- Teaching evaluations!
- If you have 5 excused absences, please submit documentation.

$g(x) = \sqrt{x}$, find the inverse function.

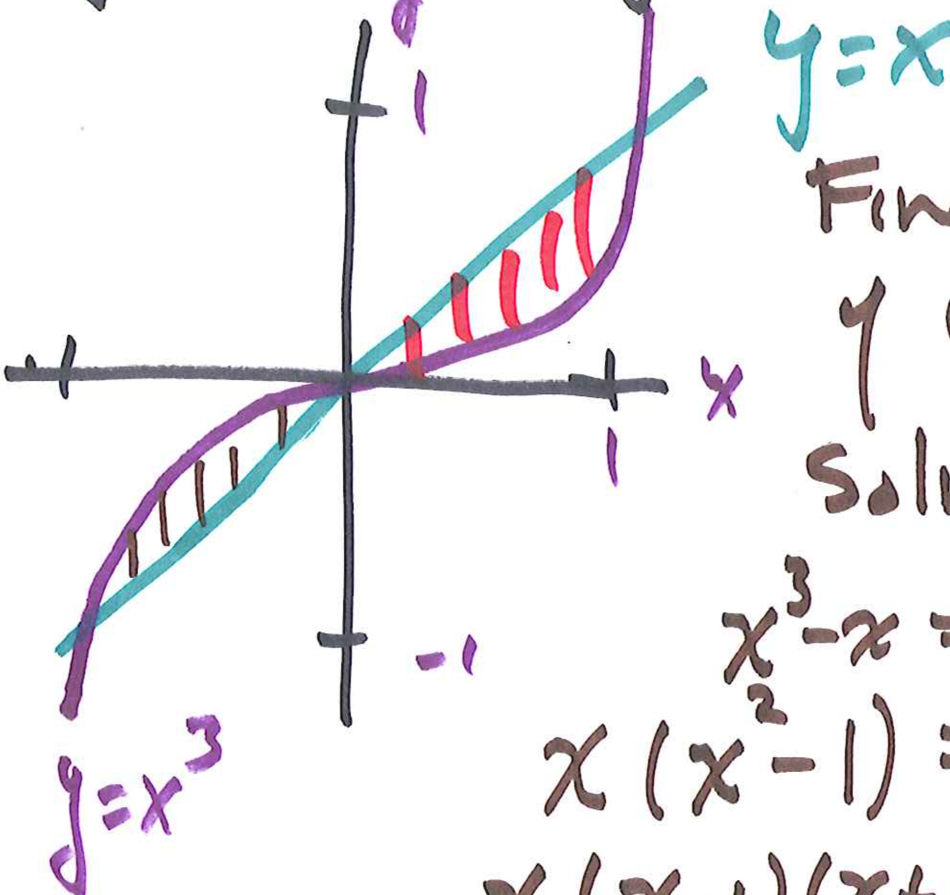
- Domain & range of g are $[0, \infty)$. Find $f = g^{-1}$

$y = \sqrt{x}$, $y^2 = x$, $\cancel{f(y) =}$

$x = f(y) = y^2$ or $f(x) = x^2$

Find the area between

$y = x$ and $y = x^3$



Find points of intersection.

Solve $x^3 = x$.

$$x^3 - x = 0$$

$$x(x^2 - 1) = 0$$

$$x(x-1)(x+1) = 0$$

Solutions are $x = 0$, $x = 1$, $x = -1$

Find area over $[-1, 0]$

Subtract upper function from lower function and integrate.

$$\int_{-1}^{0} x^3 - x \, dx$$

$$\int_0^1 x - x^3 \, dx$$

Total area is sum

$$\int_{-1}^{0} x^3 - x \, dx + \int_0^1 x - x^3 \, dx$$

$$\frac{x^4}{4} - \frac{x^2}{2} \Big|_{-1}^{0} \quad + \quad \frac{x^2}{2} - \frac{x^4}{4} \Big|_0^1$$

$$-\left(\frac{1}{4} - \frac{1}{2}\right) \quad + \quad \frac{1}{2} - \frac{1}{4}$$

$$= \underline{\underline{1/2}}.$$

Area between f + g over interval [a, b] is

$$\int_a^b |f(x) - g(x)| \, dx$$

Just as total distance travelled for t in $[a,b]$

$$\int_a^b |v(t)|\,dt$$

where $v(t)$ is velocity.

(1 point) **local/rmb-problems/quad-inverse.pg**

Let $f(x) = (x+5)^2 + 5$. Find the largest value of a so that f is one to one on the interval $(-\infty, a]$.

$a =$ -5

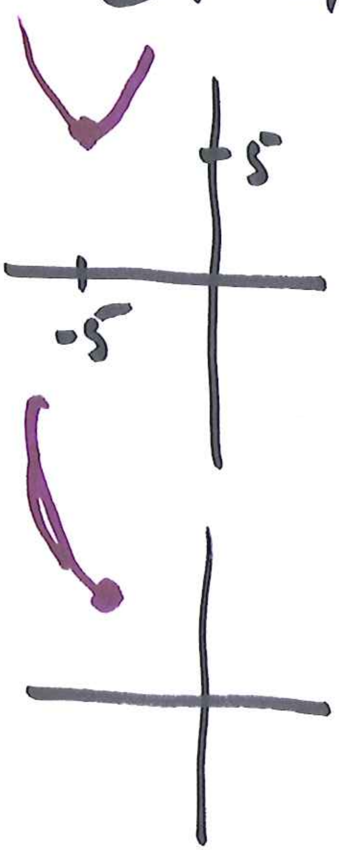
Consider f on the domain the interval $(-\infty, a]$ and let g be the inverse of the function f. Give the domain and the range of the function g.

The domain is the interval ______ and the range is the interval ______ . help (intervals)

Give a formula for the function g.

$g(x) =$ ______ help (formulas)

Graph of f is a parabola w/ vertex at $(-5, 5)$.



f is one-one on $(-\infty, -5]$

f on $(-\infty, -5]$. Domain.

has range $[5, \infty)$.

$g = f^{-1}$ has domain $[5, \infty)$

range $(-\infty, -5]$.

Find $g = f^{-1}$!

$$y = (x+5)^2 + 5.$$

$$(y-5) = (x+5)^2$$

$$\pm\sqrt{y-5} = (x+5).$$

$$x = -5 \pm \sqrt{y-5}$$

Choose neg. sign so that $-5-\sqrt{y-5}$ is in the range of g, $(-\infty, -5]$. So

$$g(y) = -5 - \sqrt{y-5}$$

or $g(x) = -5 - \sqrt{x-5}$

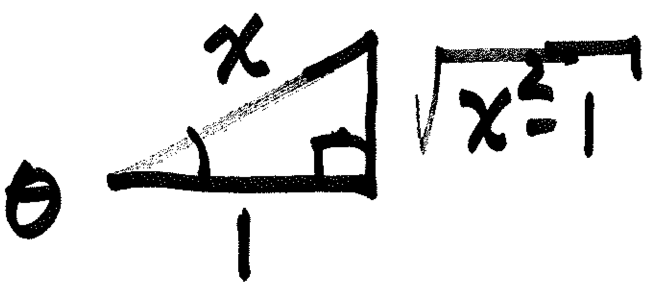
Simplify by referring to the appropriate triangle or trigonometric identity.

(Use symbolic notation and fractions where needed.)

$\cot(\sec^{-1}(x)) =$ help (fractions)

Hint: Generate the appropriate triangle and use the definition of a trigonometric function and its inverse.

$\theta = \sec^{-1}(x)$. $\quad \sec(x) = \dfrac{1}{\cos(x)}$



$= \dfrac{hyp}{adj}$.

$$\cot(\sec^{-1}(x)) = \cot(\theta)$$

$$= \frac{1}{\tan(\theta)} = \frac{adj}{opp}$$

$$= \frac{1}{\sqrt{x^2-1}}.$$

A1.6 #13

(1 point) **local/rmb-problems/exp-alg2.pg**

A function f is given by the formula $f(x) = A \cdot e^{kx}$ for constants A and k. We also know that $f(2) = 8$ and $f(3) = 1$. Find numerical values for the constants A and k.

$A =$ ______ , $k =$ ______ help (numbers).

The function f is [?].

$f(2) = Ae^{2k} = 8$

$f(3) = Ae^{3k} = 1.$

$\frac{f(3)}{f(2)} = \frac{\cancel{A}e^{3k}}{\cancel{A}e^{2k}} = \frac{1}{8}$

$e^{k} = \frac{1}{8}$

$k\,\cancel{\ln(e)} = \ln(\frac{1}{8}).$

$k = -\ln(8).$

Find A.

$Ae^{-2\ln(8)} = 8$

$A\,8^{-2} = 8$

$A = 8^{+3}$

$f(x) = 8^{3}e^{-x\ln(8)}$

$= 8^{3} \cdot 8^{-x}.$

A2.1-2.2 #3

A stone is tossed in the air from ground level with an initial velocity of 30 m/s. Its height at time t is $h(t) = 30t - 4.9t^2$ m.

Compute the stone's average velocity over the time interval $[1, 3.5]$.

Average velocity $=$

Average velocity on $[1, 3.5]$

is $\frac{h(3.5)-h(1)}{3.5-1} \frac{m}{s}$

$= \frac{19.875}{2.5}$ m/s

$= 7.95$ m/s.

A2.3 #8

Evaluate the limit assuming that $\lim_{x\to 2} g(x) = 10$:

$$\lim_{x\to 2} \frac{g(x)}{x^2} = \square$$

Quotient rule for computing limits

$$\lim_{x\to 2} \left(\frac{g(x)}{x^2}\right) = \frac{\lim_{x\to 2} g(x)}{\lim_{x\to 2} x^2}$$

Provided $\lim_{x\to 2} x^2 \neq 0$

$\parallel$

4

$$= \frac{10}{4} = \frac{5}{2}.$$