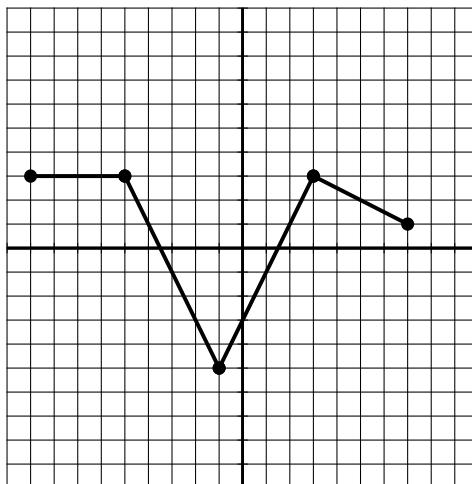


There are 16 problems on this exam. Carefully read and follow all directions. In order to receive credit show all necessary work. No credit will be given for an answer I cannot find or cannot read. All answers should be exact unless specified otherwise.

1. Use the graph of the function  $F$  shown below to determine the following. (4 points each)



- |   |  |
|---|--|
| <p>(a) Domain of <math>F</math></p> <p>(c) <math>F(-9)</math></p> <p>(e) <math>x</math>-intercept(s)</p> <p>(f) The intervals for <math>x</math> where <math>F</math> is increasing</p> <p>(g) The intervals for <math>x</math> where <math>F</math> is decreasing</p> <p>(h) The intervals for <math>x</math> where <math>F</math> is constant</p> <p>(i) Classify the point <math>(-1, -5)</math> as an extreme point. If the point is not an extreme point write NONE.</p> | <p>(b) Range of <math>F</math></p> <p>(d) <math>y</math>-intercept</p> |
|---|--|

Use the three functions given below to determine the specified information in problems 2-11. (4 points each)

$$a(x) = \frac{-3}{x-10} \quad b(x) = \sqrt{x+10} \quad c(x) = x^2 - 2$$

2. Domain of  $a(x)$

3. Domain of  $b(x)$

4. Domain of  $c(x)$

5. Range of  $b(x)$

6. Range of  $c(x)$

7.  $(b+c)(6)$

8.  $(b-c)(6)$

9.  $(b \cdot c)(6)$

10.  $\left(\frac{b}{c}\right)(6)$

11.  $a(x-3)$

Determine whether or not each of the following relations is a function. Circle YES if the relation is a function and circle NO if the relation is not a function. (2 points each)

12. YES      NO

$$y = x^3$$

13. YES      NO

$$\{(-2, 2), (-1, 0), (-5, 2), (0, -2)\}$$

14. YES      NO

$$\{(-4, -5), (-6, 3), (-4, -1), (0, 0)\}$$

15. YES      NO

$$x + y = 4$$

16. Use the function  $G(x) = -2x^2 + 10x$  to determine the following. (4 points each)

(a) Domain of  $G$

(b) Range of  $G$

(c)  $G(-8)$

(d)  $x$ -intercept(s)

(e) Determine the difference quotient,  $\frac{G(x+h)-G(x)}{h}$ , for the function  $G$  defined above. Simplify your answer.