

MAC 1147

Fall 2019

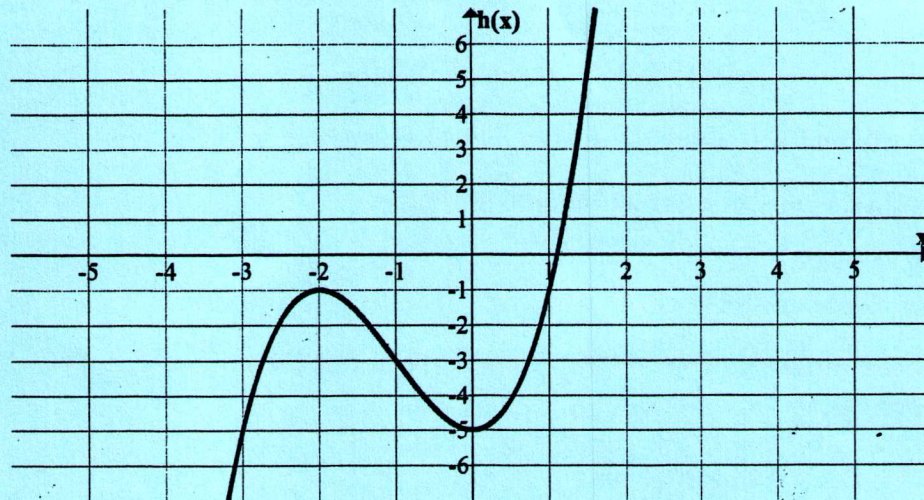
EXAM 2A

- A. Sign and date your scantron on the back at the bottom.
- B. In pencil, write and encode in the spaces indicated on your scantron:
- 1) Name (last name, first initial, middle initial)
 - 2) UF ID Number
 - 3) Section Number — Do not fill this out.
- C. Under “special codes” on your scantron, code in the test ID number 2, 1.
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|---|---|---|---|---|---|---|---|---|---|
| 1 | ● | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
| ● | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
- D. At the top right of your scantron, for “Test Form Code”, encode A.
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| ● | B | C | D | E |
|---|---|---|---|---|
- E. 1) There are eighteen 4-point multiple-choice questions and two 4-point free response questions, for a total of 80 points.
- 2) The time allowed is 90 minutes.
- 3) You may write on the test.
- 4) Raise your hand if you need more scratch paper or if you have a problem with your test. **DO NOT LEAVE YOUR SEAT UNLESS YOU ARE FINISHED WITH THE TEST.**
- F. KEEP YOUR SCANTRON COVERED AT ALL TIMES.**
- G. When you are finished:
- 1) Before turning in your test, check for transcribing errors. Any mistakes you leave in are there to stay.
 - 2) Take your test, scratch paper, and scantron to your TA. Be prepared to show your UF ID card.
 - 3) Answers will be posted in E-Learning after the exam.
- H. By taking this exam, you agree to the following **Honor Pledge:**

“I will neither give nor receive any unauthorized aid for this exam.”

Questions 1–20 are worth 4 points each.

1. Select the set on which the function graphed below is increasing.



- A. $(-5, \infty)$ B. $(-\infty, -2) \cup (0, \infty)$ C. $(-\infty, -1) \cup (-5, \infty)$
 D. $(0, \infty)$ E. $(-\infty, \infty)$

2. Given a function $f(x)$, which expression would shift the graph of $f(x)$ 3 units to the right, then shift it 4 units up, and then reflect it across the y -axis?

- A. $f(-x+3)+4$ B. $f(-x-3)+4$ C. $-f(x+3)+4$
 D. $f(-x-3)-4$ E. $-f(x+3)-4$

3. Which of the following statements is true for all functions $f(x)$ and $g(x)$?

A. $(f \circ g)(x) = (g \circ f)(x)$

B. $(f \cdot g)(x) = (g \cdot f)(x)$

C. $\left(\frac{f}{g}\right)(x) = \left(\frac{g}{f}\right)(x)$

D. $(f - g)(x) = (g - f)(x)$

E. All of these statements are true for all $f(x)$ and $g(x)$

4. Using the information provided below for the functions $f(x)$ and $g(x)$, evaluate $(f \circ g)(2)$.

$$f(x) = 3x - 5$$

x	1	2	3	4	5
$g(x)$	7	3	8	1	2

A. 5

B. 3

C. 4

D. 7

E. 2

5. Find the inverse function of $f(x) = 3x^5 + 2$.

A. $f^{-1}(x) = \frac{\sqrt[5]{x} - 2}{3}$

B. $f^{-1}(x) = \sqrt[5]{x} - \frac{2}{3}$

C. $f^{-1}(x) = \frac{\sqrt[5]{x-2}}{3}$

D. $f^{-1}(x) = \sqrt[5]{\frac{x}{3}} - 2$

E. $f^{-1}(x) = \sqrt[5]{\frac{x-2}{3}}$

6. Which point is the vertex of the parabola $h(x) = 2x^2 + 8x + 3$?

- A. (0, 3) B. (-2, 0) C. (-2, -5) D. (-2, 3) E. (0, -5)
-

7. Suppose that $f(x) = ax^2 + bx + c$ is a quadratic function with x -intercepts -3 and 5 , and $f(0) < 0$. Which of the following must be true of $f(x)$?

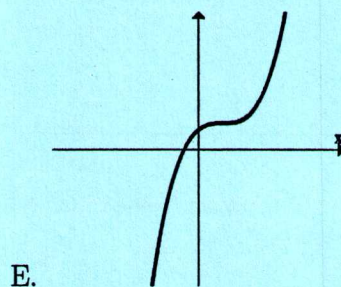
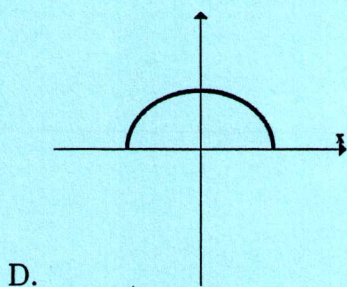
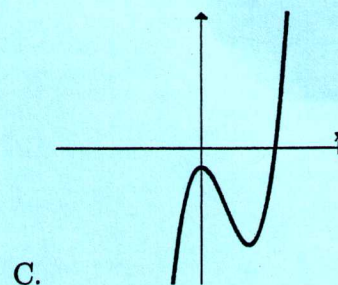
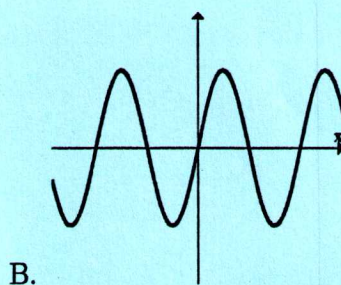
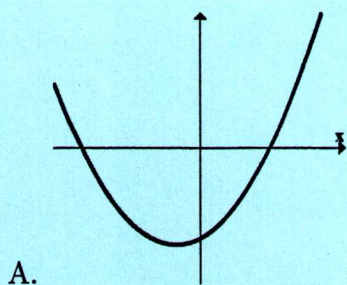
- I. $\frac{-b}{2a} = 1$
II. $c > 0$
III. The graph of $f(x)$ opens upward.

- A. I only B. I and III only C. II only
D. II and III only E. I, II, and III
-

8. For a function $f(x)$, whenever $x < 5$ then $f(x) < f(5)$ and whenever $x > 5$ then $f(x) < f(5)$. What can we conclude from this about the graph of $f(x)$?

- A. The graph of $f(x)$ has no x -intercepts
B. $f(5)$ is a relative maximum of $f(x)$
C. The graph of $f(x)$ is increasing on its entire domain
D. $f(5)$ is the y -intercept of $f(x)$
E. $f(x)$ has no relative minimum
-

12. Choose the function that has an inverse function.



13. Identify the vertical asymptotes of the function $g(x)$.

$$g(x) = \frac{x^2 - 9x + 20}{x^2 - 8x + 15}$$

A. $x = 4, x = 5, x = 3$ only

B. $x = 5, x = 3$ only

C. $x = 5$ only

D. $x = 4$ only

E. $x = 3$ only

14. Evaluate: $(i^{62})^2$

A. 1

B. i

C. -1

D. $-i$

E. 0

9. Suppose that $f(x)$ is a polynomial with real coefficients and that $3 + 4i$ is a zero of $f(x)$. Which of the expressions below must be a factor of $f(x)$?

A. x

B. $x^2 + 6x + 7$

C. $x + 3$

D. $x^2 + 25$

E. $x^2 - 6x + 25$

-
10. Perform the operation and choose the correct result: $(2 + 7i)^2$

A. $4 + 49i$

B. 53

C. $-45 + 28i$

D. $4 + 14i$

E. -45

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11. Identify the horizontal asymptote of the function: $f(x) = \frac{6x + 14}{3x + 2}$

A. $y = 7$

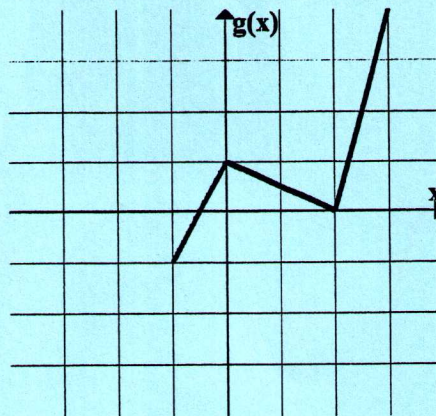
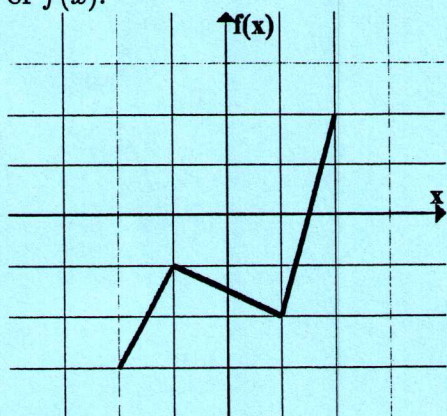
B. $x = 7$

C. $y = 2$

D. $x = 2$

E. $y = -\frac{2}{3}$

15. The graphs of two functions $f(x)$ and $g(x)$ are shown below. Express the equation for $g(x)$ in terms of $f(x)$.



- A. $g(x) = f(x+1) + 2$ B. $g(x) = f(x+1) - 2$ C. $g(x) = f(x-1) + 2$
 D. $g(x) = f(x-1) - 2$ E. $g(x) = f(x+2) + 1$

16. Use long or synthetic division to simplify the expression:

$$\frac{x^3 - 3x^2 + 3x - 1}{x - 1}$$

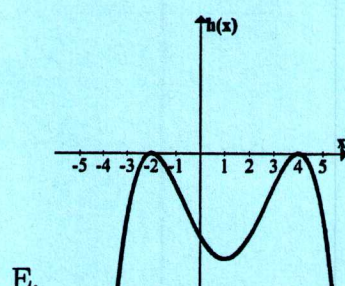
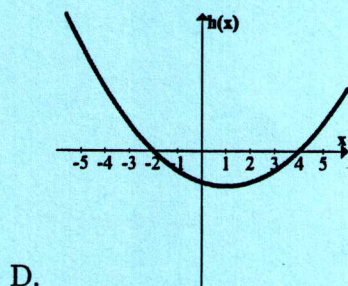
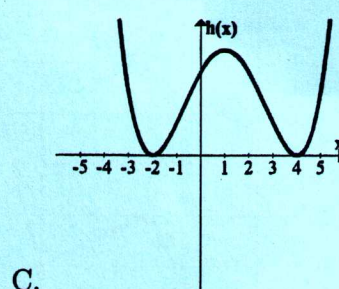
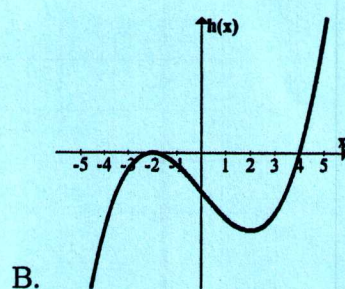
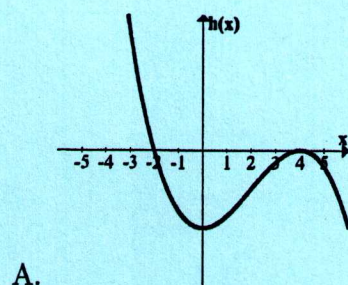
- A. $x^2 - 2x + 1, \quad x \neq 1$ B. $x^2 - 4x - 1 + \frac{2}{x-1}$ C. $x^2 - 4x - 1 + \frac{2}{x-1}$
 D. $x^2 - 3x + 3 + \frac{1}{x-1}$ E. $x^2 + 2x - 3, \quad x \neq 1$

17. Suppose that $h(x) = 15x^5 + x^4 + 5x^3 - 8x^2 + 10x + 14$.

According to the rational zero test, which of the following is not a possible zero of $h(x)$?

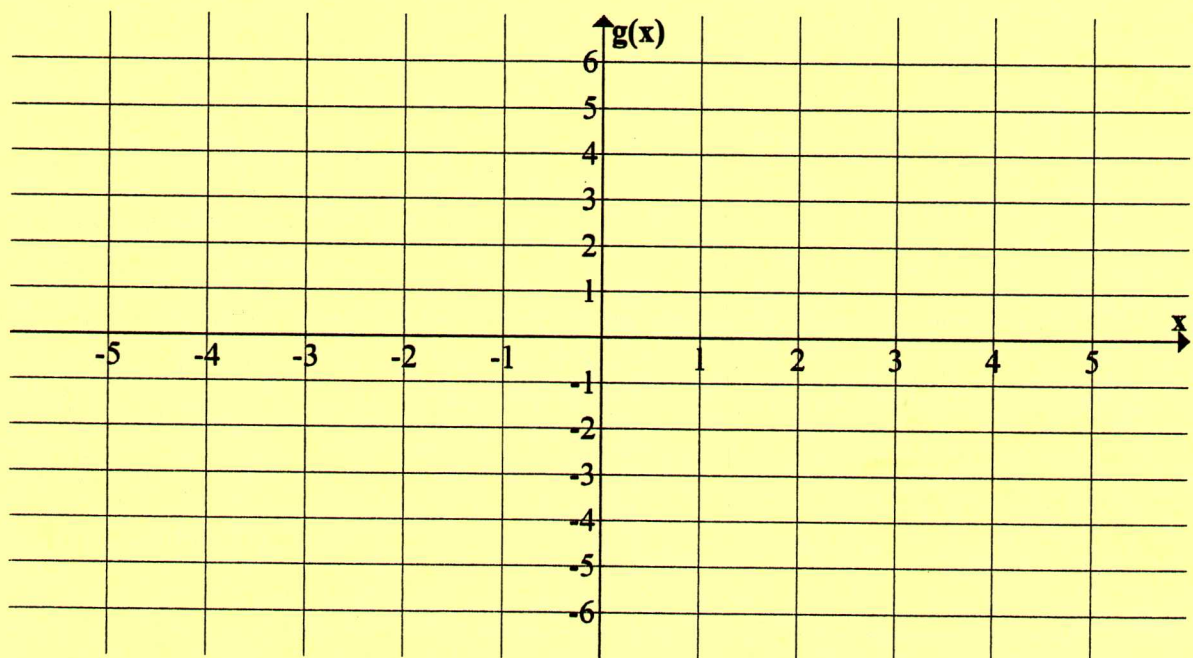
- A. 1 B. $\frac{2}{3}$ C. $\frac{8}{3}$ D. $\frac{7}{5}$ E. $\frac{14}{5}$

18. A polynomial $h(x)$ has a zero at $x = -2$ with multiplicity 1 and a zero at $x = 4$ with multiplicity 2. Choose the graph which could be the graph of $h(x)$.



20. On the axes below, sketch the graph of a function $g(x)$ with the following properties:

- a. $g(x)$ is increasing only on the interval $(-\infty, -2)$
- b. $g(x)$ is constant only on the interval $(-2, 1)$
- c. $g(x)$ has only one x -intercept, and it is at $x = -4$
- d. As $x \rightarrow \infty, g(x) \rightarrow 0$



Turn in your scantron and your free response to your TA. The worked-out solutions will be posted on Canvas after the test.

T.A. _____ Disc. Per. _____ Name _____

Honor Pledge: "On my honor, I have neither given nor received unauthorized aid for this exam."

UF ID # _____ Signature _____

YOU MUST SHOW ALL WORK TO RECEIVE FULL CREDIT.

Free response questions 19–20 are worth 4 points each.

19. A quadratic function $f(x)$ has its vertex at the point $(1, 27)$ and y -intercept 24.a. Write the standard form of $f(x)$.

Solution: _____

b. Find the x -intercepts of $f(x)$ and write them as points.

Solution: _____

c. What is the equation of the axis of symmetry of $f(x)$?

Solution: _____

TURN OVER FOR THE LAST PROBLEM.