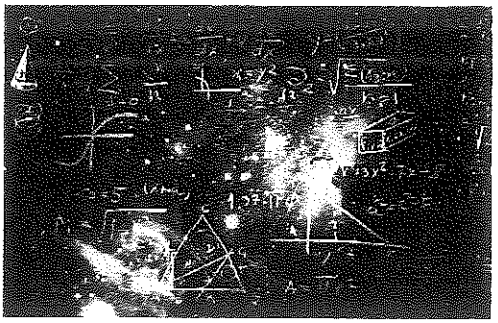
1.5 Inverse Universe

A Practice Understanding Task



You and your partner have each been given a different set of cards. The instructions are:

1. Select a card and show it to your partner.
2. Work together to find a card in your partner's set of cards that represents the inverse of the function represented on your card.
3. Record the cards you selected and the reason that you know that they are inverses in the space below.
4. Repeat the process until all of the cards are paired up.

*For this task only, assume that all tables represent points on a continuous function.

Pair 1: _____ Justification of inverse relationship: _____

Pair 2: _____ Justification of inverse relationship: _____

Pair 3: _____ Justification of inverse relationship: _____

Pair 4: _____ Justification of inverse relationship: _____

Pair 5: _____ Justification of inverse relationship: _____

Pair 6: _____ Justification of inverse relationship: _____

Pair 6: _____ Justification of inverse relationship: _____

Pair 7: _____ Justification of inverse relationship: _____

Pair 8: _____ Justification of inverse relationship: _____

Pair 9: _____ Justification of inverse relationship: _____

Pair 10: _____ Justification of inverse relationship: _____

A1

$$f(x) = \begin{cases} -2x - 2, & -5 < x < 0 \\ -2, & x \geq 0 \end{cases}$$

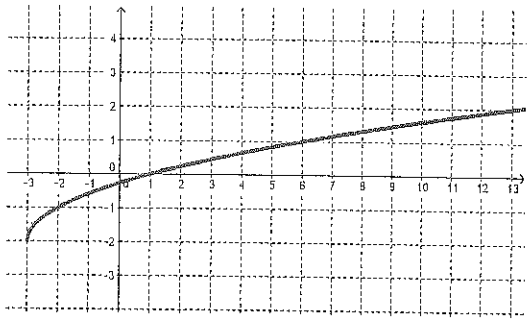
A2

The function increases at a constant rate of $\frac{a}{b}$ and the y-intercept is (0, c).

A3

Each input value, x, is squared and then 3 is added to the result. The domain of the function is $[0,\infty)$

A4



A5

x	y
-2	-3
2	3
0	0
6	5
4	4
$\frac{-4}{3}$	-2

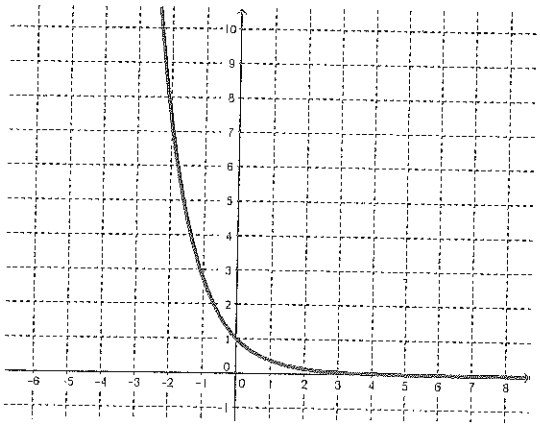
A6

$$y = 3^x$$

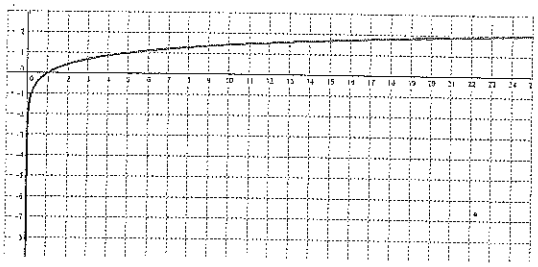
A7

x	y
-5	-125
-3	-27
-1	-1
1	1
3	27
5	125

A8



A9



A10

Yasmin started a savings account with $5. At the end of each week, she added 3. This function models the amount of money in the account for a given week.

B1

$$y = \log_3 x$$

B2

$$f(x) = \begin{cases} \frac{2}{3}x, & -3 < x < 3 \\ 2x - 4, & x \geq 3 \end{cases}$$

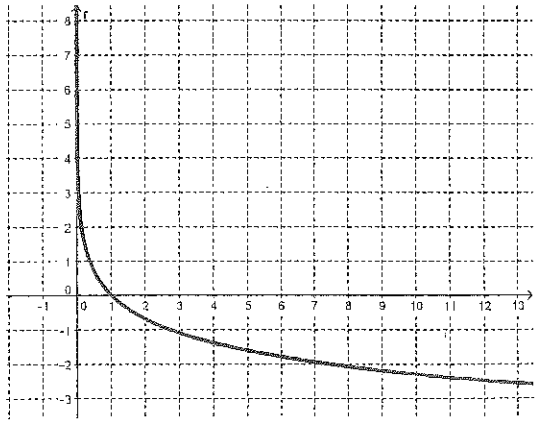
B3

The x-intercept is (c, 0) and the slope of the line is $\frac{b}{a}$.

B4

x	y
-216	-6
-64	-4
-8	-2
0	0
8	2
64	4
216	6

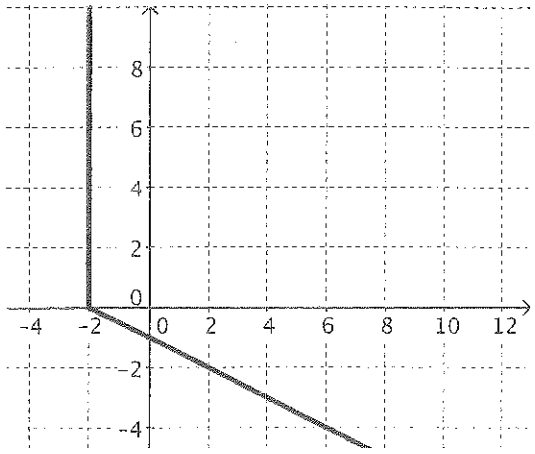
B5



B6

x	y
3	0
4	1
7	2
12	3
19	4
28	5
39	6

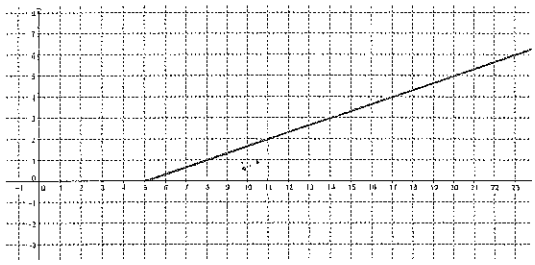
B7



B8

x	y
-2	-3
-1	-2
0	1
1	6
2	13

B9



B10

The function is continuous and grows by an equal factor of 5 over equal intervals. The y-intercept is (0,1).

1.5

READY, SET, GO! Name Period Date

READY

Topic: Properties of exponents

Use properties of exponents to simplify the following. Write your answers in exponential form with positive exponents.

1. $\sqrt[7]{x^2} \cdot \sqrt[7]{x^3}$

2. $\sqrt[3]{x} \cdot \sqrt[4]{x} \cdot \sqrt[6]{x}$

3. $\sqrt[6]{a} \cdot \sqrt[3]{a^2} \cdot \sqrt[5]{b^3}$

4. $\sqrt[5]{32} \cdot \sqrt{9} \cdot \sqrt[3]{27}$

5. $\sqrt[4]{8} \cdot \sqrt[3]{16} \cdot \sqrt[6]{2}$

6. $(5^2)^3$

7. $(7^2)^{-1}$

8. $(3^{-4})^{-5}$

9. $\left(\frac{5^{-4}}{5^2}\right)^3$

SET

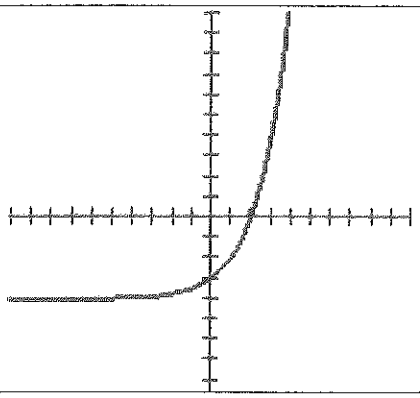
Topic: Representations of inverse functions

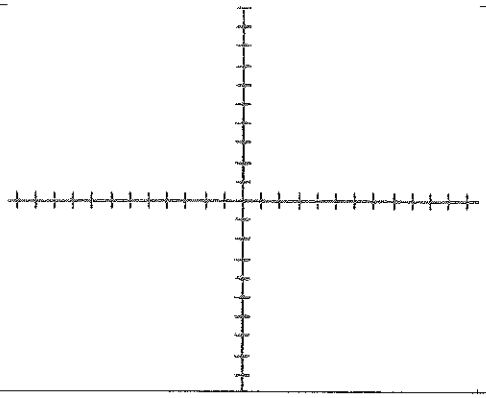
Write the inverse of the given function in the same format as the given function.

Function $f(x)$	Inverse $f^{-1}(x)$
10.	

x	$f(x)$
-8	0
-4	3
0	6
4	9
8	12

11.

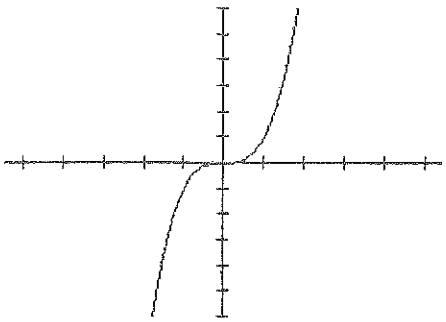


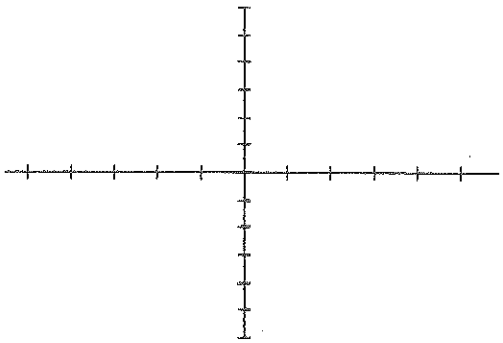


12. $f(x) = -2x + 4$

13. $f(x) = log_3 x$

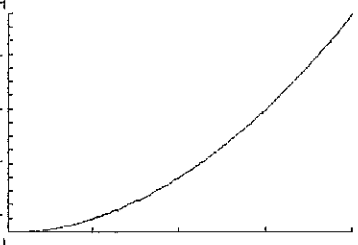
14.

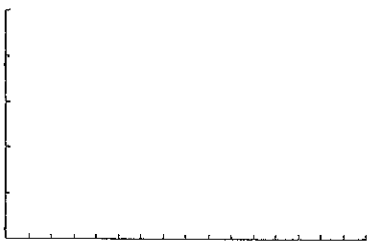




15.

x	$f(x)$
0	0
1	1
2	4
3	9
4	16





GO
Topic: Composite functions

Calculate $f(g(x))$ and $g(f(x))$ for each pair of functions.

(Note: the notation $(f \circ g)(x)$ and $(g \circ f)(x)$ mean the same thing, respectively.)

16. $f(x) = 3x + 7;\ g(x) = -4x - 11$

17. $f(x) = -4x + 60;\ g(x) = -\frac{1}{4}x + 15$

18. $f(x) = 10x - 5;\ g(x) = \frac{2}{5}x + 3$

19. $f(x) = -\frac{2}{3}x + 4;\ g(x) = -\frac{3}{2}x + 6$

20. Look back at your calculations for $f(g(x))$ and $g(f(x))$. Two of the pairs of equations are inverses of each other. Which ones do you think they are?

Why?