

Are you ready for Calculus

1. (1) Find the equation of a line through $(1, 2)$ and $(-1, 8)$.
Is the point $(2, 4)$ on the line?

(2) A car runs 90 miles from 8 am to 10 am in a morning drive. What is the average speed of the car?

2. Expand to simplify the expression.

(1) $\frac{(a+h)^3 - a^3}{h}$

(2) $\frac{\sin(a+b) - \sin(a-b)}{2}$

3. Simplify the expressions.

(1) $\sqrt{x} (2x^2 + 3(x - (\sqrt[3]{x} + x)))$

(2) $\frac{\frac{1}{x} - \frac{1}{5}}{\frac{1}{x^2} - \frac{1}{25}}$

(3) $\frac{1}{\sqrt{3} + \sqrt{2}}$

(4) $\frac{x^2 - 2x - 8}{x^3 + x^2 - 2x}$

4. Solve the equations.

(1) $4 = 3^{2x+2}$

(2) $\ln x^2 = 2 \ln 4 - 4 \ln 5$

(3) $\begin{cases} x + y = 2 \\ 2x^2 - y^2 = 1 \end{cases}$

(4) $\frac{x+1}{3x-1} + \frac{2x+1}{3x-2} = -1$

5. Sketch the graphs

(1) $y = 2e^{-x} - 1$

(2) $y = \ln(x+1)$

6. Trigonometry.

(1) Find $\sin\left(\frac{7\pi}{6}\right)$

(2) $0 \leq \theta \leq \frac{\pi}{2}$ and $\sin \theta = \frac{12}{13}$. Find $\tan \theta$.

(3) Solve $\sin 2x - \cos x = 0$

(4) Sketch the graph of $y = \cos\left(x - \frac{\pi}{2}\right)$

7. Comprehensive function problem.

$$f(x) = \frac{3x}{x-1}$$

(1) Find the domain and range of f .

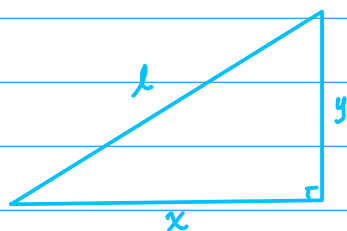
(2) $f\left(\frac{1}{x}\right) = ?$

(3) Sketch the graph of $f(x)$.

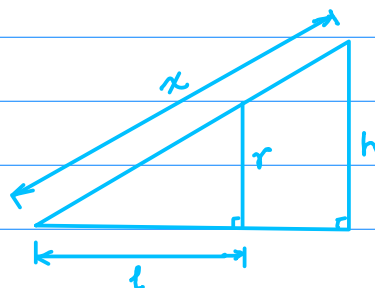
(4) Find its inverse function $y = f^{-1}(x)$.

8. Write x in terms of the other given variables.

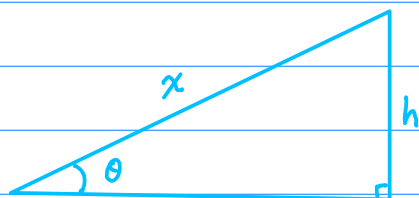
(1)



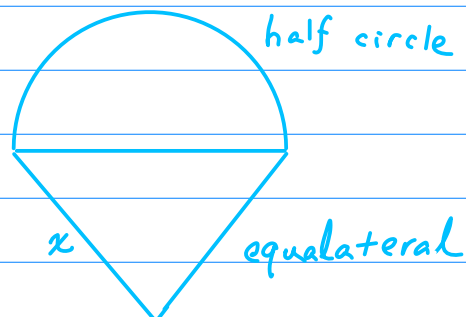
(2)



(3)



(4)



Area of the shape: y