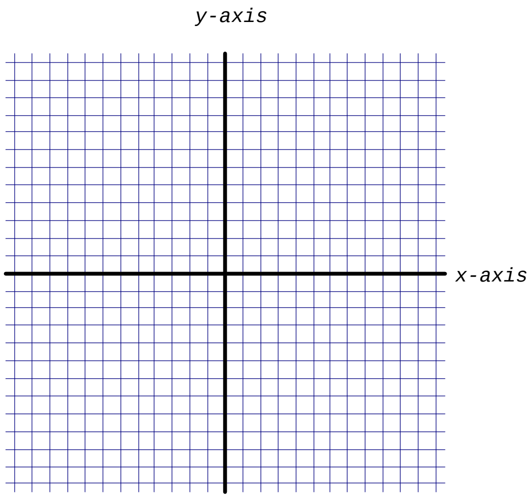
1. Verify that $f(x) = \sqrt{x - 4}$ *where* $x \geq 4$ and $g(x) = x^2 + 4$ *where* $x \geq 0$ are inverse functions by:

a) Using $f[g(x)]$ *and* $g[f(x)]$

b) Graphing



c) Using $f'(x)$ *and* $g'(x)$.

2. Which of the functions is not one-to-one?

a) $f(x) = \cos x$, $0 \leq x \leq p$

b) $f(x) = \sin\ x$, $0 \leq x \leq p$

c) $f(x) = x^3$

3. Find the inverse of $f(x) = \sqrt[3]{5x - 2}$.

4. $f(x)$ is a one-to-one function with the following properties:

i) Domain: $x \geq 2$ ii) Range: $y \geq 0$ iii) Passes through (5,8).

If the inverse of $f(x)$ is $g(x)$, find:

Domain of $g(x)$ _____________ Range of $g(x)$ _____________

A point on the graph of $g(x)$ _____________

5. Simplify: $\ln \dfrac{\sqrt[3]{x}}{y^2}$ ______________________________

6. Find to four decimal places. $\ln 0.83$ ______________________

7. Solve for x to four decimal places.

a) $\ln 8x - 3\ln x^2 = \ln 4$

b) $4e^{5x} = 23$

8. Find $\dfrac{dy}{dx}$.

a) $y = x\ln x - x$

b) $y = (\ln x)^3$

c) $y = Arc\cos 2x$

d) $y = 2\,Arc\tan \sqrt{x}$

e) $y = e^{5-2x}$

f) $y = \log_{10} x^2$

g) $y = e^{2x}\sin 5x$

h) $y = x^3\ln(2x)$

9. Find $\dfrac{dy}{dx}$ using implicit differentiation.

$x^3 + Arc\tan y = e^{5x}$

10. Use logarithmic differentiation to find $\dfrac{dy}{dx}$.

$y = \sqrt[3]{\dfrac{x+1}{x-1}}$

11. Find:

a) $Arc\cos\left(-\frac{1}{2}\right)$

b) $Arc\ \sin\left(\sin\frac{p}{9}\right)$

c) $\sin\left(Arc\ \cos-\frac{12}{13}\right)$

12. Find the limits:

a) $\lim_{x\to\frac{p}{2}} \frac{1-\sin x}{1+\cos 2x}$

b) $\lim_{x\to\infty} \frac{5x^2-3x}{7x^2+1}$

c) $\lim_{x\to\infty} \frac{x^2+e^x}{x+e^x}$

d) $\lim_{x\to\infty} \left(1+\frac{3}{x}\right)^{2x}$

Hint: Let $y=\left(1+\frac{3}{x}\right)^{2x}$