Wk2_TutorialQ

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Wk2_TutorialQ

Tutorial 1

1. When you turn on a hot-water faucet, the temperature of the water depends on how long the water has been running. Draw a rough graph of as a function of the time that has elapsed since the faucet was turned on.

2. A rectangular storage container with an open top has a volume of 10 m. The length of its base is twice its width. Material for the base costs $10 per square meter; material for the sides costs $6 per square meter. Express the cost of materials as a function of the width of the base. Plot the functions of material cost function using python. Label your axes. What can you tell from the graph?

3. Find the domain of each function.
   a. $f(x) = \sqrt{x+2}$
   b. $g(x) = \frac{1}{x^2-x}$

4. Classify the following functions as one of the types of functions that we have discussed. (i.e power function / logarithm function / polynomial / others)
   a. $f(x) = 5^x$
   b. $g(x) = x^5$
   c. $h(x) = \frac{1+x}{1-\sqrt{x}}$
   d. $u(t) = 1 - t + 5t^4$

5. The manager of a weekend flea market knows from past experience that if he charges x dollars for a rental space at the flea market, then the number y of spaces he can rent is given by the equation $y = 200\text{-}4x$.
   a. Plot a graph of this linear function using python. (Remember that the rental charge per space and the number of spaces rented can't be negative quantities.)
   b. What do the slope, the y-intercept, and the x-intercept of the graph represent?

6. Sketch the graphs of the following functions.
   a. $f(x) = \sin(2x)$
   b. $f(x) = 1 - \sin(x)$

7. Plot the graph of the function $y = |x^2 - 1|$ using python.

8. If $f(x) = x^2$ and $g(x) = x - 3$, find the composite function $fg(x)$ and $gf(x)$

9. If $f(x) = x^{1/2}$ and $g(x) = (2-x)^{1/2}$, find each function and its domain
   a. $fg(x)$
   b. $gf(x)$
   c. $ff(x)$
   d. $gg(x)$

Q1

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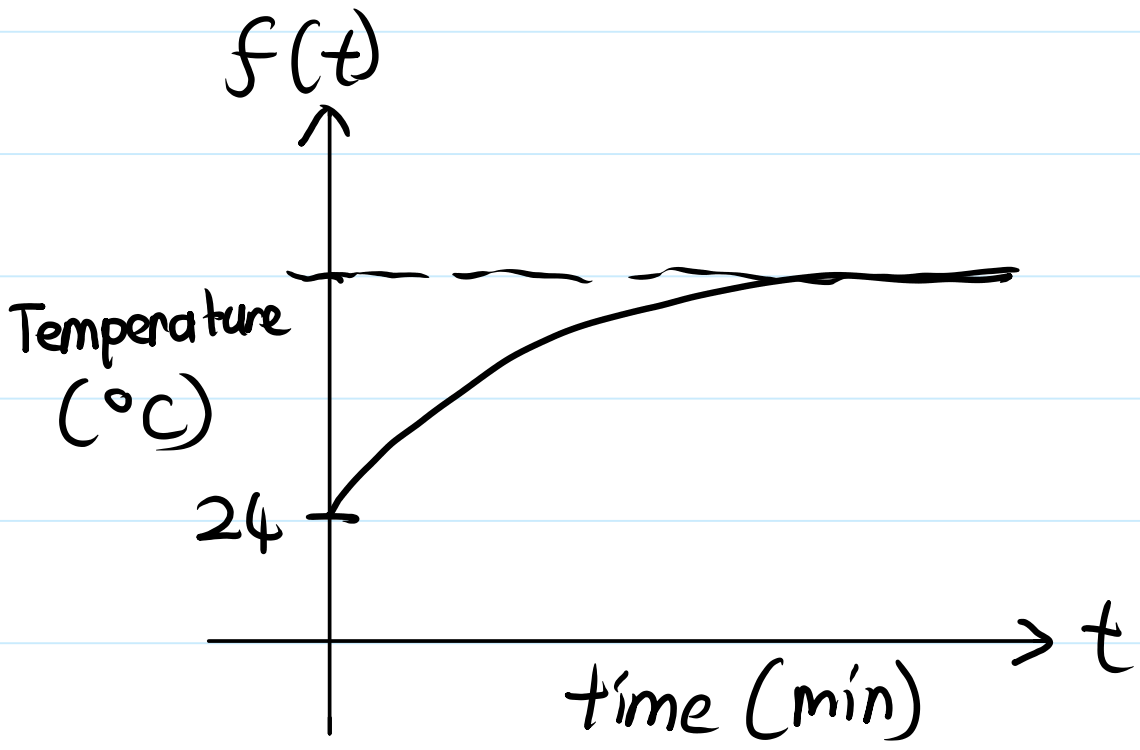
1. When you turn on a hot-water faucet, the temperature of the water depends on how long the water has been running. Draw a rough graph of as a function of the time that has elapsed since the faucet was turned on.



Q3

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3. Find the domain of each function.
   a. $f(x) = \sqrt{x+2}$
   b. $g(x) = \frac{1}{x^2-x}$

a. $f(x) = \sqrt{x+2}$

$x \in [-2, \infty)$

b. $g(x) = \frac{1}{x^2-x}$

$x \in \mathbb{R} \setminus \{0, 1\}$

Q4

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4. Classify the following functions as one of the types of functions that we have discussed. (i.e power function / logarithm function / polynomial / others)
   a. $f(x) = 5^x$
   b. $g(x) = x^5$
   c. $h(x) = \frac{1+x}{1-\sqrt{x}}$ $(1+\sqrt{x})$
   d. $u(t) = 1 - t + 5t^4$

Linear
Root

a. Exponential function
b. Power function
c. Rational // Algebraic
d. Polynomial

Q6

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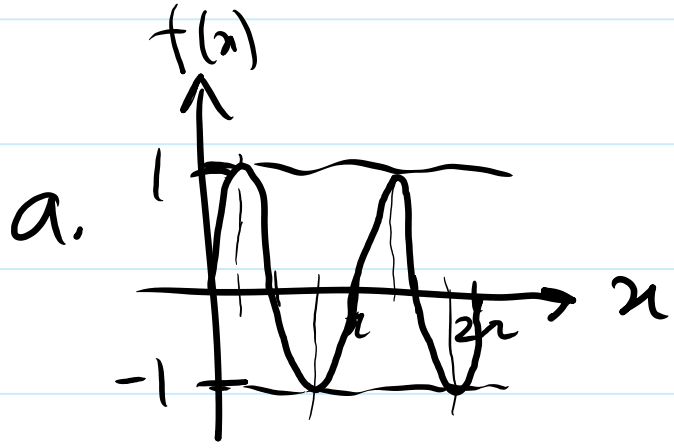
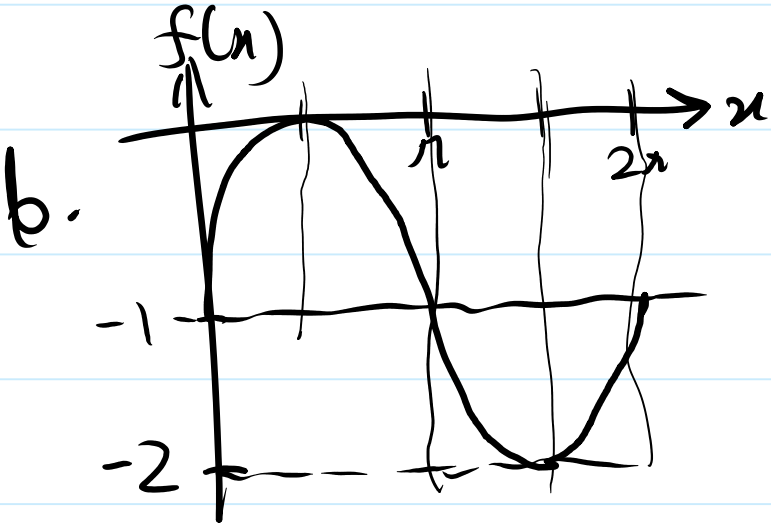
6. Sketch the graphs of the following functions.
   a. $f(x) = \sin(2x)$
   b. $f(x) = 1 - \sin(x)$





Q8

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8. If $f(x) = x^2$ and $g(x) = x - 3$, find the composite function $fg(x)$ and $gf(x)$

$$fg(x) = (x-3)^2$$
$$= x^2 - 6x + 9$$

$$gf(x) = x^2 - 3$$

Q9

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9. If $f(x) = x^{1/2}$ and $g(x) = (2-x)^{1/2}$, find each function and its domain
   a. $fg(x)$
   b. $gf(x)$
   c. $ff(x)$
   d. $gg(x)$

a. $fg(x) = (2-x)^{1/4}$

$x \in (-\infty, 2]$

b. $gf(x) = (2-\sqrt{x})^{1/2}$

$x \in [0, 2]$

c. $ff(x) = x^{1/4}$

$x \in [0, \infty)$

d. $gg(x) = (2-\sqrt{2-x})^{1/2}$

$2 - \sqrt{2-x} \geq 0$

$\sqrt{2-x} \leq 2$

$2 - x \leq 4$

$x \geq -2$

$x \in [-2, 2]$

x

$(-\infty, 2]$

$\cap (-\infty$

Q2&5&7

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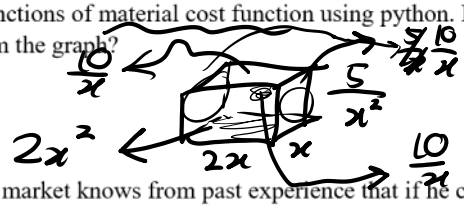
2. A rectangular storage container with an open top has a volume of 10 m. The length of its base is twice its width. Material for the base costs $10 per square meter; material for the sides costs $6 per square meter. Express the cost of materials as a function of the width of the base. Plot the functions of material cost function using python. Label your axes. What can you tell from the graph?



$SA = B + S$

$S: \frac{40}{x}$ $B: 2x^2$

5. The manager of a weekend flea market knows from past experience that if he charges x dollars for a rental space at the flea market, then the number y of spaces he can rent is given by the equation $y = 200\text{-}4x$.
   a. Plot a graph of this linear function using python. (Remember that the rental charge per space and the number of spaces rented can't be negative quantities.)
   b. What do the slope, the y-intercept, and the x-intercept of the graph represent?

$C(x) = 20x^2 + \frac{240}{x}$

$C'(x) = 40x - \frac{240}{x^2}$

$C''(x) = 40$

$6 = x^3$

7. Plot the graph of the function $y = |x^2 - 1|$ using python.

https://github.com/IKRAMJAAFAR/Computing-Math-2-Y1S2