

The following 14 multiple choice questions are worth 5 points each.

1. Solve:  $\frac{1}{x-1} - \frac{2}{x+3} = \frac{4}{x^2 + 2x - 3}$

- a.  $x = -11$
- b.  $x = -1$
- c.  $x = 1$
- d.  $x = -6$
- e. no solution

2. Solve:  $(x+2)(x+5) = 28$

- a.  $x = -2$  and  $x = -5$
- b.  $x = -9$  and  $x = 2$
- c.  $x = -2$  and  $x = 9$
- d.  $x = 26$  and  $x = 23$
- e. no real solution

3. Solve for  $P$ :  $T = \frac{A+P}{Pr}$

- a.  $P = \frac{T(A+1)}{r}$
- b.  $P = Tr - A$
- c.  $P = \frac{A}{Tr}$
- d.  $P = \frac{Tr}{A}$
- e.  $P = \frac{A}{Tr - 1}$

4. Solve and write your answer using interval notation:  $\frac{x}{4} - \frac{2}{3} - 1 > \frac{x}{2}$

a.  $\left(-\infty, -\frac{20}{3}\right)$

b.  $(-\infty, -3)$

c.  $\left(-\infty, -\frac{4}{3}\right)$

d.  $\left(\frac{7}{2}, \infty\right)$

e.  $\left(\frac{15}{2}, \infty\right)$

5. Determine which of the following is/are true.

I. The equation  $-3x^2 = 4x + 2$  has one solution.

II. The equation  $(3x - 2)^2 = 49$  is equivalent to  $3x - 2 = 7$ .

III. The equation  $x^2 = 25$  has two solutions.

a. None are true.

b. Only I and II are true.

c. Only II and III are true.

d. Only I is true.

e. Only III is true.

6. Given  $f(x) = -x^2 + 3x - 7$ , evaluate the difference quotient:  $\frac{f(x+h) - f(x)}{h}$

a.  $-h + 3$

b.  $-2x + 3$

c.  $2x - 2h + 1$

d.  $-2x - h + 3$

e. 1



Use the following table for questions 9 and 10

$X$	$Y_1$	$Y_2$
-3	-5	-1
-2	0	0
-1	3	1
0	4	2
1	3	3
2	0	4
3	-5	5

9. Determine which of the following is/are true.

- I.  $Y_1$  crosses the  $y$ -axis at  $-2$  and  $2$ .
- II.  $Y_2$  crosses the  $y$ -axis at  $2$ .
- III.  $Y_1$  and  $Y_2$  both cross the  $x$ -axis at  $-2$ .

- a. Only I is true.
- b. All are true.
- c. Only II and III are true.
- d. Only I and II are true.
- e. Only I and III are true.

10. The graphs of  $Y_1$  and  $Y_2$  intersect at which point(s) ?

- a. At  $(-2, 0)$  and  $(1, 3)$
- b. At  $(1, 3)$  and  $(3, 5)$
- c. Only at  $(-2, 0)$
- d. At  $(2, 0)$  and  $(2, 4)$
- e. The graphs do not intersect.

11. The city of Newark recently revised the fines for speeding. The statement reads “drivers who exceed the speed limit by less than 16 miles per hour will be fined an amount equal to the number of miles per hour over the maximum speed limit multiplied by itself”. For drivers who exceed the speed limit by 16 miles per hour or more, “the fine will be the first fee plus an additional \$15 per mile per hour for each additional mile in excess”.

Thus we have the following piece-wise function for the fine,  $f(x)$ , for  $x$  miles per hour over the speed limit.

$$f(x) = \begin{cases} x^2 & \text{if } x < 16 \\ 225 + 15(x - 16) & \text{if } x \geq 16 \end{cases}$$

Suppose you are caught driving at 50 miles per hour in a school zone which has a maximum speed limit of 25 miles per hour. What would your fine be?

- a. \$600                      c. \$625  
b. \$400                      d. \$375  
   e. \$300
12. Write the equation of the line that passes through the point  $(3, 6)$  and has  $x$ -intercept  $= -5$ .
- a.  $y = \frac{3}{4}x + \frac{15}{4}$   
b.  $y = \frac{4}{3}x + \frac{20}{3}$   
c.  $y = \frac{11}{3}x - 5$   
d.  $y = \frac{1}{4}x + \frac{5}{4}$   
e.  $y = -\frac{4}{3}x - \frac{20}{3}$

13. Write the equation of the line that passes through the point  $(4, -3)$  and is perpendicular to the line with equation  $3x - 4y + 7 = 0$ . What is the  $y$ -intercept of the line you found?
- a. 9
  - b.  $\frac{7}{4}$
  - c.  $-\frac{25}{3}$
  - d. 0
  - e.  $\frac{7}{3}$
14. Determine which of the following statements is/are true.
- I. For the line with equation  $9x - 3y + 27 = 0$ , the  $x$ -intercept is  $-3$  and the  $y$ -intercept is  $9$ .
  - II. The equation of the line passing through the point  $(3, -5)$  and parallel to the line with equation  $x = -1$ , is  $x = -5$ .
  - III. Every line in the rectangular coordinate system has an equation that can be expressed in slope-intercept form.
- a. Only III is true.
  - b. Only I is true.
  - c. Only II and III are true.
  - d. Only I and III are true.
  - e. All are true.

Name \_\_\_\_\_ Instructor \_\_\_\_\_ Section \_\_\_\_\_

**Problems 15-17 are free response.****Pages 7 and 8 should be turned in with your Answer Sheet.**

15. (8 pts) Solve and put your answer in simplest radical form. (To receive credit show all work.)

$$8x^2 - 12x = 7$$

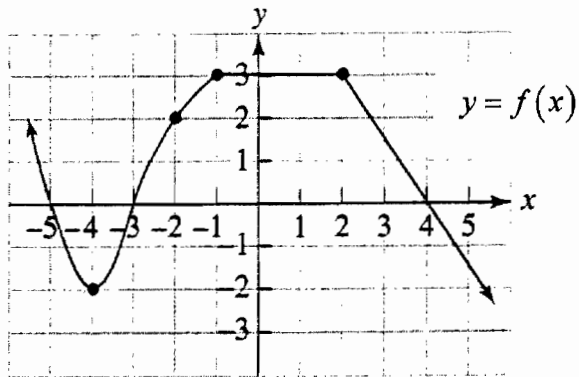
16. (6 pts) The linear function  $f(x) = 0.265x + 27.35$  models the median age of the US population,  $f(x)$ ,  $x$  years after 1970.

a. Use the model to predict the median age of the US population in the year 2020. (Show your work.)

b. Describe what the  $y$ -intercept means in context of the problem.

c. Describe what the slope means in context of the problem.

17. (16 pts) Use the graph of  $f$  below to answer each of the questions. Use interval notation when appropriate.



- What are the zeros of  $f$ ? \_\_\_\_\_
- On what intervals is  $f(x) < 0$ ? \_\_\_\_\_
- What is  $f(1)$ ? \_\_\_\_\_
- On what interval is  $f$  constant? \_\_\_\_\_
- On what interval is  $f$  increasing? \_\_\_\_\_
- What is the relative minimum value of  $f$ ? \_\_\_\_\_
- What is the domain? \_\_\_\_\_
- What is the range? \_\_\_\_\_

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Multiple Choice Key – White

Question	Answer Choice
1	E
2	B
3	E
4	A
5	E
6	D
7	B
8	C
9	C
10	A
11	D
12	A
13	E
14	B