

Do not remove this answer page — you will turn in the entire exam. You have two hours to do this exam. No books or notes may be used. You may use an ACT-approved calculator during the exam, but NO calculator with a Computer Algebra System (CAS), networking, or camera is permitted. Absolutely no cell phone use during the exam is allowed.

The exam consists of multiple choice questions. Record your answers on this page. For each multiple choice question, you will need to fill in the circle corresponding to the correct answer. For example, if (b) is correct, you must write

(a) (b) (c) (d) (e)

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GOOD LUCK!

- | | |
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For grading use:

Number Correct	
	(out of 20 problems)

Total	
	(out of 100 points)

Name: _____

Multiple Choice Questions

*Show all your work on the page where the question appears.
Clearly mark your answer both on the cover page on this exam
and in the corresponding questions that follow.*

1. What is the leading term of $5 + 99x^7 + 2x^6 + 3x^{88} + x$?

Possibilities:

- (a) 5
 - (b) $3x^{88}$
 - (c) x
 - (d) $2x^6$
 - (e) $99x^7$
-

2. Consider $f(x) = -6x^3 + 4x^2$. What is the end behavior?

Possibilities:

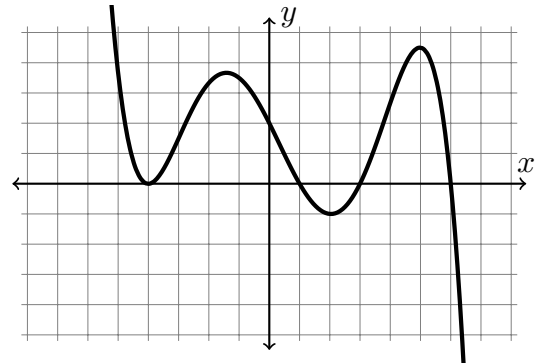
- (a) $y \rightarrow -\infty$ as $x \rightarrow -\infty$ and $y \rightarrow \infty$ as $x \rightarrow \infty$
 - (b) $y \rightarrow \infty$ as $x \rightarrow -\infty$ and $y \rightarrow -\infty$ as $x \rightarrow \infty$
 - (c) $y \rightarrow -\infty$ as $x \rightarrow -\infty$ and $y \rightarrow -\infty$ as $x \rightarrow \infty$
 - (d) $y \rightarrow \infty$ as $x \rightarrow -\infty$ and $y \rightarrow \infty$ as $x \rightarrow \infty$
 - (e) $y \rightarrow 0$ as $x \rightarrow -\infty$ and $y \rightarrow 0$ as $x \rightarrow \infty$
-

3. Suppose a polynomial has $x = 3$ as a root. Which of these must be a factor of the polynomial?

Possibilities:

- (a) $(3x)$
 - (b) $(x + 3)$
 - (c) $(3x - 1)$
 - (d) $(3x + 1)$
 - (e) $(x - 3)$
-

-
4. Let $f(x)$ be the polynomial whose graph is given below. What can be said about the leading coefficient and degree of the polynomial?



Possibilities:

- (a) Leading coefficient is positive; degree is odd
- (b) Leading coefficient is negative; degree is even
- (c) Leading coefficient is negative; degree is odd
- (d) Leading coefficient is positive; degree is even
- (e) Leading coefficient is negative; degree is zero

-
5. Refer to the graph from problem 4. Which of these cannot be factors of the polynomial in the graph?

Possibilities:

- (a) $(x - 3)$
- (b) $(x - 6)$
- (c) $(x - 1)$
- (d) $(x + 4)$
- (e) $(x - 2)$

-
6. Refer to the graph from problem 4. Which root of the polynomial has even multiplicity?

Possibilities:

- (a) 6
- (b) 3
- (c) 2
- (d) -4
- (e) 1

7. Let

$$r(x) = \frac{5x + 40}{x^2 + 4x + 4}$$

The graph of $r(x)$ has a horizontal asymptote at:

Possibilities:

- (a) $y = 5$
 - (b) $y = -2$
 - (c) $y = 10$
 - (d) $y = -8$
 - (e) $y = 0$
-

8. Let

$$r(x) = \frac{2x + 60}{3x - 15}$$

The graph of $r(x)$ has a horizontal asymptote at:

Possibilities:

- (a) $y = 0$
 - (b) $y = 5$
 - (c) $y = 2/3$
 - (d) $y = -30$
 - (e) $y = 4$
-

9. Let

$$r(x) = \frac{2x + 60}{3x - 15}$$

The graph of $r(x)$ has a vertical asymptote at:

Possibilities:

- (a) $x = 2/3$
 - (b) $x = 0$
 - (c) $x = 5$
 - (d) $x = -30$
 - (e) $x = 4$
-

10. Which of the following is most reasonable as the equation of the following graph:

Possibilities:

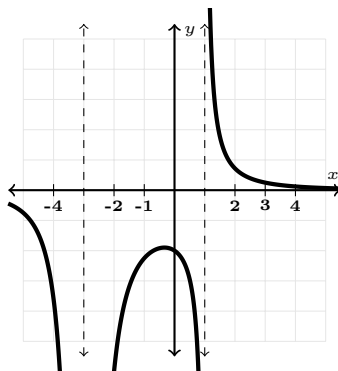
(a) $\frac{18}{(x-1)(x+3)^2}$

(b) $\frac{1}{(x+1)(x-3)}$

(c) $\frac{6}{(x+1)^2(x-3)}$

(d) $\frac{6}{(x-1)^2(x+3)}$

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



11. Solve for x : $\sqrt{x-7} + 4 = 8$.

Possibilities:

(a) 63

(b) 23 and -23

(c) 81

(d) 23 only

(e) 9

12. Solve for x : $x^{2/3} = 25$.

Possibilities:

(a) 5 and -5

(b) 125 and -125

(c) 5 only

(d) 125 only

(e) no solution

13. Let $f(x) = \sqrt[3]{x-2} + 4$. What is the formula for $f^{-1}(x)$?

Possibilities:

- (a) $(x-4)^3 + 2$
- (b) $\frac{1}{\sqrt[3]{x-2} + 4}$
- (c) $\sqrt[3]{-x+2} - 4$
- (d) $(x-4)^3$
- (e) $x^3 - 62$

14. Find a formula for an exponential function $f(x) = a \cdot b^x$ that satisfies $f(0) = 2$ and $f(1) = 6$.

Possibilities:

- (a) $2 \cdot 6^x$
- (b) 6^x
- (c) $2 \cdot 4^x$
- (d) $2 \cdot 3^x$
- (e) $6 \cdot 2^x$

15. Let

$$f(x) = \frac{1}{\sqrt{25^x}}.$$

If $f(x)$ is rewritten in the form $f(x) = b^x$, what is the growth factor b ?

Possibilities:

- (a) $\frac{1}{5}$
- (b) $-\frac{1}{5}$
- (c) 5
- (d) $\frac{1}{25}$
- (e) 25

16. What is the end behavior of $f(x) = (2/3)^x$ on the right as $x \rightarrow \infty$?

Possibilities:

- (a) $y \rightarrow 1$ as $x \rightarrow \infty$
- (b) $y \rightarrow -\infty$ as $x \rightarrow \infty$
- (c) $y \rightarrow 0$ as $x \rightarrow \infty$
- (d) $y \rightarrow \infty$ as $x \rightarrow \infty$
- (e) $y \rightarrow 2/3$ as $x \rightarrow \infty$

17. What is the range of $g(x) = 2^x + 3$?

Possibilities:

- (a) $(2, \infty)$
- (b) $(-\infty, \infty)$
- (c) $(4, \infty)$
- (d) $(0, \infty)$
- (e) $(3, \infty)$

18. Find the y -intercept of

$$h(x) = -5 \cdot 2^{x+3} + 80.$$

Possibilities:

- (a) 40
- (b) -5
- (c) 1
- (d) 80
- (e) 0

19. What is the domain of $\log(3 - x)$?

Possibilities:

- (a) $(-\infty, \infty)$
- (b) $(3, \infty)$
- (c) $[3, \infty)$
- (d) $(-\infty, 3)$
- (e) $(-\infty, 3]$

20. If $x^y = z$, then

Possibilities:

- (a) $\log_y(x) = z$
 - (b) $\log_x(z) = y$
 - (c) $\log_x(y) = z$
 - (d) $\log_z(x) = y$
 - (e) $\log_y(z) = x$
-

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