

MAC 1147
Spring 2020

PRACTICE EXAM 2

- 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, 0.
- | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ● | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | ● |
- D. At the top right of your scantron, for “Test Form Code”, encode .
- A B C D E
- E.
- 1) The answer to every question is E
 - 2) The time allowed is .
 - 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.”

The answer to each question is E.

1. Factor: $x^4 - 8x^3 + 23x^2 - 28x + 12$

A. $(x - 2)^2(x - 3)^2(x - 1)$

B. $(x - 2)(x - 3)(x - 1)^2$

C. $(x - 2)(x - 3)^2(x - 1)$

D. $(x - 2)^2(x - 3)(x - 1)^2$

E. $(x - 2)^2(x - 3)(x - 1)$

2. The function $f(x)$ is linear with $f(8) = -43$. Its graph is parallel to the line that passes through the points $(-9, 24)$ and $(7, -88)$. Find the formula for $f(x)$ in slope-intercept form.

A. $f(x) = \frac{1}{7}x - 13$

B. $f(x) = \frac{1}{7}x + 13$

C. $f(x) = 7x + 13$

D. $f(x) = -7x - 13$

E. $f(x) = -7x + 13$

3. How many solutions does the system below have?

$$\begin{aligned} xy &= -12 \\ |x + y| &= 1 \end{aligned}$$

A. 0

B. 1

C. 2

D. 3

E. 4

4. Which interval satisfies the inequality $-3(x - 4)(x - 7)^2(x - 11) \geq 0$?

A. $(-\infty, 4] \cup [11, \infty)$

B. $(-\infty, 11)$

C. $(-\infty, \infty)$

D. $[11, \infty)$

E. $[4, 11]$

5. The graph of a polynomial $p(x)$ has two x -intercepts and three turning points. What is the smallest number of complex zeros that $p(x)$ could have?

A. 1

B. 0

C. 4

D. 3

E. 2

6. Which point is the vertex of the parabola $h(x) = 3x^2 + 24x + 1$?

- A. $(0, 1)$ B. $(-4, 0)$ C. $(-4, 1)$ D. $(0, -47)$ E. $(-4, -47)$

7. Suppose that $f(x) = ax^2 + bx + c$ is a quadratic function with x -intercepts -7 and 9 , and $f(0) < 0$. Which of the following must be true of $f(x)$?

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

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

8. What is the vertex of the parabola with x -intercepts 3 and 9 and y -intercept -81 ?

- A. $(0, 0)$ B. $(0, -81)$ C. $(3, 9)$ D. $(27, 6)$ E. $(6, 27)$

9. Suppose that $f(x)$ is a polynomial with real coefficients and that $5 + 2i$ is a zero of $f(x)$. Which of the expressions below must be a factor of $f(x)$?

- A. x B. $x^2 + 10x + 21$ C. $x + 5$
 D. $x^2 + 29$ E. $x^2 - 10x + 29$

10. Perform the operation and choose the correct result: $(3 + 8i)^2$

A. $9 + 64i$

B. 73

C. $6 + 16i$

D. -55

E. $-55 + 48i$

11. Identify the horizontal asymptote of the function: $f(x) = \frac{15x + 11}{3x + 5}$

A. $y = 2$

B. $y = -\frac{11}{5}$

C. $y = 0$

D. $y = -\frac{5}{3}$

E. $y = 5$

12. Which statement correctly describes the long-term behavior of $f(x) = \frac{3x^5 + 7x^3 + 2x^2 + 9x + 5}{x^2 + 6x + 4}$?

A. As $x \rightarrow \infty$, $f(x) \rightarrow 4$. As $x \rightarrow -\infty$, $f(x) \rightarrow 4$.

B. As $x \rightarrow \infty$, $f(x) \rightarrow 3$. As $x \rightarrow -\infty$, $f(x) \rightarrow -3$.

C. As $x \rightarrow \infty$, $f(x) \rightarrow 3$. As $x \rightarrow -\infty$, $f(x) \rightarrow 3$.

D. As $x \rightarrow \infty$, $f(x) \rightarrow \infty$. As $x \rightarrow -\infty$, $f(x) \rightarrow \infty$.

E. As $x \rightarrow \infty$, $f(x) \rightarrow \infty$. As $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$.

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

$$g(x) = \frac{x^2 - 16x + 55}{x^2 - 13x + 22}$$

A. $x = 5, x = 11, x = 2$ only

B. $x = 11, x = 2$ only

C. $x = 11$ only

D. $x = 5$ only

E. $x = 2$ only

14. Evaluate: $(i^{59})^3$

- A. 1 B. -1 C. $-i$ D. 0 E. i
-

15. What is the equation for the line that is perpendicular to the x -axis and passes through the point $(4, 9)$?

- A. $y = x$ B. $y = -x + 13$ C. $y = x + 5$
D. $y = 9$ E. $x = 4$
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16. Use long or synthetic division to simplify the expression:

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

- A. $x^2 - 4x - 1 + \frac{2}{x-1}$ B. $x^2 - 4x - 1 + \frac{2}{x-1}$ C. $x^2 - 3x + 3 + \frac{1}{x-1}$
D. $x^2 + 2x - 3, \quad x \neq 1$ E. $x^2 - 2x + 1, \quad x \neq 1$
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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. $\frac{7}{5}$ D. $\frac{14}{5}$ E. $\frac{8}{3}$
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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 $h(x)$.

