Math 105 Exam #4

Simplify $\sqrt{(x+1)^2 - 2x - 1}$. Assume that all variables are real numbers.

State the domain of the function $f(x) = \sqrt[4]{(2-x)^2 - x^2}$.

Simplify $\left(\dfrac{x^{\frac{1}{2}}y}{x^{\frac{-1}{4}}y^{\frac{3}{2}}}\right)$ if each variable represents a positve real number.

Simplify the product $\sqrt[3]{24x^5y^7}\ \sqrt[3]{18x^4y^4}$.

Simplify the quotient $\dfrac{\sqrt[4]{125x^{20}y^6}}{\sqrt[4]{25x^5y^{14}}}$.

Multiply and simplify $\sqrt{x}(1-2\sqrt{x}) + (\sqrt{x}-2)(3\sqrt{x})$.

Rationalize and simplify $\dfrac{5}{\sqrt{3}-\sqrt{2}} - \dfrac{3}{\sqrt{3}}$.

Solve $\sqrt{x^2 - x + 30} = x + 8$ and check your solution.

Solve $\sqrt[3]{2x+45} = -4$ and check your solution.

Solve the formula $x = \dfrac{\sqrt[3]{6y}}{3}$ for the variable y.

The formula $v = 20\sqrt{273 + t}$ is used to find the velocity, *v*, of sound in meters per second at a temperature of *t* degrees Celsius. Find the temperature when the velocity of sound in air is 325 meters per second.

Solve the equation. $x(x-5)=2(5-x)$

Find all of the x-intercepts of the function $f(x)=3x^2-10x+5$.

Solve $P=2+\dfrac{B}{P}$ for P and simplify if $B\geq -1$.

Solve for the indicated variable. $2b=\sqrt{\dfrac{c^2-1}{3a}}$ for c

Together, Naomi Madison and Tyrone Nelson can paint an apartment in 19 hours. Working alone, Naomi can do the job 5 hours faster than Tyrone. Find the time that each person takes to paint an apartment. Round to the nearest tenth.

The autopilot on Doug Landy's twin engine seaplane maintains a constant throttle setting. Doug flew on autopilot 120 miles against the wind. He then turned around and flew the same distance with the wind. The wind was a constant 25 miles per hour. If the total time for the trip was 1.8 hours, find the speed of Doug's seaplane in still air (to the nearest tenth of a mile per hour) with the same autopilot setting.

For the given function, determine all real number values of the variable for which the function has the indicated value. $f(x)=-2x^{-2}+15x^{-1}+7$; $f(x)=7$

Draw the graph of the parabola. Label the vertex and the intercepts. Show all work. $y=6x^2+7x-5$

Kerry Corcoran throws a ball upward from the top of a building. The ball's height, *h*, in feet above the ground, after *t* seconds, can be found by the formula $h=-16t^2+96t+57$.

a) At what time will the ball reach its maximum height?

b) What is the maximum height the ball will reach?

Express the function in the form $f(x)=a(x-h)^2+k$.
$f(x)=-2x^2-12x+7$

Write the equation of a parabola that goes through (1 ,1) and has vertex (4 , 28).

Simplify: i) $27^{-2/3}$ ii) $\dfrac{x^{4/3}y^{3/2}}{x^{-2/3}y}$

Simplify: $\sqrt[3]{2x^2y}\left(\sqrt[3]{4x^5y^5}+\sqrt[3]{32xy}\right)$

Simplify: $\dfrac{5}{\sqrt{3}-\sqrt{2}}-\dfrac{3}{\sqrt{3}}$

Let $f(x)=\sqrt{x+2}$ and $g(x)=\sqrt{x-3}+1$.
Solve the following equation for x:

$$f(x)-g(x)=0$$

Solve the following equation for x:

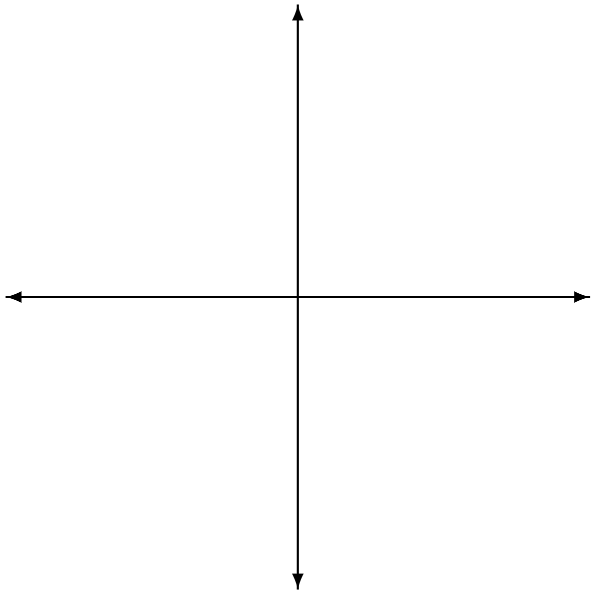
$$x(x-5)=6$$

Solve the following equation for x:

$$x^{-2/3}-2x^{-1/3}-15=0$$

Find the quadratic function $f(x)$ with vertex $(2,3)$ such that $f(0)=6$.

Let $f(x) = 2x^2 - 12x + 11$. Find the x-intercept(s), y-intercept, and vertex. Then graph the function.



Solve the following equation for L (assume L, P, Q, R are real numbers and $P \neq Q$):

$$\sqrt[3]{\frac{L^2}{P-Q}} = R$$

It takes Bryce a half hour less time to wash a whale bone than it does Jessie. Together they can wash the whale bone in 6 hours. How long would it take Bryce to wash the whale bone by himself?

Cathy throws a ball from her deck. The height, $h(t)$ of the ball (in feet) at any time t (in seconds) can be determined by the function $h(t) = -16t^2 + 80t + 40$. Find the following:

i) The height of the deck.

ii) The maximum height of the ball and how long it takes the ball to reach its maximum height.

Simplify: $(b^{1/2} - b^{-1/2})^2$

Simplify: $\sqrt{18x} + x\sqrt{\frac{8}{x}}$

Determine the length and width of a rectangle with perimeter of 34 inches and a diagonal of 13 inches.

One pipe can fill a swimming pool in 5 hours. Another pipe can drain the pool in 15 hours. Find the time it takes to fill the pool if both pipes are left open.