



MATH 103 - General Mathematics

Second Midterm Examination

1) Find the equations of the following lines:

- a) Passing through points $(1, 3)$ and $(2, 10)$
- b) Slope is $m = -3$, passes through the point $(4, 0)$.

2) Sketch the graphs of the following lines:

- a) $y = \frac{1}{2}x - \frac{5}{2}$
- b) $10x + 4y = 120$

3) Sketch the graphs of the following parabolas:

- a) $y = x^2 + 8x + 24$
- b) $y = -9x^2 + 18x + 16$

4) Find the domain of the following functions:

- a) $f(x) = \sqrt{9 - x^2}$
- b) $f(x) = \frac{x - 2}{6x^2 - 30x}$

5) Simplify the following:

- a) $\log \left(\frac{10^3 \cdot \sqrt{10} \cdot 100^4}{0.1} \right)$
- b) $\log_2 (36 \cdot 32 \cdot 3 \cdot 4^5)$

ANSWERS

1) a) $m = \frac{10 - 3}{2 - 1} = 7$

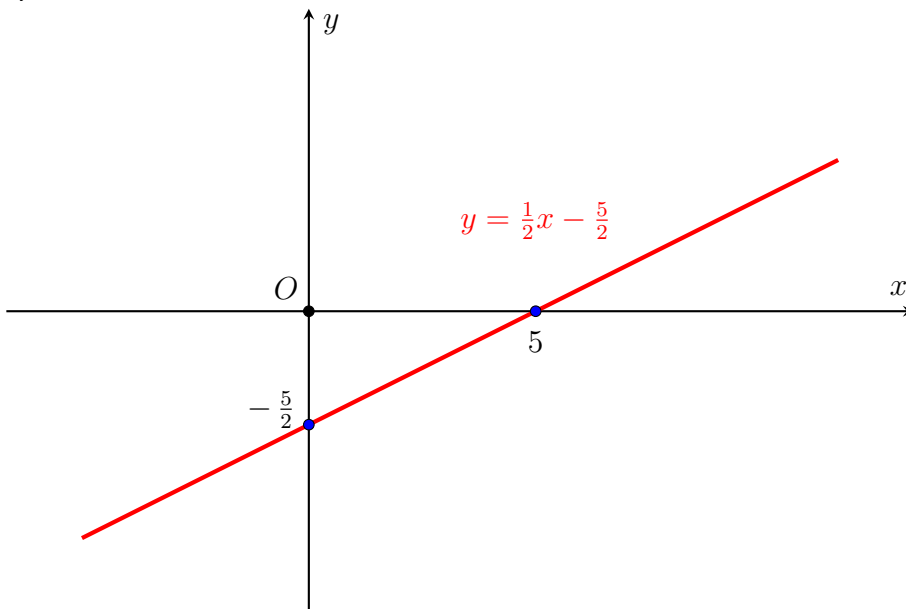
$$y - y_1 = m(x - x_1) \Rightarrow y - 3 = 7(x - 1)$$

$$y = 7x - 4$$

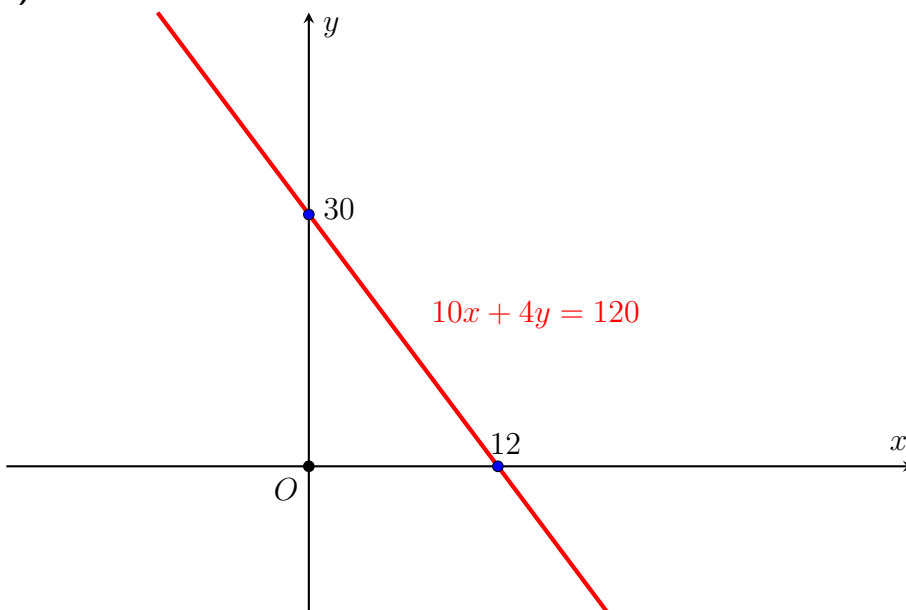
b) $y - 0 = -3(x - 4)$

$$y = -3x + 12$$

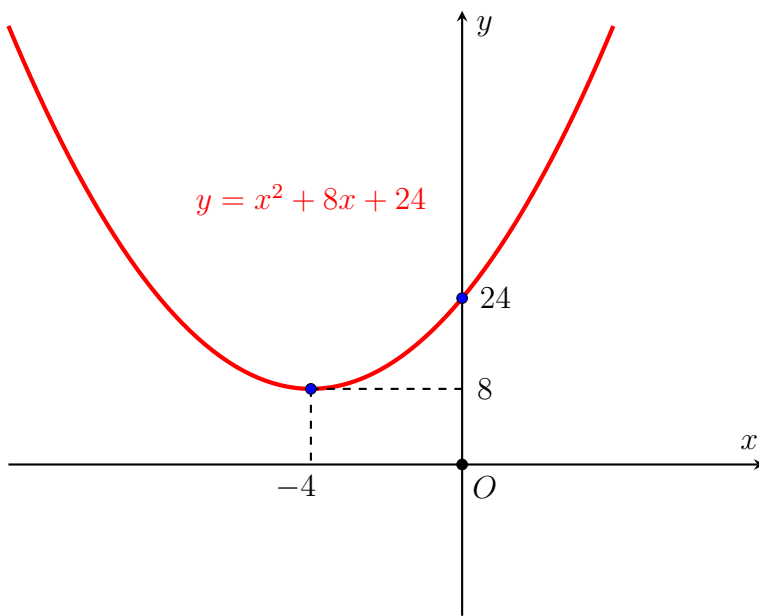
2) a)



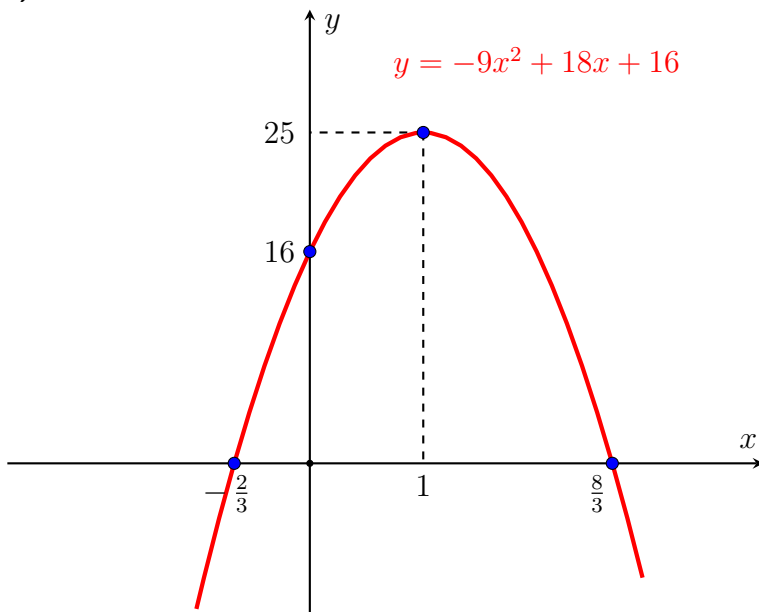
b)



3) a)



b)



4) a) $9 - x^2 \geq 0 \Rightarrow$ Domain is: $[-3, 3]$

b) $6x^2 - 30x \neq 0 \Rightarrow x \neq 0, x \neq 5$

Domain is: $\mathbb{R} \setminus \{0, 5\}$

5) a)

$$\begin{aligned} \log \left(\frac{10^3 \cdot \sqrt{10} \cdot 100^4}{0.1} \right) &= \log(10^3) + \log(10^{1/2}) + \log(10^8) - \log(10^{-1}) \\ &= 3 + \frac{1}{2} + 8 + 1 \\ &= \frac{25}{2} = 12.5 \end{aligned}$$

b)

$$\begin{aligned} \log_2(36 \cdot 32 \cdot 3 \cdot 4^5) &= \log_2(36) + \log_2(32) + \log_2(3) + \log_2(2^{10}) \\ &= \log_2(2^2 \cdot 3^2) + \log_2(2^5) + \log_2(3) + \log_2(2^{10}) \\ &= 2 + 2\log_2(3) + 5 + \log_2(3) + 10 \\ &= 17 + 3\log_2(3) \end{aligned}$$