8.1 Radical Functions

Given the function $f(x) = 3.2\sqrt[6]{x}$ find the following:

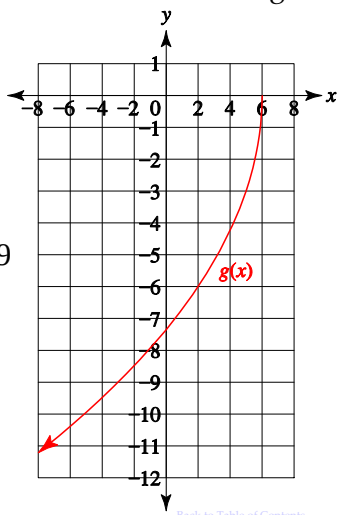
a. $f(45)$

b. Estimate x such that $f(x) = 16$

Given the graph of the function find the following:

a. Estimate $g(2)$

b. Estimate x such that $g(x) = -9$



Give the domain and range of the following radical functions.

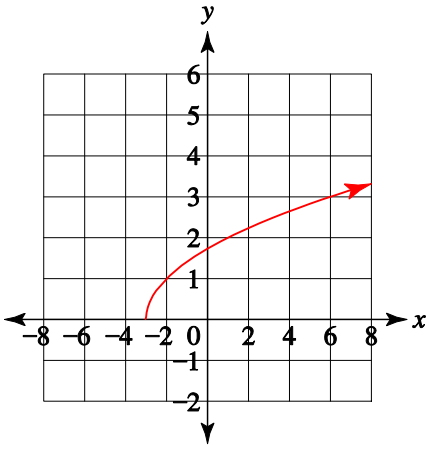
a. $h(x) = \sqrt{x+10}$

b. $g(x) = \sqrt[7]{x+5}$

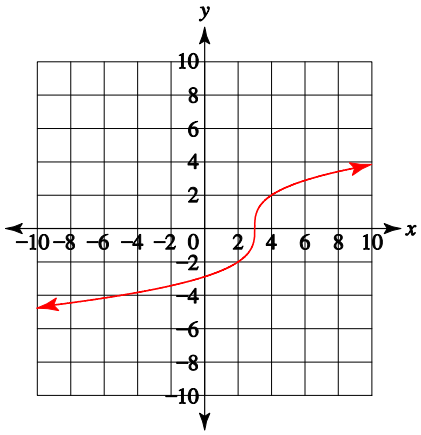
c. $f(x) = \sqrt{8-x}$

Give the domain and range of the following radical functions.

a.



Give the domain and range of the following radical functions.
b.



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3.1 Exponents revisited

Radical expression can also be written with rational (fraction) exponents.

In general: $a^{1/n} = \sqrt[n]{a}$

Examples:

a. $x^{1/2} =$ _____ b. $\sqrt[3]{t} =$ _____

Similarly: $a^{m/n} = \sqrt[n]{a^m}$ OR $\sqrt[n]{a}^m$

Examples:

a. $d^{3/5} =$ _____ b. $\sqrt[4]{w^3} =$ _____

Rewrite the following exponents in radical form.

a. $a^{\frac{1}{4}}$ b. $p^{\frac{3}{5}}$

Rewrite the following radicals using rational exponents.

c. $\sqrt{6x}$ d. $\sqrt[7]{h^2}$

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Simplify the following expressions. Write all answers without negative exponents.

a. $\left(81m^2n^8\right)^{\frac{1}{2}}$

b. $\left(\dfrac{32x^5y^{10}z^{-1}}{2xy^{-2}z^3}\right)^{\frac{1}{4}}$

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8.2 Simplifying, Adding, and Subtracting Radicals

Evaluate the following radicals without a calculator.

a. $\sqrt{4}$

b. $\sqrt[3]{343}$

c. $\sqrt[3]{-64}$

d. $\sqrt[5]{32}$

Simplify the following radicals. Assume all variables are nonnegative.

a. $\sqrt{36m^2}$

b. $\sqrt[3]{54g^4h^{11}}$

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Add or subtract the following expressions. Assume all variables are nonnegative.

a. $5\sqrt{6}+4\sqrt{6}$

b. $7ab^2\sqrt{7ab}+4a\sqrt{63ab^5}$

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Add or subtract the following expressions. Assume all variables are nonnegative.

a. $8\sqrt{3a}+4\sqrt[5]{3a}-2\sqrt{3a}+17\sqrt[5]{3a}$

b. $\sqrt[4]{32m^5n^6}+3\sqrt[5]{2mn^2}-5mn\sqrt[4]{2mn^2}$

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8.3 Multiply and Divide Radicals

a. $\sqrt{3a}\cdot\sqrt{5b}$

b. $\sqrt{6m}\cdot\sqrt{10m}$

c. $\sqrt[3]{6a}\cdot\sqrt[3]{12a^2}$

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Simplify the following radicals.

a. $\sqrt{\frac{16}{25}}$

b. $\sqrt{\frac{50a^5b^3}{8ab^7}}$

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Multiply the following and simplify the result.

a. $(2+\sqrt{11})(8-\sqrt{5})$

b. $(3-\sqrt{5})^2$

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Rationalize the denominator and simplify the following radical expressions.

a. $\sqrt{\frac{7}{6}}$

b. $\sqrt{\frac{3a}{5b}}$

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Rationalize the denominator of the following fractions.

a. $\dfrac{6}{5+\sqrt{2}}$

b. $\dfrac{4+7\sqrt{2}}{5+\sqrt{6}}$

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