2 = -2$
 $f(-2) = -2 - 3 = -5$

15) $g(x) = 4x - 4$
 $f(x) = x^2 + 1$
 Find $g(f(-7))$
 $f(-7) = (-7)^2 + 1 = 49 + 1 = 50$
 $g(50) = 4(50) - 4 = 196$

Evaluate each function.

16) $f(x) = 3x + 2$; Find $f(-5)$
 $= 3(-5) + 2$
 $= -13$

17) $f(n) = 3n + 5$; Find $f(-3)$
 $= 3(-3) + 5$
 $= -4$

Find the inverse of each function.

18) $f(x) = \frac{x+1}{2}$ $y = \frac{x+1}{2}$
 $x = \frac{y+1}{2}$ Verify: $f(f^{-1}(x)) = \frac{2x-1+1}{2} = \frac{2x}{2} = x$
 $2x = y+1$
 $2x-1 = y$
 $f^{-1}(f(x)) = 2\left(\frac{x+1}{2}\right) - 1 = x+1-1 = x$

20) $f(x) = \sqrt[3]{x+1}$
 $y = \sqrt[3]{x+1}$ Verify: $f(f^{-1}(x)) = \sqrt[3]{x^3-1+1} = \sqrt[3]{x^3} = x$
 $x = \sqrt[3]{y+1}$
 $x^3 = y+1$
 $x^3 - 1 = y$
 $f^{-1}(f(x)) = (\sqrt[3]{x+1})^3 - 1 = x+1-1 = x$

19) $g(x) = -3 + (x+1)^5$ $y = -3 + (x+1)^5$
 $x = -3 + (y+1)^5$ Verify: $g(g^{-1}(x)) = -3 + (\sqrt[5]{x+3}-1+1)^5 = -3 + (\sqrt[5]{x+3})^5 = -3 + x + 3 = x$
 $x+3 = (y+1)^5$
 $\sqrt[5]{x+3} = y+1$
 $\sqrt[5]{x+3} - 1 = y$
 $g^{-1}(g(x)) = \sqrt[5]{-3+(x+1)^5} + 3 - 1 = \sqrt[5]{(x+1)^5} - 1 = x+1-1 = x$