Name_____ Period _____

# Intermediate Algebra – Mr. McAdams

## Sample Test – Unit 3

## NO CALCULATOR

Matching – more than one may apply. Each letter may be used more than once or not at all. Each number may have one or more letters that apply.
(1 pt each letter/number pair)

1. Which of the following is an example of the product property of exponents?
   A. $2^2 \cdot 3^2 = 6^2$
   B. $2^4 \cdot 2^2 = 2^2$
   C. $3^2 \cdot 3^3 = 3^5$ $\quad b^m \cdot b^n = b^{m+n}$
   D. $3^2 \cdot 3^5 = 3^{10}$
2. $\sqrt{-4}$ is what type of number?
   A. rational
   B. irrational
   C. whole
   D. complex
3. Which of the following functions represents exponential growth?
   A. $y = .03x + 5$
   B. $y = .03 \cdot 5^x$ $\quad y = a \cdot b^x,\ b > 1$
   C. $y = 5 \cdot (.03)^x$
   D. $y = 5x + .03$
4. Which of the following represents the range of $y = 3 \cdot 1.02^x$?
   A. $(0, \infty)$
   B. $(1.02, \infty)$
   C. $(-\infty, 3)$
   D. $(-\infty, 1.02)$
5. In the function $t(r) = \dfrac{3 \cdot r}{k}$, what does r represent?
   A. function name
   B. constant
   C. dependent variable
   D. independent variable

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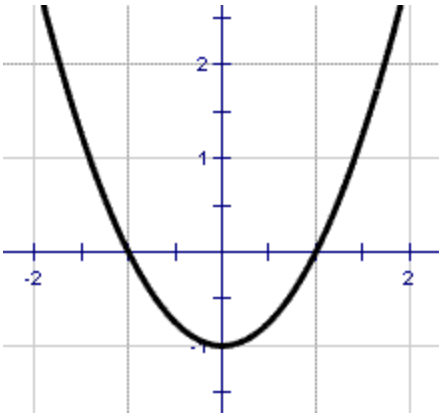
6. Which of the following represents the range of the function in the graph?




   A. $(-\infty, \infty)$
   B. $[-1, \infty)$
   C. $(\infty, -1]$
   D. $[-1,1]$

7. Which of the following equations represent the product property of exponents?
   A. $2^2 \cdot 3^2 = 6^2$
   B. $3^2 \cdot 3^3 = 3^6$
   C. $3^4 \cdot 3^2 = 3^6$
   D. $2^4 \cdot 2^2 = 2^2$

8. The population of a certain bacteria in a growth medium starts at 30 million, and increases by 20% every hour. After 1 hour there are 36 million bacteria. What is the formula for this relationship?
   A. $y = 30 \cdot 1.2^x$
   B. $f(t) = 1.2 \cdot 30^x$
   C. $p = 30 + 1.2t$
   D. $g(r) = 30t + 1/2$

9. A high-school has implemented a tardy policy that requires 2 minutes time in detention for the first tardy, 4 minutes for the second tardy, 8 for the third, and so on. Joanne has 6 tardies. How many minutes will Joanne spend in detention for the $6^{th}$ tardy?
   A. 12
   B. 16
   C. 32
   D. 64
   E. 128

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F. Simplify using the properties of exponents (3 points each, show each step for partial credit)

10. $\sqrt{\frac{18}{2}} = 3$

11. $b^3 \cdot b^{-1} = b^2$

12. $\left(\zeta^5\right)^2 = \zeta^{10}$

13. $\frac{z^4}{z^3} = z$

14. $\sqrt{g^2} = g$

15. $x^2 - x^3 = x^2 - x^3$ *already simplified*

16. $g^2 \cdot g^5 = g^7$

17. $\frac{4^{\frac{13}{5}}}{4^{\frac{3}{5}}} = 4^{\frac{13}{5}} \cdot 4^{-\frac{3}{5}} = 4^{\frac{13-3}{5}} = 4^{\frac{10}{5}} = 4^2$

18. $\left(25^3\right)^{\frac{1}{6}} = 25^{3\cdot\left(\frac{1}{6}\right)} = 25^{\frac{3}{6}} = 25^{\frac{1}{2}} = \sqrt{25} = 5$

19. Which of the following is true? (4 points)

A. $4^{-2} \cdot 4^2 = 8^0$ B. $7^{3/2} - 7^{1/2} = 7^1$

C. $3^{1/2} \cdot 3^2 = 3^1$ D. $5^{1/2} + 5^{1/2} = 5^1$

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## Matching - Match a letter with each number. Each letter may be used more than once. (2 points each)

20. A__ $y = (2^4)x$

21. D__ $y = 3x^2$

22. B__ $y = 2(3^x)$

23. C__ $y = 15(.5)^x$

24. B__ $y = 1.5 \cdot 2.2^x$

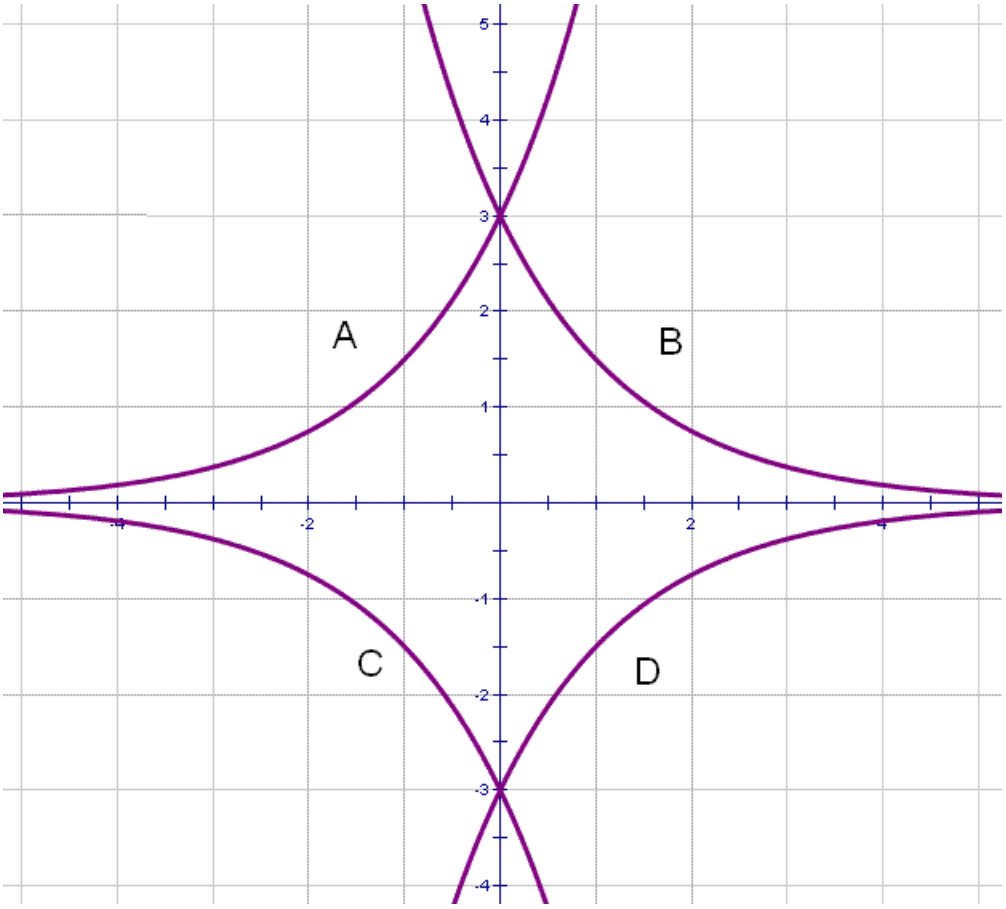
A. Linear growth

B. Exponential growth

C. Exponential decay

D. Neither

## Match the graphs and the equations. (2 points each)




25. A____ $y = 3(2^x)$

26. D____ $y = -3 \cdot 2^{-x}$

27. B____ $y = 3(0.5^x)$

28. C____ $y = -3 \cdot 2^x$

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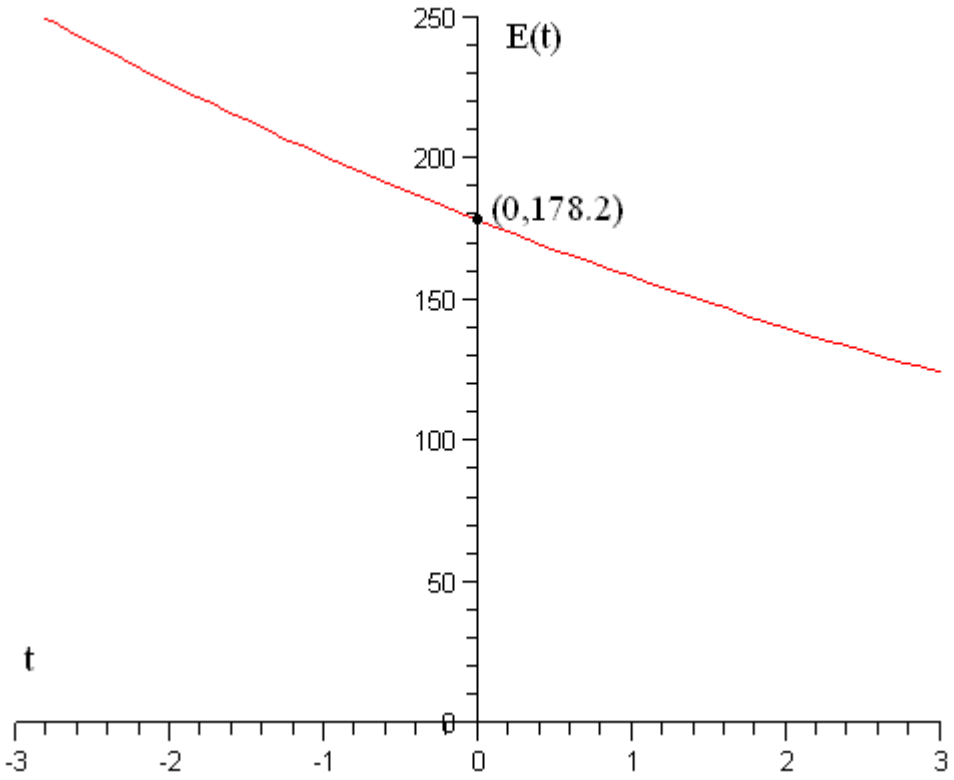
**Intermediate Algebra – Mr. McAdams**

**Sample Test – Unit 3 Section 2**

## CALCULATOR ALLOWED

**Graph the following function. Label the axes and at least one point. (4 points each)**

29. $E(t) = 178.2e^{-0.12t}$



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Write an exponential function whose graph passes through the following points (4 points).

30. Write an exponential function whose graph passes through the following points (4 points). (0,6), (7,9)

$y = 6(1.046)^x$

31. Which exponential function passes through the points (0,3) and (1,6).

A. $y = x^6$

B. $y = 6^x$

C. $y = 3 \cdot 2^x$

D. $y = 3 \cdot x^2$

32. An associate at a department store is paid a starting wage of $7.20 per hour. She expects a raise of 5% per year for the first five years. How much will she earn per hour during the fourth year? (4 points)

| Year after hire | Wage |
|---|---|
| 0 | $7.20$ |
| 1 | $7.20 \cdot (1.05) = 7.56$ |
| 2 | $7.56 \cdot (1.05) \approx 7.94$ |
| 3 | $7.94 \cdot (1.05) \approx 8.34$ |
| 4 | $8.34 \cdot (1.05) \approx 8.76$ answer is 8.76 |

33. Which of the following equations represents an exponential decay function whose graph passes through (2, 1)? (4 points)

A. $y = (0.5)^x$

B. $y = \frac{1}{4}(0.5)^{-x}$

C. $y = \frac{1}{4}2^x$

D. $y = 4(0.5)^x$

E. $y = (0.5x)^2$