Note: Certain questions have been more challenging for students. Questions marked (***) are similar to those challenging questions.

- 1. Determine the domain of $g(x) = \frac{2x+1}{x^2+5x+4}$.
 - (A) All real numbers except $\frac{1}{4}$
 - (B) All real numbers except -4, -1, $-\frac{1}{2}$
 - (C) All real numbers except $-\frac{1}{2}$, 1, 4
 - (D) All real numbers except 1, 4
 - (E) All real numbers except -4, -1







3. (***) The top 15 hottest temperatures recorded in Tucson until the year 2000 are shown in the table below [Source: National Weather Service]. Temperatures are given in degrees Fahrenheit.

Temperature	Date		
(in degrees F°)			
117	06/26/90		
116	06/29/94		
115	06/28/94		
115	06/25/94		
114	07/28/95		
114	07/04/89		
114	06/22/88		
113	06/27/95		
113	06/26/94		
113	06/24/94		
113	06/26/93		
113	06/28/90		
113	06/25/90		
113	06/18/89		
113	06/23/88		

Which one of the following statements is true about this data?

- (A) The date is a function of the temperature.
- (B) The temperature is a function of the date.
- (C) Neither of the above statements is true.
- 4. Which one of the following has a domain of all real numbers except x = 4?

(A)
$$y = x - 4$$
 (B) $y = \frac{1}{x^2 - 16}$ (C) $y = \sqrt{x - 4}$

(D) $y = \frac{3x}{2x-8}$ (E) $y = \frac{x-4}{x}$

Questions 5, 6 and 7, refer to the following situation: A manufacturer of DVD players estimates that the profit, in dollars, for producing and selling x players is given by the function

$$P(x) = -\frac{1}{50}x^2 + 258x - 38250.$$

Graph this function in your calculator.

- 5. (***) Find the *x*-intercepts on the graph of this function, and give a practical interpretation.
 - (A) The *x*-intercepts are (150, 0), (12750, 0), and (-38250, 0).
 The manufacturer would make \$0 in profit by selling 150 DVD players, 12,750 DVD players, and -38,250 DVD players.
 - (B) The x-intercepts are (150, 0), (12750, 0), and (-38250, 0).
 The manufacturer could sell a minimum of -38,250 DVD players, a maximum of 12,750 DVD players, or 150 DVD players.
 - (C) The *x*-intercepts are (150, 0) and (12750, 0).The manufacturer would make \$0 in profit by selling 150 DVD players and 12,750 DVD players.
 - (D) The *x*-intercepts are (150, 0) and (12750, 0).The manufacturer could sell a minimum of 150 DVD players and a maximum of 12,750 DVD players.
- 6. On what open interval(s) is the profit function increasing?
 - (A) (150, 6450)
 - (B) (0, 6450)
 - (C) (150, 12750)
 - (D) (0, 12750)
 - (E) (0, 25800)
- 7. According to this model, what is the maximum profit?

The maximum profit is:

- (A) More than \$900,000
- (B) Between \$850,000 and \$900,000
- (C) Between \$800,000 and \$850,000
- (D) Between \$750,000 and \$800,000
- (E) Less than \$750,000

8. Determine an equation for the linear function graphed below.



(A)	y = x + 1	(B)	y = 2x + 1	(C)	$y = -\frac{1}{2}x + 1$

(D)
$$y = \frac{1}{2}x + 1$$
 (E) $y = -2x + 1$

Midterm 1 Practice Exam 1

Questions 9, 10, and 11, refer to the following situation: Vehicles commonly depreciate in value as they grow older. Samantha purchases a new car. After 1 year, the value of the car has depreciated to \$41,500. After 2 years, the value of the car has depreciated to \$38,000. Assume that the car's value has been decreasing linearly.

9. Write a function to model the depreciation of the car as a function of years since the initial purchase where D(t) is the value, in dollars, of the car, t years after purchase.

(A)
$$D(t) = -3500t$$

(B) D(t) = -3500t + 45,000

- (C) D(t) = -3500t + 41,500
- (D) D(t) = -3500t + 38,000
- (E) D(t) = -3500t + 79,500

10. What is the slope of this function, and what does it tell you in practical terms?

- (A) The slope is -3,500. Each year, the car decreases in value by 3,500.
- (B) The slope is -3,500. Every two years, the car decreases in value by 3,500.
- (C) The slope is -3,500. Within one day of purchase, the car decreases in value by 3,500.
- (D) The slope is -3,500. Eventually, the car's value will only be \$3,500.
- (E) The slope is -3,500. Each year, the car increases in value by 3,500.
- 11. According to this model, what was the initial purchase price of Samantha's car?
 - (A) \$38,000
 - (B) \$41,500
 - (C) \$45,000
 - (D) \$79,500
 - (E) Cannot be determined from information provided.

12. Which one of the following is the graph of the function





Questions 13 and 14 refer to the following situation: MJ is planning a trip on the subway. If MJ travels 20 miles or less, she pays \$1.30 per mile. If MJ travels more than 20 miles, her ticket costs her \$1.15 per mile.

13. Create a piecewise linear function for the total cost of the ticket, in dollars, C(x), as a function of *x* miles traveled.

(A)
$$C(x) = \begin{cases} 1.30x & 0 \le x \le 20\\ 1.15x & x > 20 \end{cases}$$

(B)
$$C(x) = \begin{cases} 1.30x + 20 & 0 \le x \le 20\\ 1.15x + 20 & x > 20 \end{cases}$$

(C) $C(x) = \begin{cases} 1.30x & 0 \le x \le 20\\ 1.15(x-20) & x > 20 \end{cases}$

(D)
$$C(x) = \begin{cases} 1.30x & 0 \le x \le 20\\ 1.15(20-x) & x > 20 \end{cases}$$

14. (***) If MJ has \$22, what is the farthest she could travel on the subway?

The number of miles MJ can travel is:

- (A) Fewer than 15 miles
- (B) Between 15 and 17 miles
- (C) Between 17 and 19 miles
- (D) More than 19 miles

- 15. (***) The function d = f(x) represents the average distance traveled by an automobile when x gallons of gas are used. Suppose the point (10, 250) is on the graph of d = f(x). In five years, advances in technology will allow the car to travel twice as far with the same amount of gas. What point MUST be on the new graph?
 - (A) (20, 250) (B) (20, 500) (C) (10, 125)
 - (D) (10, 500) (E) (20, 125)

16. (***) The function C = f(x) represents the cost for a company to manufacture *x* skateboards. If the company doubles the number of skateboards it produces, the cost triples. Which one of the following represents the new cost?

(A)
$$C = 3f\left(\frac{1}{2}x\right)$$
 (B) $C = 3f(2x)$ (C) $C = 2f(3x)$
(D) $C = 2f\left(\frac{1}{3}x\right)$ (E) None of these

- 17. (***) Suppose the graph of $y = x^2$ is transformed into $y = -\frac{2}{7}(x+5)^2$. Which one of the following describes the transformations performed?
 - (A) Shift right 5 units, horizontal compression, reflect over the x-axis
 - (B) Shift left 5 units, vertical compression, reflect over the x-axis
 - (C) Shift left 5 units, vertical compression, reflect over the y-axis
 - (D) Shift right 5 units, vertical compression, reflect over the x-axis
 - (E) Shift left 5 units, horizontal expansion, reflect over the y-axis

- 18. Given $g(x) = 3x^2 5x$, evaluate g(h-2).
 - (A) $3h^2 5h 22$
 - (B) $3h^2 5h 2$
 - (C) $3h^2 17h + 22$
 - (D) $3h^2 17h 2$
 - (E) $3h^2 17h + 2$

Midterm 1			
Practice Exam 1 Answers			
Ouestion	Answer		
1	Е		
2	В		
3	В		
4	D		
5	С		
6	В		
7	D		
8	D		
9	В		
10	А		
11	С		
12	В		
13	А		
14	В		
15	D		
16	А		
17	В		
18	С		