

NAME: _____

[4] **1.** Find the **exact value** of

a) $\log_{64} 8 =$

b) $\log_3 \sqrt{3} =$

c) $8^{\log_8 49} =$

d) $\log_5 5^7 =$

[6] **2.** Find the **exact value** of

a) $\tan\left(\frac{5\pi}{6}\right) =$

b) $\sec\left(\frac{2\pi}{3}\right) =$

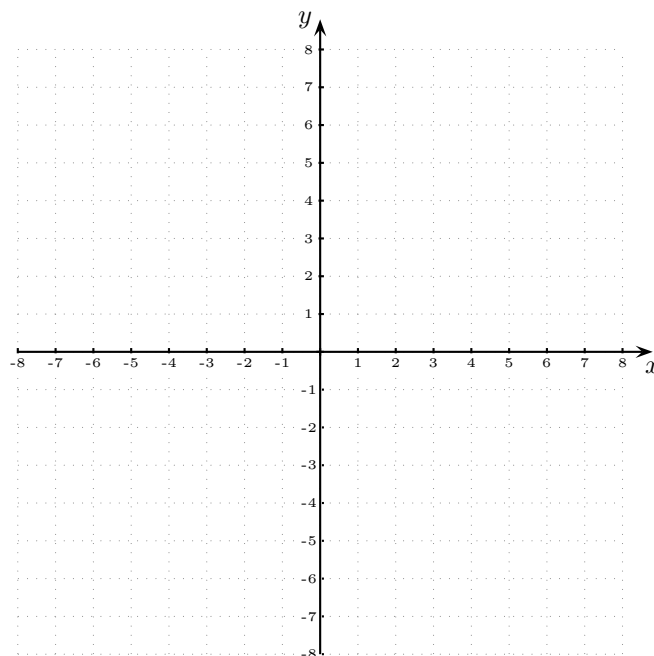
c) $\cos\left(-\frac{\pi}{4} - 1000\pi\right) =$

d) $\sin\left(\frac{17\pi}{6}\right) =$

e) $\cos\left(-\frac{7\pi}{3}\right) =$

f) $\tan\left(\frac{\pi}{4} + 15\pi\right) =$

[8] **3.** Graph the function $f(x) = 2^x$ and the function $g(x) = \log_2 x$ in the axes provided below.



[12] **4.** Solve the following equations. If necessary, leave the answer expressed in terms of logarithms (you do not need to use the calculator).

a) $7^{x+1} = 410$

b) $\log_2(x+2) - \log_2(x-5) = 3$

c) $\ln(x-4) + \ln(x+1) = \ln(x-8)$

[8] **5.** Given that $\tan x = \frac{5}{12}$, and that x lies in the first quadrant,

a) Find $\sin x$.

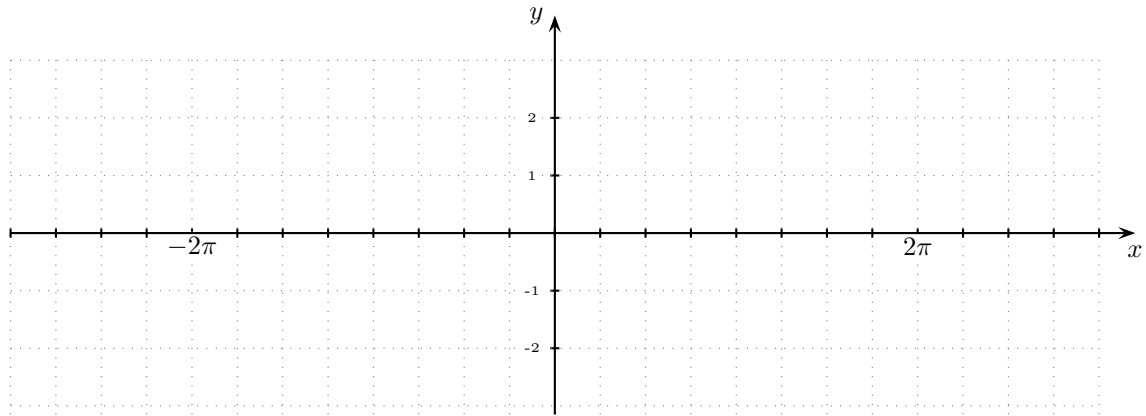
b) Find $\cos x$.

c) Find $\cot\left(\tan^{-1}\frac{5}{12}\right)$.

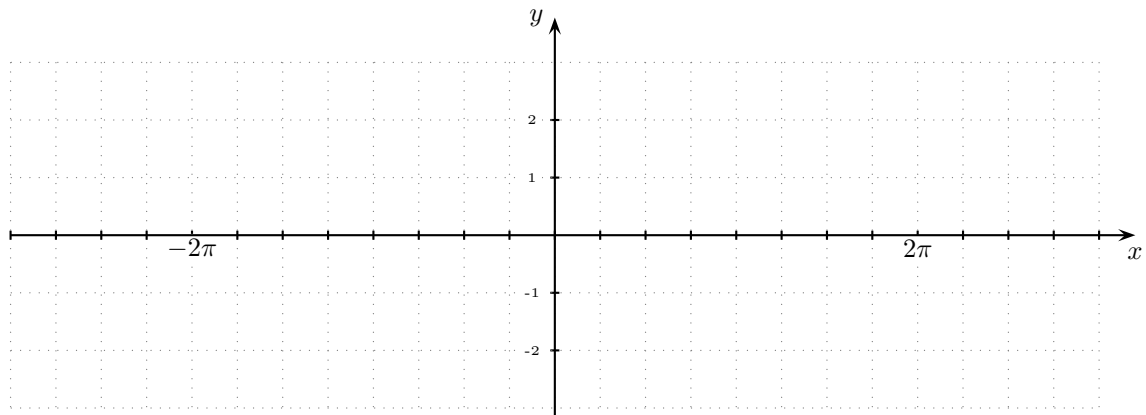
d) Find $\sec\left(\tan^{-1}\frac{5}{12}\right)$.

[8] **6.** Graph **two** cycles of the following functions in the axes provided.

a) $f(x) = \sin(2x)$

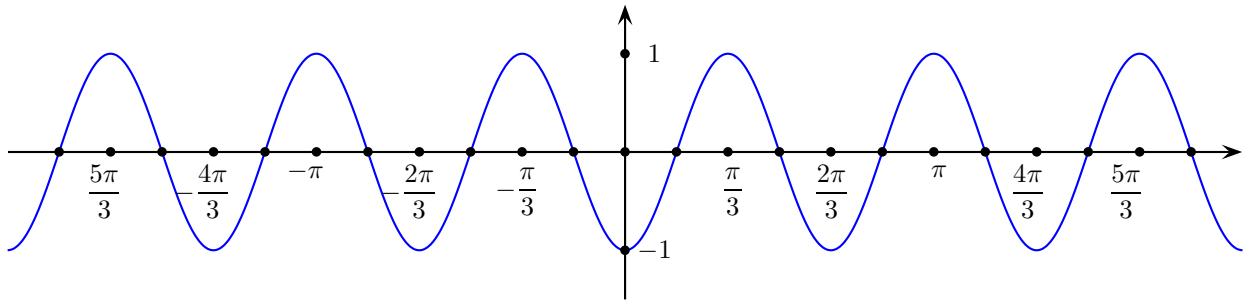


b) $g(x) = -2 \cos\left(x - \frac{3\pi}{4}\right)$



[6] **7.** Find the domain of the function $\log_4(x^2 - 1)$.

- [8] **8.** Write an equation of the form $y = A \sin(Bx + C)$ for the sinusoidal curve whose graph is shown below.



- [6] **9.** Let the functions f and g be defined by $f(x) = \frac{e^x + e^{-x}}{2}$ and $g(x) = \frac{e^x - e^{-x}}{2}$.

a) Prove that $f(x)$ is an even function.

b) Prove that $g(x)$ is an odd function.

c) Prove that $[f(x)]^2 - [g(x)]^2 = 1$.