

Show all work on the short answer questions. Good Luck!

1. If $f(x) = (x+5)^2$ for $x \geq -5$, then $f^{-1}(x) = \sqrt{x-5}$
 $\sqrt{x-5} = y+5$
 $\sqrt{x-5} = y$

2. $f(x)$ and $g(x)$ are inverses of each other. $f(7) = 56$. What is $g(56)$?
7

3. $f(x) = 8(x-9)^2 + 7$. For which values of x will $f(x)$ be invertible?
 $x \geq 9$

4. $f(x) = 4x^2$. What are the domain and range of $f^{-1}(x)$?
D: $(-\infty, \infty)$
R: $(-\infty, \infty)$

5. What is the inverse of $f(x) = 9x^2$?
 $\log_9 x$

6. What are the features of $f(x)$ and its inverse given $f(x) = \frac{-8x+3}{5}$?
 $f^{-1}(x) = \frac{5x-3}{8}$

7. Solve for the unknown variable. Estimate answers to the nearest hundredth when necessary.
 $7. 9x^{x-3} = 9x^{x-17}$
Answer: 10
 $20 = 2x$
Answer: 10
 $10 = x$
Answer: 3
 $15 = 5x$
Answer: 3
 $3 = x$

10. A mold formation grows by 3.5% each day. If the volume of the formation is 18,800 cm^3 today, find the expected volume two weeks from now.
30,431.457

$y = ab^x$
18,800(1.035)¹⁴
(30,431.457)

$a = \text{initial amount}$
 $b = \text{how it's growing or decaying}$
 $x = \text{time}$
 $y = \text{value}$
 $n = \text{number of times it grows or decays}$
 $t = \text{time}$
 $P = \text{principal}$
 $r = \text{rate}$
 $A = \text{amount}$
 $n = \text{number of times it grows or decays}$
 $t = \text{time}$
 $P = \text{principal}$
 $r = \text{rate}$
 $A = \text{amount}$

11. Margaret Rockefeller bought a painting for \$4,716,000. The painting increases in value by 5.75% annually. How much will the painting increase in value in the next 7 years?
6,974,875.00

$A = P(1 + \frac{r}{n})^{nt}$
4,716,000(1.0575)⁷
6,974,875.00

6,974,875.00
-4,716,000
2,258,875

12. Eric is a ranger at Caryl Lake National Park. The Park is re-stocking the lake with fish. Park visitors will be allowed to fish one the population reaches 10,000 fish. The park stocks the lake with 550 bass, and the population grows at 13.5% each month.
 a. Write an equation that could allow you to find out the number of months until park visitors can be allowed to fish.
 $10,000 = 550(1.135)^x$
 $\frac{10,000}{550} = 1.135^x$
 $\log 1.135 = \log(1.135)^x$
 $\log 1.135 = x \log(1.135)$
 $x = \frac{\log 1.135}{\log(1.135)}$

b. Solve your equation.
22.9 months or 1.9 years

13. Lauren has \$7000 she wants to invest. An account at Bank of Raleigh pays 7% compounded quarterly. At Apex Bank, she can get an account that pays 6.5% compounded monthly. Which bank should she use in order to have the most money after 9 years? Justify your answer.
Raleigh
 $A = 7000(1 + \frac{0.07}{4})^{4 \cdot 9}$
 $A = 13,071.85$
Apex
 $A = 7000(1 + \frac{0.065}{12})^{12 \cdot 9}$
 $A = 12,545.12$
She should use BDR to earn more interest

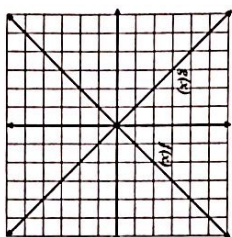
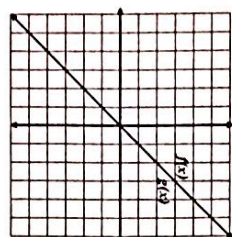
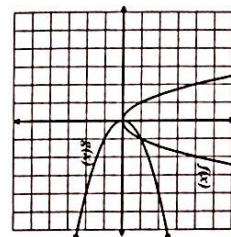
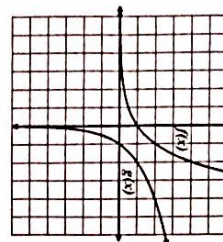
14. Donna fell and hurt her ankle. The doctor gave her a pain reliever to help. Donna's body will break down 14% of the medicine every 4 hours.
 $800(1 - 0.14)^4$
 $800(.86)^4$

c. How much of a 800-mg dose is still in her system after 4 hours?
688 mg
 $800(.86)^4$

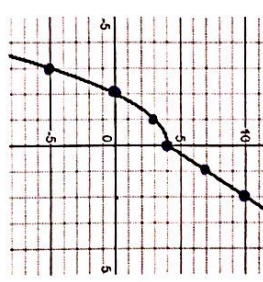
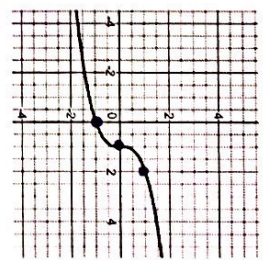
d. How many 4-hour periods will go by in 32 hours?
8
 $32 \div 4 = 8$

e. How much of a 800-mg dose is still in Katie's system after 32 hours?
239.374 mg
 $800(.86)^8$

15. Which of the following shows two graphs that are not inverses of one another?



Matching
Match each function on the left with its inverse on the right. Assume that all functions are continuous.



$y = 2x - 5$

$y = x^3 + 1$

x	y
-5	-3
0	-2
3	-1
4	0
7	1
10	2

x	y
-1	5
0	3
1	5
3	45
9	32,805

← correction

$y = \frac{9}{x+4}$

$y = \frac{9}{x} - 4$

$y = 5(3^{x-1})$

$y = \frac{x+5}{2}$

D 19.
C 20.

17. $y = 2x - 5$
 $x = 2y - 5$
 $x + 5 = 2y$
 $\frac{x+5}{2} = y$

19. $y = \frac{9}{x+4}$
 $x(y+4) = 9$
 $y+4 = \frac{9}{x}$
 $y = \frac{9}{x} - 4$

20. $y = 5(3^{x-1})$
 $x = 5(3^{y-1})$
 $\frac{x}{5} = 3^{y-1}$
 $\log_3(\frac{x}{5}) = y - 1$
 $\log_3(\frac{x}{5}) + 1 = y$
graph it!