

Read the directions below carefully.

BEFORE THE TEST...

- Take 10 minutes to review your notes.
- Get a calculator and blank sheets of paper for your calculations.

KEEP IN MIND...

- There are 30 questions on the test.
- You may use a calculator throughout the exam.
- Write your answers clearly in the space given. Do your work on separate paper.
- There is no time limit, but you must complete the test in ONE sitting.
- Do NOT look at the other pages of the workbook while taking the exam. Consider carefully cutting the pages of the exam out of the workbook and removing the workbook from your desk.

AFTER THE TEST...

- Grade yourself and record your score on your grading sheet.



When you are ready,
begin the test.

1. $|x - 3| + 1 = 6$

What is the positive solution to the equation above?

2. A line passes through $(0, 6)$ and $(1, 3)$.
If the line intersects the x -axis at $x = p$,
what is the value of p ?

3. $3x + y = 1$

$x + 2y = 7$

If (a, b) satisfies the system of equations above, what is the value of ab ?

4. $(x + 1)^2 = x + 3$

If m and n are two solutions to the equation above, what is the value of $m + n$?

5. $f(x) = 2(x - 2)(x + 1)^2$

Which statement is true about the function above? Select all that apply.

- A) The graph of the function crosses the x -axis at $x = 2$.
- B) The graph of the function crosses the x -axis at $x = -1$.
- C) The function is negative over the interval $(-1, 2)$.
- D) Both ends of the graph of the function go up.

6. $(8x^2)(2x^{-3})^{-2}$

If the expression above is written in the form ax^k , what is the value of ak ?

7. $3^{x-1} = 9^{x-3}$

What value of x satisfies the equation above?

8. $f(x) = -e^x$

Which statement is true about the function above? Select all that apply.

- A) The y -intercept is -1 .
- B) The asymptote is $y = 0$.
- C) As x increases, $f(x)$ approaches 0.
- D) The graph is in Quadrants I and II.
- E) The graph is the same as the graph of $y = e^x$ reflected over the x -axis.

9. Brooke put \$3,000 in her account that earns 4% interest compounded annually. Which function models the balance B of the account after t years?

- A) $B(t) = 3000(0.96)^t$
- B) $B(t) = 3000(1.04)^t$
- C) $B(t) = 3000 + 4t$
- D) $B(t) = 3000 + 120t$

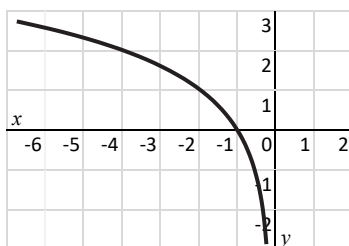
10. $\log_3 1 - 2 \log_3 3 + \log_3 27$

What is the value of the expression above?

11. $\ln x + \ln 9 = 2 \ln(x + 2)$

Find all values of x that satisfy the equation above. Be sure to check for extraneous solutions.

12. Which function is graphed below?



- A) $f(x) = \log_2 x$
- B) $f(x) = \log_2(-x)$
- C) $f(x) = -\log_2 x$
- D) $f(x) = -\log_2(-x)$

13. A cup of coffee contains 100 mg of caffeine. Caffeine leaves the body at 17% per hour. How long will it take for half the caffeine to leave the body after drinking a cup of coffee? Round your answer to the nearest hour.

14. $\sqrt[5]{32} + 64^{2/3} - 81^{1/4}$

What is the value of the expression above?

15. $x^{2/5}(x^3)^{2/5}$

If the expression above is written in the form $\sqrt[m]{x^n}$, what is the value of $m - n$?

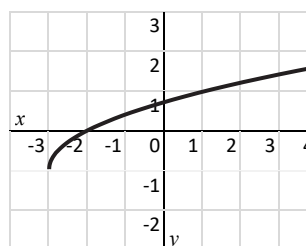
16. $x - 4 = \sqrt{2x + 7}$

Find all values of x that satisfy the equation above. Be sure to check for extraneous solutions.

17. $(4x + 3)^{3/2} = 8$

If x satisfies the equation above, what is the value of x^{-1} ?

18. Which function is graphed below?



- A) $f(x) = \sqrt{x + 3} - 1$
- B) $f(x) = \sqrt{x - 3} + 1$
- C) $f(x) = -\sqrt{x + 3} - 1$
- D) $f(x) = -\sqrt{x - 3} + 1$

19. $\frac{1 - \frac{4}{x^2}}{\frac{1}{x} - \frac{2}{x^2}}$

Simplify the expression above.

20. $\frac{2}{x} - \frac{1}{4} = \frac{2}{x^2 + x}$

Find all values of x that satisfy the equation above. Be sure to check for extraneous solutions.

21. $f(x) = \frac{1}{x+3} + 2$

Write the equations of two asymptotes of the graph of the function above.

A) $x = 3, y = -2$

B) $x = -3, y = 2$

C) $x = 2, y = -3$

D) $x = -2, y = 3$

22. Two pipes A and B together can fill a pool in 3 hours. If used alone, pipe A takes 4 hours. How long will pipe B take to fill the pool by itself?

23. $x^2 + y^2 + 4x - 6y + 5 = 0$

What is the radius of the circle defined by the equation above? Write your answer in simplest radical form.

24. $(x - 2)^2 + y^2 = 25$

$y = x - 3$

What is the sum of the x -values of the solutions to the system of equations above?

25. $y = x^2 - 2x + 3$

$y = 2x + k$

For what value of k do the graphs of the equations above intersect at exactly one point?

26. In a certain sequence, the first term is 2 and each term after the first is 3 times the previous term. What is the 7th term of the sequence?

27. 1, 4, 7, 10, 13, ...

What is the sum of the first 30 terms of the sequence above?

28. 3, 4, 6, 7, 5, 2

Which statement is true about the data set above?

- A) The mean is higher than the median.
- B) The mean is lower than the median.
- C) The mean is equal to the median.

29. A random survey of 80 employees in a company found that 60 of them are in favor of working from home full-time. If the company has 1,200 employees, what is a reasonable estimate of the number of employees who are in favor of working from home full-time?

30. In a group of people, 11 like tea, 16 like coffee, 6 like both, and 4 like neither. What is the probability that a randomly selected person likes tea only?

STOP

This is the end of the test.
Review your answers before grading.