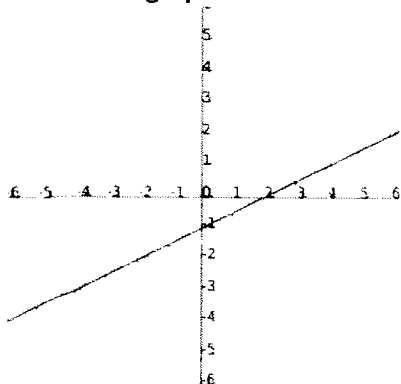


Study Guide for Midterm One Answers

In general, **do not use mixed numbers**. Instead, **use improper fractions** from here on out.

1. Use the graph to answer the questions.



- a) Find x when $y = 1$.
- b) Find y when $x = 2$.
- c) What is the slope of the line?
- d) What is the y -intercept of the line? Write your answer as an ordered pair.
- e) What is the x -intercept of the line? Write your answer as an ordered pair.

2. Evaluate the following expressions for $a = 2$, $b = -5$, $c = -4$, and $d = 10$. **Show all work for credit.** Unless otherwise specified, write your answers as integers or simplified fractions.

a) $\frac{a}{d} \div \frac{b}{c}$	b) $b^2 - 4ac$	c) $\frac{-b-c^2}{2a}$	d) $2c^2 - 5c + 3$
$\frac{4}{25}$	57	$-\frac{11}{4}$	55

3. Use your calculator to perform the indicated operations. Round the result to two decimal places.

$$18.67 - 36.9(22.4) + 12.38 \div 5.72$$

$$-805.73$$

4. An airplane drops from 32,500 feet to 27,800 feet. Find the change in altitude. Show all work for credit.

$$-4700$$

5. Perform the indicated operations and simplify your answers. **Show all work for credit!** No work means no credit! Unless otherwise specified, your answers should be an integers or simplified fractions.

a) $2(5)^2 - 6 \div 2 + 1$	b) $5[3 + 2(4 - 2)]$	c) $9(4 - 6)^2 - 2(2 - 4)^3$
48	35	52
d) $(-5)^2$	e) $(\frac{3}{5})^2$	f) $\frac{-15(-8)}{10 - (-10)}$
25	$\frac{9}{25}$	6

6. For the following problems, let x be a number.

a) Subtract 14 from the quotient of the number and -2 .

i. Translate the English phrase into a mathematical expression.

$$\frac{x}{-2} - 14$$

ii. Evaluate the expression for $x = -14$. Show all work for full credit.

$$-7$$

b) 7 more than the product of -2 and the number

i. Translate the English phrase into a mathematical expression.

$$-2x + 7$$

ii. Evaluate the expression for $x = -14$. Show all work for full credit.

$$35$$

7. Use the slope formula to find the slope of the line that passes through the two given points.

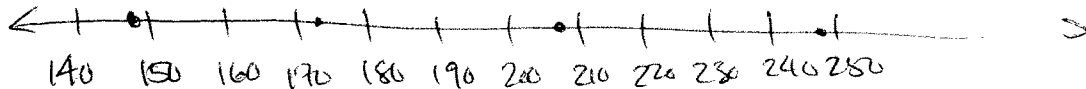
$(6, 7)$ and $(8, 1)$

a) Slope (Write your answer as an integer or simplified fraction): -3

b) Is the line increasing, decreasing, horizontal, or vertical? decreasing

8. The number of complaints (in thousands) of identity theft in the years 1999, 2000, 2001, and 2002 is, 148, 173, 208, and 247, respectively. Let n be the number of complaints (in thousands).

a) Use points on a number line to describe the values of n . Be sure to label the units on the number line.



b) Find the average of the values you plotted in part (a). Round your answer to the nearest integer.

$$194$$

c) Did the number of complaints increase, decrease, stay approximately constant, or none of these between 1999 and 2002, inclusive? Explain your reasoning.

increase - notice that the numbers are increasing in the original data set

d) Did the increases in the number of complaints per year increase, decrease, stay approximately constant, or none of these between 1999 and 2002, inclusive. Explain your reasoning.

increase - the distances between the points are increasing as you move from left to right on the number line.

9. Consider the numbers below. Which of these numbers are the given type of number?

$\left\{ \frac{4}{5}, -3, \sqrt{64}, 0, -\pi, 5.8, \sqrt{64}, -\sqrt{5} \right\}$

- a) The counting numbers are: $\sqrt{64}$
- b) The negative integers are: -3
- c) The integers are: $-3, 0, \sqrt{64}$
- d) The rational numbers are: $\frac{4}{5}, -3, 0.2, 0, 5.8, \sqrt{64}$
- e) The irrational numbers are: $-\pi, \sqrt{5}$
- f) The real numbers are: $\frac{4}{5}, -3, 0.2, 0, \pi, 5.8, \sqrt{64}, -\sqrt{5}$

10. Which of the given ordered pairs satisfy the given equation? Show all work for full credit.

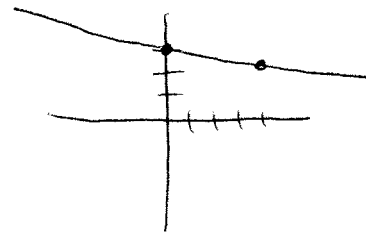
$y = -5x + 8$ $(-2, 3), (0, 8), (3, -7)$
 no yes no

11. Let a be the total amount of money spent on ads (in billions of dollars) in the United States at t years since 2000. What does the ordered pair $(1, 106.6)$ mean in this situation? Write your answer in a complete sentence.

In 2001, the total spent on ads in the US was \$106.6 billion.

12. Graph $y = -\frac{1}{4}x + 3$

- a) y-intercept as an ordered pair: $(0, 3)$
- b) Slope: $-\frac{1}{4}$
- c) Graph



13. Let r be the revenue (in millions of dollars) of a company for the year that is t years since 2000. Some pairs of values of t and r are shown in the table to the right.

t (years)	r (millions of dollars)
0	7
1	10
3	16
4	19
6	25

- a) Create a scattergram of the data. Then draw a linear model. Be sure to label your axes and the units.

- b) When was the revenue \$13 million? Write your answer in a complete sentence in the context of the problem.

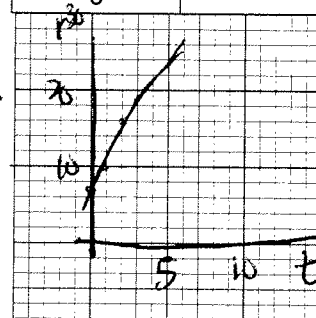
$t=2$ In 2002, the company's revenue was \$13 million.

- c) Predict the revenue in 2010. Write your answer in a complete sentence in the context of the problem.

In 2010, the revenue is predicted to be \$37 million.

- d) What is the r -intercept of the model? What does it mean in this situation? Write your answer in a complete sentence in the context of the problem.

$(0, 7)$ In 2000, the company's revenue was \$7 million.



Notice this is an exact linear relationship.

t	r
8	31
10	37

14. Perform the indicated operations and simplify your answers. **Show all work for credit!**

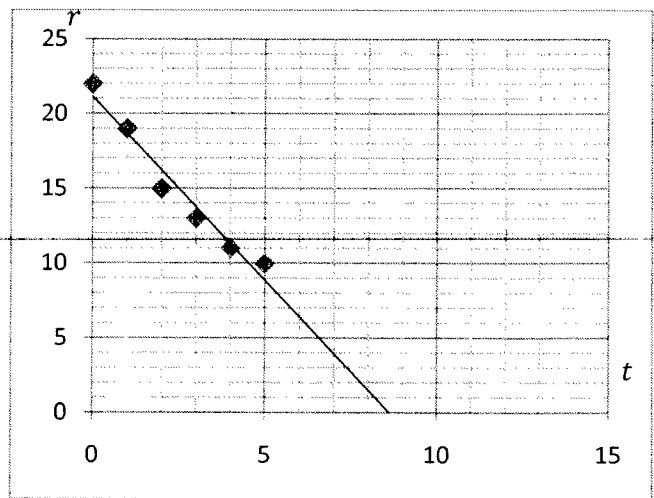
Unless otherwise specified, your answers should be integer or simplified fraction.

a) $\frac{2}{11} \cdot \frac{3}{7}$ $\frac{6}{77}$	b) $\frac{2}{3} \div 6$ $\frac{1}{9}$	c) $\frac{3}{14} + \frac{5}{4}$ $\frac{41}{28}$
d) $-\frac{1}{11} - (-\frac{10}{11})$ $\frac{9}{11}$	e) $(\frac{3}{5})^2$ $\frac{9}{25}$	f) $\frac{3}{7}(-\frac{4}{5})$ $-\frac{12}{35}$

15. If there are too many ticketed passengers for a flight, a person can volunteer to be "bumped" onto another flight. The voluntary bumping rates for large US airlines (number of bumps per 10,000 passengers, January through September) are shown in the table for various years. Let r be the voluntary bumping rate (number of bumps per 10,000 passengers) at t years since 2000. Use the scattergram and linear model to answer the questions that follow.

Notice this is an approx linear model

Year	Bumping Rate
2000	22
2001	19
2002	15
2003	13
2004	11
2005	10



a) What is the r -intercept of the model?

$(0, 22)$

b) What does it mean in this situation? Write your answer in a complete sentence.

According to the model, the average bumping rate was 22 per 10,000 passengers in 2000.

c) Predict when the voluntary bumping rate will be 6 bumps per 10,000 passengers. Round your answer to the nearest year and write your answer in a complete sentence.

In 2006, the voluntary bumping rate was 6 bumps per 10,000 passengers.

d) Use your model to predict what the bumping rate will be in 2007. Round your answer to the nearest integer. Write your answer in a complete sentence.

According to the model, in 2007, the bumping rate was 4 per 10,000 passengers.