

Name _____

Date _____

#1-8 CALCULATOR - Solve for the given variable. **Show all your work** - round to 3 decimals.

1. $11(4^{x+2}) - 18 = 1082$

$x = 1.322$

2. $\log_5(6x+1) = \log_5(3x+16)$

$x = 5$

3. $-3e^{4x} - 7 = -40$

$x = .599$

4. $12 - 3\ln(2x) = 6$

$x = 3.695$

5. $\log_6 x = 2 - \log_6(x+5)$

$x = 4, -\cancel{x}$

6. $1296^{x-1} = 6^{x-1}$

$x = 1$

7. You purchase a car for \$27,000. The value of the car decreases 10% each year.

a. Write the equation for the car's value in terms of the number of years since the purchase.

$A = 27,000(1 - .10)^t$

b. What is the value of the car after 4 years?

$A = \$17,714.70$

c. When will the car be worth half the original value?

$t \approx 6.579$ years

8. You deposit \$5100 in an account that earns 4.5% annual interest. Find the balance after 10 years if the interest is compounded:

a. Semi-Annually

b. Quarterly

c. Continuously

$\$7,958.60$

$\$7,978.32$

$\$7,998.39$

b. How long would it take to double your investment if it is compounded continuously?

$t \approx 15.403$ years

#9-31 NON-Calculator

<p>9. Rewrite as a log:</p> $\left(\frac{1}{4}\right)^{-3} = 64$ $\log_{\frac{1}{4}} 64 = -3$	<p>10. Rewrite as an exponential</p> $\log_5\left(\frac{1}{125}\right) = h$ $5^h = \frac{1}{125}$
<p>11. Expand $\log_4 \frac{16d^5}{b^4c^3}$</p> $2 + 5\log_4 d - 4\log_4 b - 3\log_4 c$	<p>12. Expand $\ln y^4 \sqrt[3]{y+2}$</p> $4 \ln y + \frac{1}{3} \ln(y+2)$
<p>13. Condense $4\ln b - \ln 7 - \ln g - 5\ln j$</p> $\ln \frac{b^4}{7gj^5}$	<p>14. Condense $\log_6 2 - \frac{1}{3}\log_6(x+3) - 4\log_6 y$</p> $\log_6 \frac{2}{y^4 \sqrt[3]{x+3}}$

Find the Domain, Range, and Asymptote of each function

<p>15. $f(x) = \log_3(-x-3) + 2$</p> <p>Domain: $(-\infty, -3)$</p> <p>Range: $(-\infty, \infty)$</p> <p>Asymptote: $x = -3$</p> <p>$-x-3=0$ $-x=3$ $x=-3$</p>	<p>16. $f(x) = -3^{x-2} + 7$</p> <p>Domain: $(-\infty, \infty)$</p> <p>Range: $(-\infty, 7)$</p> <p>Asymptote: $y = 7$</p>
<p>17. $h(x) = \ln(3x-4) - 5$</p> <p>Domain: $(\frac{4}{3}, \infty)$</p> <p>Range: $(-\infty, \infty)$</p> <p>Asymptote: $x = \frac{4}{3}$</p> <p>$3x-4=0$ $3x=4$ $x=\frac{4}{3}$</p>	<p>18. $g(x) = 2^{x-2} - 3$</p> <p>Domain: $(-\infty, \infty)$</p> <p>Range: $(-3, \infty)$</p> <p>Asymptote: $y = -3$</p>

Describe the Transformation in each function

<p>19. $f(x) = \log_4(-x-1) - 2$</p> <ul style="list-style-type: none"> • Reflect y-axis • Left 1 • Down 2 	<p>20. $f(x) = -2^x - 1$</p> <ul style="list-style-type: none"> • Reflect x-axis • Down 1
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State whether the function is **increasing or decreasing** + write the **interval** of inc/dec.

21. $f(x) = -2^x - 5$

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

22. $f(x) = \log_{\frac{1}{2}}(-x+1) + 2$

Increasing: $(-\infty, 1)$

23. A) Is the table below an exponential function or a logarithmic function?

exponential

B) Does the function have a vertical or horizontal asymptote?

horizontal

C) What is the equation of the asymptote?

$y = 2$

X	F(x)
-2	2.33333
-1	3
0	5
1	11
2	29

24. A) Is the table below an exponential function or a logarithmic function?

logarithmic

B) Does the function have a vertical or horizontal asymptote?

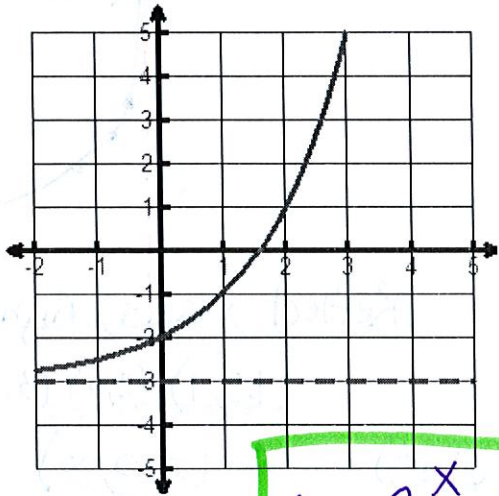
vertical

C) What is the equation for the asymptote?

$x = 1$

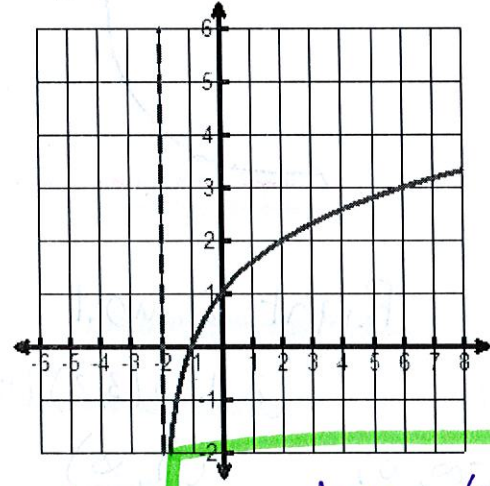
X	F(x)
1.5	-0.631
2	0
4	1
10	2

25. What is the equation of the function graphed below?



$y = 2^x - 3$

26. What is the equation of the function graphed below?



$y = \log_2(x+2)$

Find the Inverse of the Functions Below

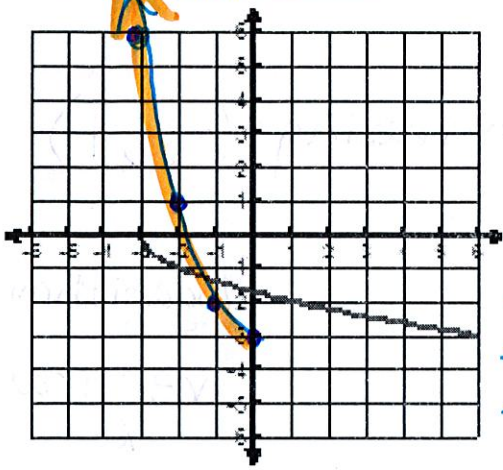
22. $y = 3^{x+1} - 4$

$y^{-1} = \log_3(x+4) - 1$

23. $y = \log_2(x-1)$

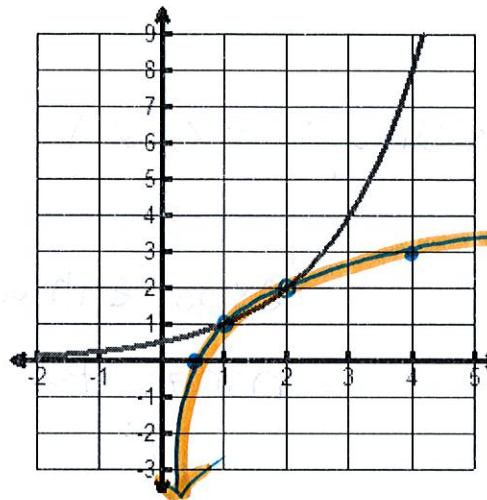
$f^{-1}(x) = 2^x + 1$

27. Graph the inverse



x	y ⁻¹
0	-3
-1	-2
-2	1
-3	6

28. Graph the inverse



x	y ⁻¹
.5	0
1	1
2	2
4	3
8	4

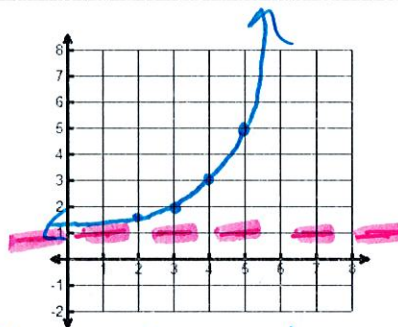
29. Prove whether the functions INVERSES using composite functions. Must show your work!

$f(x) = 3x - 2$
 $g(x) = \frac{x+2}{3}$

$f(g(x)) = 3\left(\frac{x+2}{3}\right) - 2 = x+2-2 = x$
 $g(f(x)) = \frac{3x-2+2}{3} = \frac{3x}{3} = x$

yes, inverses

30. $y = 2^{x-3} + 1$



Transformations Right 3, up 1

State 3 points on Graph (2, 1.5) (3, 2) (4, 3)

Domain $(-\infty, \infty)$ Range $(1, \infty)$

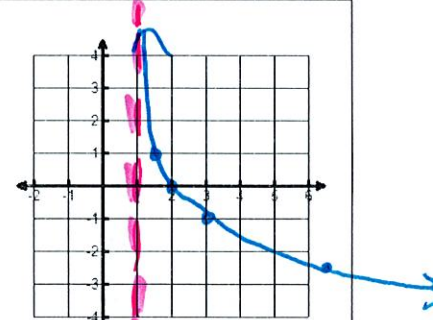
Asymptote $y = 1$

X-intercept none Y-intercept $(0, 9/8)$

Increasing or Decreasing $(-\infty, \infty)$

End Behavior: $x \rightarrow -\infty, f(x) \rightarrow 1$
 $x \rightarrow \infty, f(x) \rightarrow \infty$

31. $y = -\log_2(x-1)$



Transformations Reflect x-axis, Right 1

State 3 points on Graph (1.5, 1) (2, 0) (3, -1)

Domain $(1, \infty)$ Range $(-\infty, \infty)$

Asymptote $x = 1$

X-intercept (2, 0) Y-intercept none

Increasing or Decreasing $(1, \infty)$

End Behavior: $x \rightarrow 1, f(x) \rightarrow \infty$
 $x \rightarrow \infty, f(x) \rightarrow -\infty$