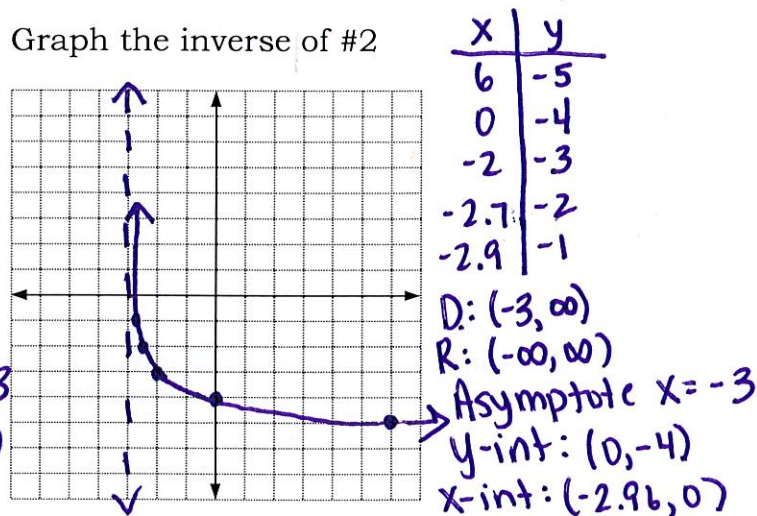
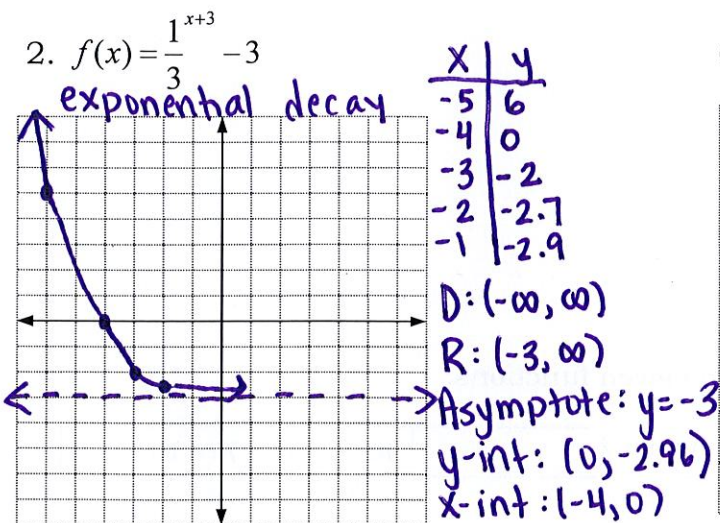
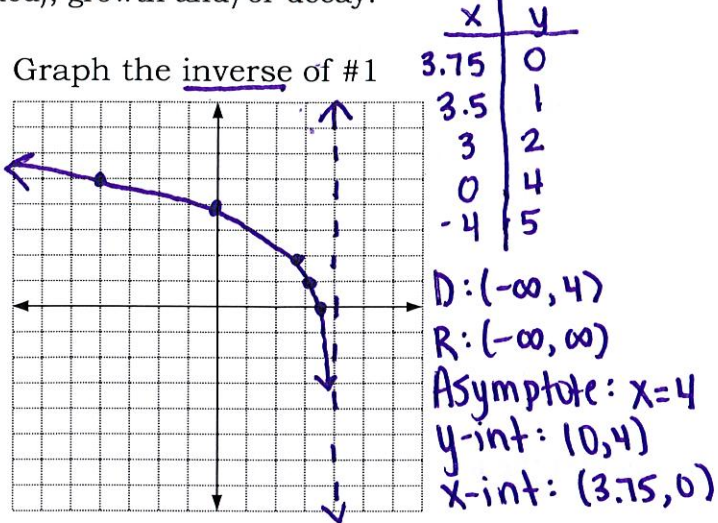
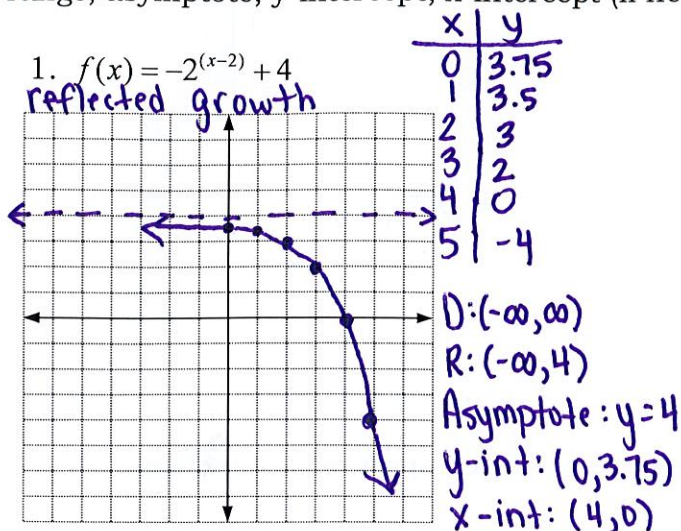
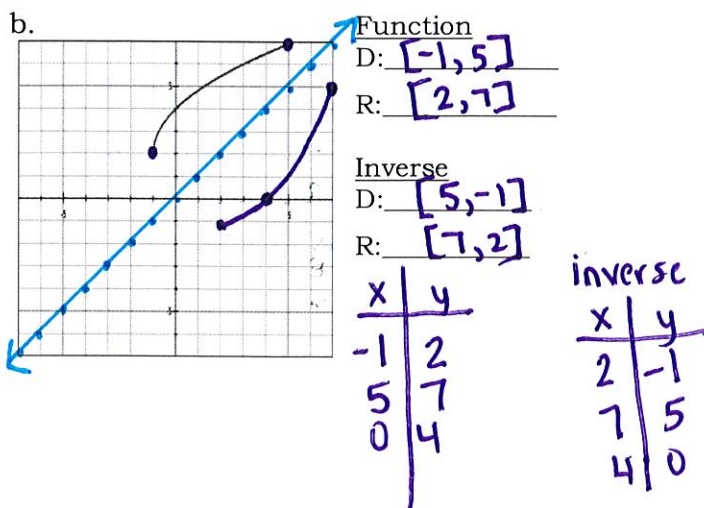
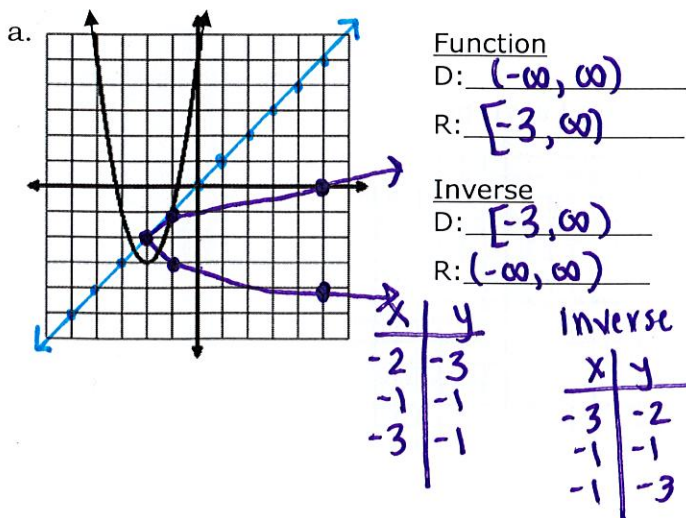


Graph the following and find the inverse. Make sure to include the table, description, domain, range, asymptote, y-intercept, x-intercept (if needed), growth and/or decay.



3. Sketch the inverse. Find the domain and range of the given function and the inverse.



4. Solve each equation:

a. $3^{2x+1} = 9^{2x-3}$

$$3^{2x+1} = 3^{2(2x-3)}$$

$$2x+1 = 4x-6$$

$$1 = 2x - \frac{6}{+6} \quad \frac{2x}{-2} = 7 \quad \boxed{x = 7/2}$$

b. $\frac{1}{4}^{-x-4} = 64^{x+1}$

$$4^{-1(-x-4)} = 4^{3(x+1)}$$

$$x+4 = 3x+3$$

$$2x = 1 \quad \boxed{x = 1/2}$$

5. Find the inverse of each function, showing algebraic steps

a. $y = \sqrt[3]{x-2} + 5$

$$x = \sqrt[3]{y-2} + 5$$

$$(x-5)^3 = (\sqrt[3]{y-2})^3$$

$$(x-5)^3 = y-2$$

$$\boxed{y = (x-5)^3 + 2}$$

b. $y = (3x-2)^3 - 9$

$$x = \frac{(3y-2)^3 - 9}{3}$$

$$\sqrt[3]{x+9} = \sqrt[3]{(3y-2)^3}$$

$$\sqrt[3]{x+9} = 3y-2$$

$$3y = \sqrt[3]{x+9} + 2$$

$$\boxed{y = \frac{\sqrt[3]{x+9} + 2}{3}}$$

c. $y = \frac{3(y-1)}{x-1}$ $x = \frac{3}{y-1} \cdot (y-1)$

$$\frac{x(y-1)}{x} = \frac{3}{x}$$

$$y-1 = \frac{3}{x}$$

$$\boxed{y = \frac{3}{x} + 1}$$

6. Verify that the following functions are (or are not) inverses using composition of functions.

$$f(x) = x^2 + 2, x \geq 0$$

$$g(x) = \sqrt{x-2}$$

$f(g(x)) = x$
 $g(f(x)) = x$] then inverses!

plug in for x

$$f(g(x)) = f(\sqrt{x-2}) = (\sqrt{x-2})^2 + 2 = x - 2 + 2 = x \quad \checkmark$$

$$g(f(x)) = g(x^2 + 2) = \sqrt{x^2 + 2 - 2} = \sqrt{x^2} = x \quad \checkmark$$

plug in for x

Yes, they are inverses

7. Find the following function compositions using the given functions:

$f(x) = 4x - 3$	$g(x) = x^2 + 7$	$h(x) = x + 2$	$m(x) = x^2 + 7x + 10$
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a. $(f \circ g)(x)$

$$f(g(x)) =$$

$$f(x^2 + 7) = 4(x^2 + 7) - 3$$

$$= 4x^2 + 28 - 3$$

$$= \boxed{4x^2 + 25}$$

b. $m(h(x))$

$$m(x+2) =$$

$$(x+2)^2 + 7(x+2) + 10$$

$$x^2 + 4x + 4 + 7x + 14 + 10$$

$$\boxed{x^2 + 11x + 28}$$

c. $g(f(2))$

$$g(4 \cdot 2 - 3)$$

$$g(5) = 5^2 + 7$$

$$= 25 + 7$$

$$= \boxed{32}$$

d. $(h \circ m)(1)$

$$h(m(1))$$

$$h(1^2 + 7 \cdot 1 + 10)$$

$$h(18) = 18 + 2$$

$$= \boxed{20}$$

8. Graph $f(x) = 2^{x+2} - 3$. List the intercepts, domain, range and asymptote

x	y
0	-2.75
1	-2.5
2	-2
3	-1
4	1
5	5

exponential growth

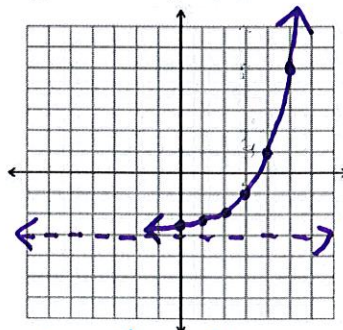
D: $(-\infty, \infty)$

R: $(-3, \infty)$

Asymptote: $y = -3$

y-int: $(0, -2.75)$

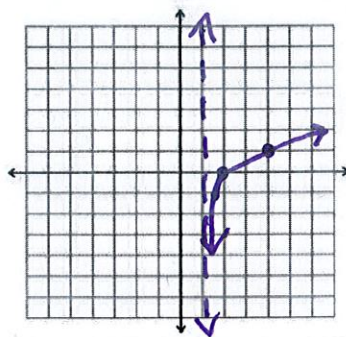
x-int: $(3.58, 0)$ → use



calculator (2nd trace, zero, etc.)

9. Graph the inverse of $f(x) = 3^x + 1$. List the intercepts, domain, range and asymptote

x	y	inverse	x	y
-2	1.1		1.1	-2
-1	1.3		1.3	1.3 -1
0	2		2	0
1	4		4	1
2	10		10	2



10. Write the following in logarithmic form

a. $10^3 = 1000$

$$\log_{10} 1000 = 3$$

b. $\frac{1}{2}^{-3} = 8$ or $2^3 = 8$

$$\log_2 8 = 3$$

11. Write the following in exponential form

a. $\log_5 125 = 3$

$$5^3 = 125$$

b. $\log_3 81 = 4$

$$3^4 = 81$$

12. Solve the following for x.

a. $10^{2x-1} = 10^{x+7}$

$$2x - 1 = x + 7$$

$$x = 8$$

b. $4^{2x+2} = 32^{x-5}$

$$2^{2(2x+2)} = 2^{5(x-5)}$$

$$4x + 4 = 5x - 25$$

$$x = 29$$

13. How much money will you have in the bank if you invest \$500 at continuously compounding interest for 3 years with an interest rate of 3%?

$$y = Pe^{rt}$$

$$y = 500e^{(0.03)(3)}$$

$$y \approx \$547.09$$

14. How many mold spores will be present in your biology lab after 24 hours if you started with 5 mold spores and their growth constant is $k = .0355$?

$$y = Ae^{kt}$$

$$y = 5e^{0.0355(24)}$$

$$\approx 12 \text{ spores}$$

Evaluate each expression.

7) $\log_5 125 = x$ $5^x = 125$
 A) -3 **B) 3** $x = 3$
 C) 5 D) 25

8) $\log_6 \frac{1}{216} = x$
 A) 2 B) 3
C) -3 D) $\frac{1}{1296}$

$6^x = \frac{1}{216}$
 $6^x = \frac{1}{6^3}$
 $6^x = 6^{-3}$
 $x = -3$

9) $\log_2 32 = x$
A) 5 B) -5
 C) 3 D) 16

$2^x = 32$
 $x = 5$

10) $\log_4 \frac{1}{4} = x$
 A) $\frac{1}{16}$ **B) -1**
 C) 1 D) -4

$4^x = \frac{1}{4}$
 $4^x = 4^{-1}$
 $x = -1$

Find the inverse of each function.

Don't worry about this one!

13) $y = \log_5 5^x$
 A) $y = \frac{1}{3^{\frac{x}{5}}}$ **B) $y = \log_5 10^x$**
 C) $y = 4^{\frac{x}{3}}$ D) $y = 6^x - 9$

$x = \log_{10} 5^y$
 $10^x = 5^y$
 back to a log
 $\log_5 10^x = y$

14) $y = \log_{\frac{1}{5}} x + 5$
 A) $y = 6^x - 8$ B) $y = 4^x - 8$
C) $y = \frac{1}{5^{x-5}}$ D) $y = 5^{\frac{x}{8}}$

$x = \log_{\frac{1}{5}} y + 5$
 $x - 5 = \log_{\frac{1}{5}} y$
 $\left(\frac{1}{5}\right)^{x-5} = y$
 ~~$|x-5$~~
 $\frac{1}{5^{x-5}} = y$