AMAT100: Pre-Calculus
Worksheet 2

Due: 2/14 (MW Sections) and 2/15 (TTh Sections) in Class or Digitally

Name:

UAlbany Email:

———— Instructions ————

- This homework should be submitted in class or digitally on the date listed above.

- There are three main ways you might want to write up your work.

  - Write on this pdf using a tablet
  - Print this worksheet and write in the space provided
  - Write your answers on paper, clearly numbering each question and part.
    * If using either of the last two options, you can use an app such as Microsoft Lens to take pictures of your work with your phone and convert them into a single pdf file.

- **You must show all work**. You may receive zero or reduced points for insufficient work. **Your work must be neatly organised and written**. You may receive zero or reduced points for incoherent work.

- If you are writing your answers on anything other than this sheet, you should only have **one question per page**. You can have parts a), b) and c) on the page for example, but problems 1) and 2) should be on separate pages.

- **Put a box or circle around your final answer** for each question.

- The problems on this assignment will be **graded on correctness and completeness**.

- These problems are designed to be done without a calculator. Whilst there is nothing stopping you using a calculator when working through this assignment, be aware of the fact that you are not permitted to use calculators on exams so you might want to practice without one.

1. Explain your reasoning for each question below. Partial credit awarded for selecting the correct answer without an explanation.

   (a) (0.5 Point) The domain of $S(x) = \sqrt{x-3}$ is

   (A) $(-\infty, 3)$ (D) $[3, \infty)$
   (B) $(3, \infty)$ (E) None of the above.
   (C) $(-\infty, 3]$

   (b) (0.5 Point) The zeros of $Q(x) = x^2 - 2x - 3$ are

   (A) 1 and 3   (D) -1 and -3
   (B) 1 and -3   (E) None of the above.
   (C) -1 and 3

(c) (0.5 Point) The domain of $R(x) = \dfrac{1}{x^2 - 2x - 3}$ is

(A) $(-\infty, -1) \cup (3, \infty)$ (D) $(3, \infty)$

(B) $(-1, 3)$ (E) $(-1, \infty)$

(C) $(-\infty, -1) \cup (-1, 3) \cup (3, \infty)$ (F) None of the above.

(d) (0.5 Point) The domain of $G(x) = \dfrac{\sqrt{x - 3}}{x^2 - 2x - 3}$ is

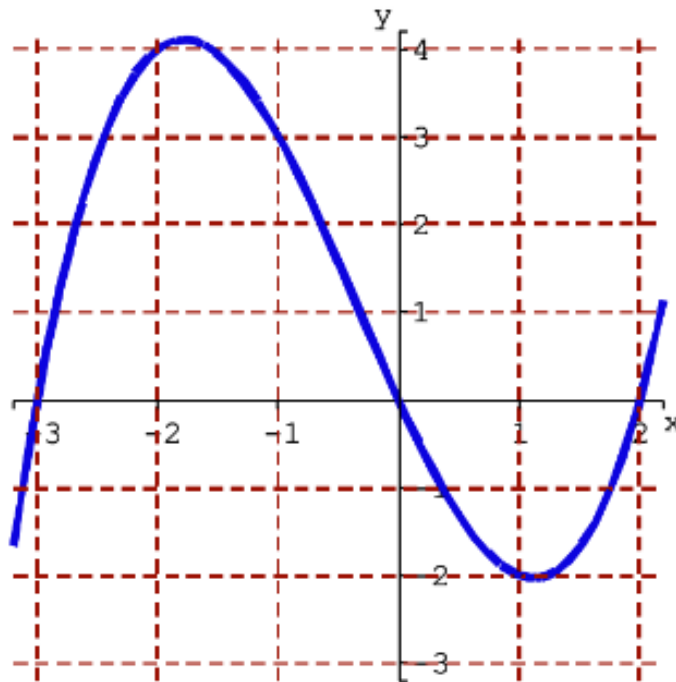(A) $(-\infty, -1) \cup (3, \infty)$ (D) $[3, \infty)$

(B) $(-1, 3)$ (E) $(-1, \infty)$
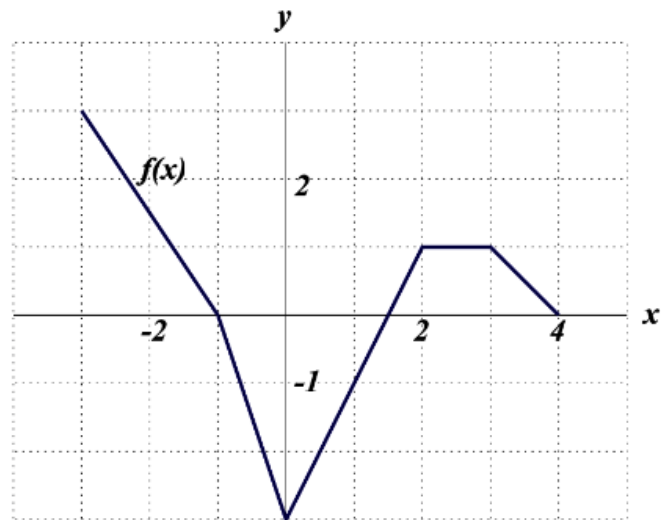
(C) $(-\infty, 3]$ (F) None of the above.

2. Let $p(x)$ be defined by the graph shown above.

(a) (0.5 Point) Evaluate $p(-1)$.

(b) (0.5 Point) Solve $p(x) = 0$.

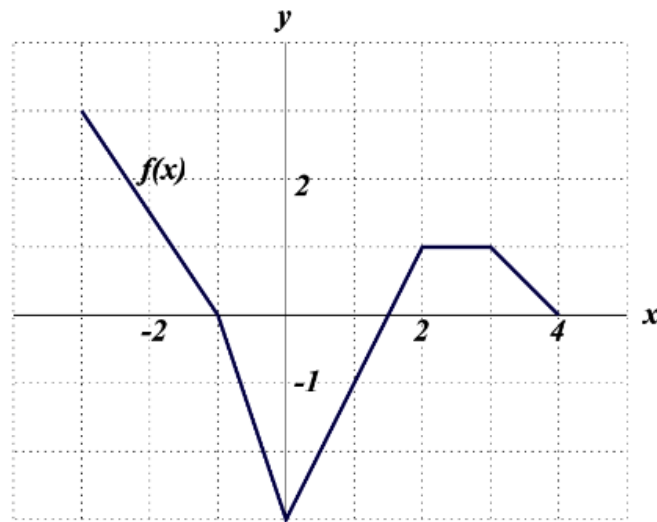(c) (0.5 Point) Is $p(-3/2)$ positive or negative?

(d) (0.5 Point) How often does the line $x = -1$ intersect the graph of p?

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3. Consider the graph of $f(x)$ in the figure above.

(a) (0.5 Point) State all of the intervals on which $f(x)$ is decreasing and positive.

(b) (0.5 Point) State all of the intervals on which $f(x)$ is increasing and negative.

(c) (0.5 Point) Find the average rate of change between $x = 1$ and $x = -3$.

(d) (0.5 Point) Which is larger, the average rate of change between $x = 3$ and $x = 4$ or the average rate of change between $x = 2$ and $x = 3$?

4. (2 Points) In the space provided graph $f(x)$, then graph $g(x)$ the function obtained by transforming $f(x)$

$$f(x) = x^2 - 2x - 8 \qquad g(x) = -\frac{1}{2}f(x - 4) + \frac{1}{2}$$

5. (a) (1 Point) Find the inverse of $f(x) = \dfrac{x}{2x+1}$

(b) Verify $f^{-1}(x)$ is the inverse function of $f(x)$ by showing:

    i. (0.5 Point) $f(f^{-1}(x)) = x$

    ii. (0.5 Point) $f^{-1}(f(x)) = x$