Review Lessons 6.1 – 6.4 Worksheet Name: LEY

Evaluate the expression without using a calculator.

1.) $36^{-1/2}$

$\frac{1}{36^{1/2}}$

$\frac{1}{\sqrt{36}}$

$\boxed{\frac{1}{6}}$

2.) $64^{5/6}$

$(\sqrt[6]{64})^5$

$(2)^5$

$\boxed{32}$

3.) $(\sqrt[3]{216})^{-2}$

$(6)^{-2}$

$\frac{1}{6^2}$

$\boxed{\frac{1}{36}}$

4.) $(\sqrt[5]{-32})^4$

$(-2)^4$

$\boxed{16}$

Solve the equation. Round your answer to two decimal places when necessary.

5.) $x^4 = 20$

$\sqrt[4]{x^4} = \sqrt[4]{20}$

$\boxed{x \approx \pm 2.11}$

6.) $x^5 = -10$

$\sqrt[5]{x^5} = \sqrt[5]{-10}$

$\boxed{x \approx -1.58}$

7.) $x^6 + 5 = 26$

$x^6 = 21$

$\sqrt[6]{x^6} = \sqrt[6]{21}$

$\boxed{x \approx \pm 1.66}$

8.) $(x+3)^3 = -16$

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

$x + 3 = -2.52$

$\boxed{x = -5.52}$

Simplify the expression. Assume all variables are positive.

5.) $\left(\frac{16^{1/3}}{2^{1/3}}\right)^2$

$\left(\left(\frac{16}{2}\right)^{1/3}\right)^2$

$(8^{1/3})^2$

$(2)^2$

$\boxed{4}$

6.) $(x^{3/2} \cdot x^3)^{1/3}$

$(x^{3/2 + 6/2})^{1/3}$

$(x^{9/2})^{1/3}$

$x^{9/6}$

$\boxed{x^{3/2}}$

7.) $\sqrt[3]{16x^7y^2} \cdot \sqrt[3]{6xy^5}$

$\sqrt[3]{96x^8y^7}$

$\sqrt[3]{\underline{8} \cdot 12 \cdot \underline{x^3} \cdot \underline{x^3} \cdot x^2 \cdot \underline{y^3} \cdot \underline{y^3} \cdot y}$

$\boxed{2x^2y^2\sqrt[3]{12x^2y}}$

8.) $2\sqrt[4]{1250} - 8\sqrt[4]{32}$

$2 \cdot \sqrt[4]{625} \cdot \sqrt[4]{2} - 8\sqrt[4]{16} \cdot \sqrt[4]{2}$

$2 \cdot 5\sqrt[4]{2} - 8 \cdot 2\sqrt[4]{2}$

$10\sqrt[4]{2} - 16\sqrt[4]{2}$

$\boxed{-6\sqrt[4]{2}}$

9.) $\frac{x}{\sqrt[5]{9x}} \cdot \frac{\sqrt[5]{27x^4}}{\sqrt[5]{27x^4}}$

$\frac{x\sqrt[5]{27x^4}}{\sqrt[5]{243x^5}}$

$\frac{x\sqrt[5]{27x^4}}{3x}$

$\boxed{\frac{\sqrt[5]{27x^4}}{3}}$

10.) $\frac{6xy^{3/4}}{3x^{1/2}y^{1/2}}$

$2x^{2/2 - 1/2}y^{3/4 - 2/4}$

$\boxed{2x^{1/2}y^{1/4}}$

Let $f(x) = 4x^{3/2}$, $g(x) = 2x^{1/3}$, and $h(x) = -6x^{1/2}$. **Perform the indicated operation and state the domain.**

11.) $f(x) \cdot h(x)$

$(4x^{3/2})(-6x^{1/2})$

$-24x^{3/2+1/2}$

$\boxed{-24x^2}$

D: all real #s

12.) $\frac{h(x)}{f(x)}$ $\frac{(-6x^{1/2})}{(4x^{3/2})}$

$\frac{-3x^{1/2-3/2}}{4}$

$\frac{-3x^{-1}}{4} = \boxed{\frac{-3}{4x}}$

D: all real #s, $x \neq 0$

13.) $\frac{f(x)}{g(x)}$ $\frac{(4x^{3/2})}{(2x^{1/3})}$

$2x^{9/6-2/6}$

$\boxed{2x^{7/6}}$

D: all real nonnegative #s

Let $f(x) = 2x + 2$, $g(x) = x^2$, and $h(x) = \frac{3}{x-2}$. **Perform the indicated operation and state the domain.**

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

$(2x+2) + (x^2)$

$\boxed{x^2+2x+2}$

D: all real #s

15.) $h(x) - f(x)$

$\left(\frac{3}{x-2}\right) - (2x+2)$

$\frac{3}{x-2} - \left(\frac{(2x+2)(x-2)}{x-2}\right)$

$\frac{3}{x-2} - \left(\frac{2x^2-2x-4}{x-2}\right)$

$\boxed{\frac{-2x^2+2x+7}{x-2}}$

D: all real #s, $x \neq 2$

16.) $h(x) \cdot g(x)$

$\left(\frac{3}{x-2}\right)(x^2)$

$\boxed{\frac{3x^2}{x-2}}$

D: all real #s, $x \neq 2$

17.) $\frac{g(x)}{f(x)}$

$\frac{(x^2)}{(2x+2)}$

D: all real #s, $x \neq -1$

$\boxed{\frac{x^2}{2x+2}}$

$2x+2=0$

$2x=-2$

$x=-1$

18.) $h(g(x))$

$h(x^2)$

$\frac{3}{(x^2)-2}$

D: all real #s, $x \neq \pm\sqrt{2}$

$\boxed{\frac{3}{x^2-2}}$

$x^2-2=0$

$x^2=2$

$x=\pm\sqrt{2}$

19.) $f(g(x))$

$f(x^2)$

$2(x^2)+2$

$\boxed{2x^2+2}$

D: all real #s

Find the inverse of the function.

20.) $f(x) = \frac{4}{3}x + 2$

$x = \frac{4}{3}y + 2$

$x - 2 = \frac{4}{3}y$

$\frac{3}{4}(x-2) = \left(\frac{4}{3}y\right)\frac{3}{4}$

$\frac{3}{4}x - \frac{3}{2} = y$

$\boxed{y = \frac{3}{4}x - \frac{3}{2}}$

21.) $f(x) = \frac{4x^4-1}{18}, x \geq 0$

$18 \cdot x = \frac{4y^4-1}{18} \cdot 18$

$18x = 4y^4 - 1$

$18x + 1 = 4y^4$

$\frac{18x+1}{4} = y^4$

$y = \sqrt[4]{\frac{18x+1}{4}} \cdot \frac{\sqrt[4]{4}}{\sqrt[4]{4}}$

$y = \frac{\sqrt[4]{72x+4}}{\sqrt[4]{16}}$

$\boxed{y = \frac{\sqrt[4]{72x+4}}{2}}$

Verify that *f* and *g* are inverse functions.

22.) $f(x) = 2x - 4,\ g(x) = \frac{1}{2}x + 2$

$f(g(x))$

$f(\frac{1}{2}x + 2)$

$2(\frac{1}{2}x + 2) - 4$

$x + 4 - 4$

$\boxed{x}$

✓

$g(f(x))$

$g(2x - 4)$

$\frac{1}{2}(2x - 4) + 2$

$x - 2 + 2$

$\boxed{x}$

23.) $f(x) = 3x^2 + 1, x \geq 0;\ g(x) = \left(\frac{x-1}{3}\right)^{1/2}$

$f(g(x))$

$f\left(\left(\frac{x-1}{3}\right)^{1/2}\right)$

$3\left(\left(\frac{x-1}{3}\right)^{1/2}\right)^2 + 1$

$3\left(\frac{x-1}{3}\right) + 1$

$x - 1 + 1$

$\boxed{x}$

$g(f(x))$

$g(3x^2 + 1)$

$\left(\frac{(3x^2+1)-1}{3}\right)^{1/2}$

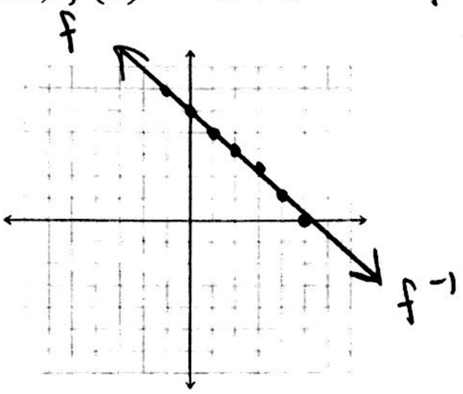
$\left(\frac{3x^2}{3}\right)^{1/2}$

$(x^2)^{1/2}$

$\boxed{x}$

Graph the function *f*. Use the horizontal line test to determine whether the inverse of *f* is a function. Then graph the inverse of *f*.

24.) $f(x) = -x + 5$



f

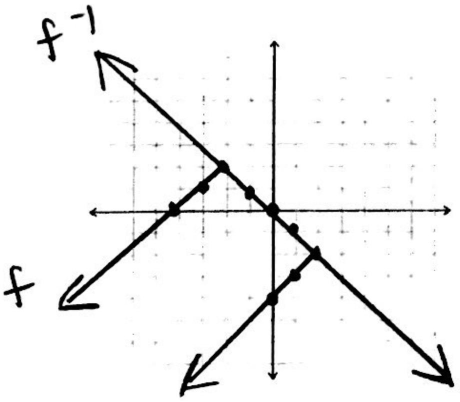
x	y
-1	6
0	5
1	4
2	3

Yes, inverse is a function (HLT)

f^{-1}

y	x
6	-1
5	0
4	1
3	2

25.) $f(x) = -|x + 2| + 2$



f

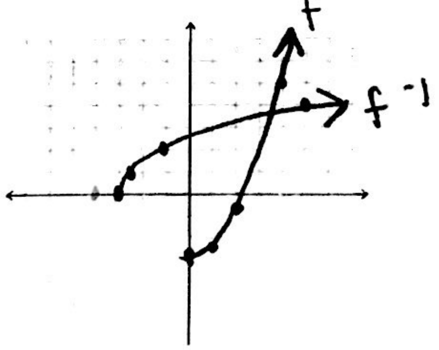
x	y
-2	2
-1	1
0	0
1	-1
2	-2
-3	1
-4	0

No, inverse is NOT a function (HLT)

f^{-1}

x	y
2	-2
1	-1
0	0
-1	1
-2	2
1	-3
0	-4

26.) $f(x) = \frac{1}{2}x^2 - 3, x \geq 0$



f

x	y
0	-3
2	-1
4	5
1	-2.5

Yes, inverse is a function (HLT)

f^{-1}

x	y
-3	0
-1	2
5	4
-2.5	1

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