

A function and its domain - Answers

Task 1. Determine the domain D_f of the function f given by the formula.

1. (2p) $f(x) = 1 - x$

Answer: $D_f = \mathbb{R}$

2. (2p) $f(x) = \frac{1}{1-x}$

Answer: $D_f = \mathbb{R} - \{1\}$

Explanation: $D_f = \mathbb{R} - \{x \in \mathbb{R} \mid 1 - x = 0\} = \mathbb{R} - \{1\}$

3. (2p) $f(x) = \sqrt{1-x}$

Answer: $D_f = (-\infty, 1]$

Explanation: $D_f = \{x \in \mathbb{R} \mid 1 - x \geq 0\} = (-\infty, 1]$

4. (2p) $f(x) = \frac{3x}{\sqrt{1-x}}$

Answer: $D_f = (-\infty, 1)$

Explanation: $D_f = \{x \in \mathbb{R} \mid 1 - x > 0\} = (-\infty, 1)$

5. (2p) $f(x) = \frac{1}{(2x-1)(3x+2)}$

Answer: $D_f = \mathbb{R} - \left\{\frac{1}{2}, -\frac{2}{3}\right\}$

Explanation: $D_f = \mathbb{R} - \{x \in \mathbb{R} \mid (2x - 1)(3x + 2) = 0\}$

$$D_f = \mathbb{R} - \left\{x \in \mathbb{R} \mid 2 \cdot \left(x - \frac{1}{2}\right) \cdot 3 \cdot \left(x + \frac{2}{3}\right) = 0\right\}$$

$$D_f = \mathbb{R} - \left\{\frac{1}{2}, -\frac{2}{3}\right\}$$

6. (2p) $f(x) = \log_2(x - 4)$

Answer: $D_f = (4, \infty)$

Explanation: $D_f = \{x \in \mathbb{R} \mid x - 4 > 0\} = (4, \infty)$

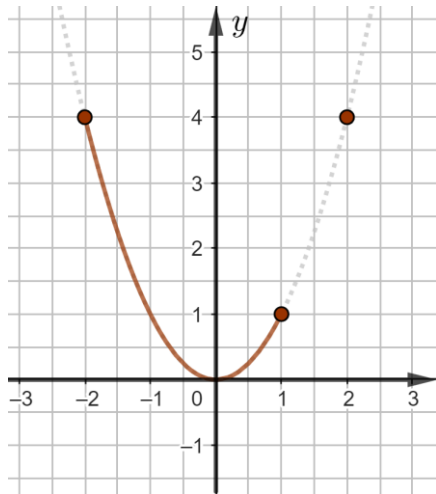
3. (2p) $f(x) = 7^{3x+1}$

Answer: $D_f = \mathbb{R}$

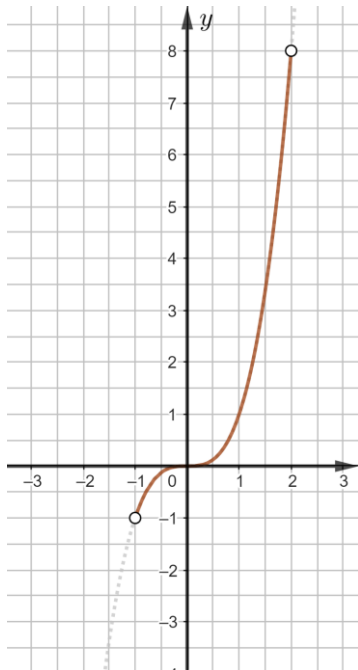
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Task2. Draw a graph of the function f given by the formula and the domain D_f .

1. $f(x) = x^2$ $D_f = [-2,1] \cup \{2\}$

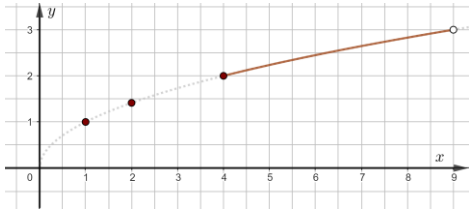


2. $f(x) = x^3$ $D_f = (0,2)$

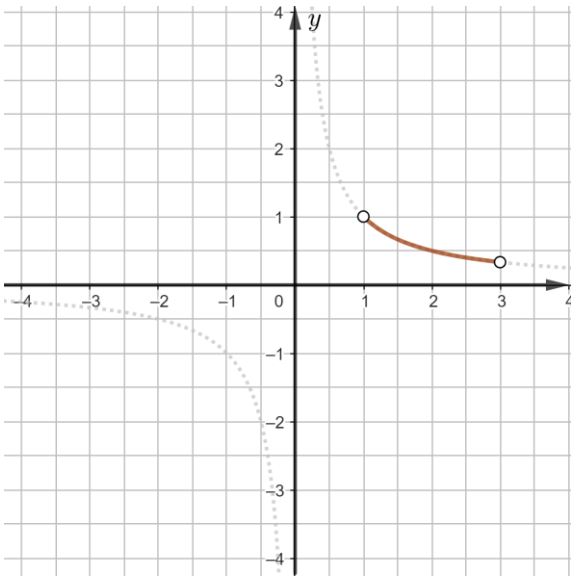


3. $f(x) = \sqrt{x}$ $D_f = \{1,2\} \cup [4,9)$

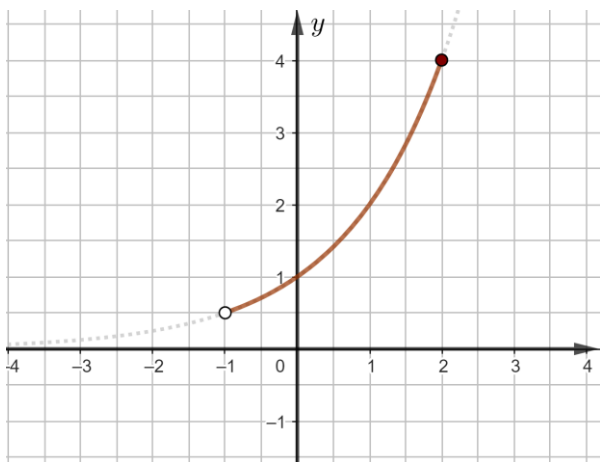
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4. $f(x) = \frac{1}{x}$ $D_f = (1,3)$

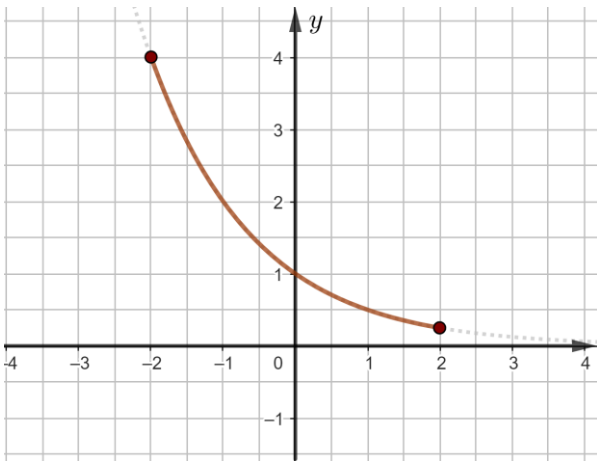


5. $f(x) = 2^x$ $D_f = (-1,2]$

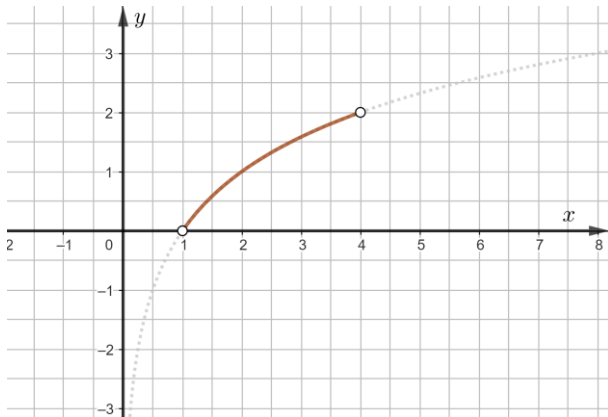


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6. $f(x) = \left(\frac{1}{2}\right)^x$ $D_f = [-2, 2]$



7. $f(x) = \log_2 x$ $D_f = (1, 4)$



8. $f(x) = \log_{\frac{1}{2}} x$ $D_f = \{1, 2, 4\}$

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