MATH 1005: College Algebra
Spring 2019 – March 8
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Answer Key
Quiz 6 – 2.4, 2.5, 2.6, & 2.7
Total: 25 / 25

*Show **all** of your work in the space provided. Clearly indicate your final answer.*

1. Let $f(x) = \dfrac{2x}{\sqrt{9-x^2}}$. Find $f(0), f(1)$, and $f(3)$. 3 / 3

Solution:

$$f(0) = \frac{2(0)}{\sqrt{9-0^2}} = \frac{0}{3} = 0$$
$$f(1) = \frac{2(1)}{\sqrt{9-1^2}} = \frac{2}{\sqrt{8}}$$
$$f(3) = \frac{2(3)}{\sqrt{9-3^2}} \text{ is undefined.}$$

2. Find the domain of the function $G(x) = \dfrac{\sqrt{x-7}}{x+3}$. Write your answer in interval notation. 5 / 5

Solution: We have two restrictions on what we are allowed to plug in: First, we must have $x \neq -3$ and second, we must have $x - 7 \geq 0$, i.e. $x \geq 7$. Combining these restrictions, we get that our domain is $[7, \infty)$.

3. Determine *algebraically* whether the function $h(x) = \dfrac{3x^3}{3x^2-5}$ is even, odd, or neither. Describe what this means about the graph of h. 5 / 5

Solution: The function h is odd if $h(-x) = -h(x)$, and is even if $h(-x) = h(x)$. The graph of an odd function is symmetric about the origin, and that of an even function is symmetric about the y-axis.

So, let's look at $h(-x)$:

$$\begin{aligned} h(-x) &= \frac{3(-x)^3}{3(-x)^2 - 5} \\ &= \frac{-3x^3}{3x^2 - 5} \\ &= -\frac{3x^3}{3x^2 - 5} \\ &= -h(x), \end{aligned}$$

and hence h is odd and therefore the graph of h is symmetric about the origin.

4. Find the average rate of change of the function $f(x) = 2x + c$ as x changes from $x = 2$ to $x = 3$, where c is any real number. 3 / 3

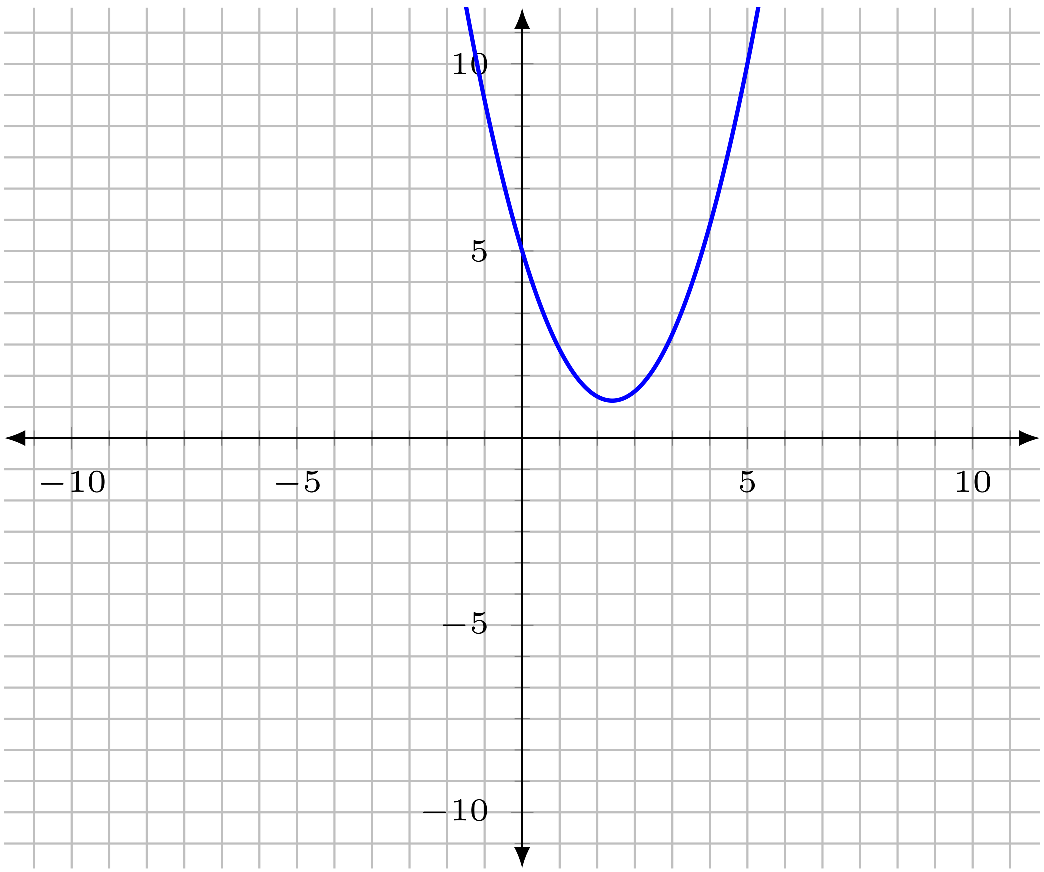
Solution:

$$\frac{f(3) - f(2)}{3 - 2} = \frac{(6 + c) - (4 + c)}{1} = \frac{6 + c - 4 - c}{1} = 2.$$

5. Graph the function $f(x) = (x - 2)^2 + 1$ without using an xy table. 4 / 4

Solution:

We recognize that this is the graph of x^2 shifted right 2 and up 1, so:



6. Let $f(x) = x^3$. Find the function $g(x)$ obtained from shifting the graph of f by shifting two units upward and three units to the left. Then graph $g(x)$. 5 / 5

Solution: First, we let $y = x^3$. Then

$$\begin{aligned} y &= x^3 \\ y &= (x+3)^3 && \text{(shift 3 left, so replace } x \text{ with } x+3) \\ y - 2 &= (x+3)^3 && \text{(shift 2 up, so replace } y \text{ with } y-2) \\ y &= (x+3)^3 + 2 && \text{(solve for } y) \end{aligned}$$

So $g(x) = (x+3)^3 + 2$.