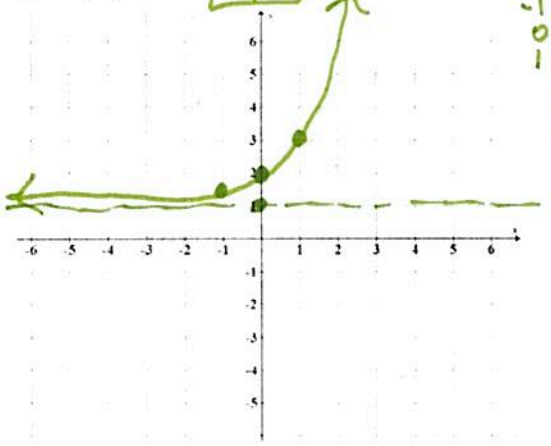
PAP Algebra 2
Exponential & Log Test Review

Name: Key

Exponential Functions & Key Attributes

Given the following functions: graph and identify the key attributes.

1. $y = (2)^x + 1$ Up 1

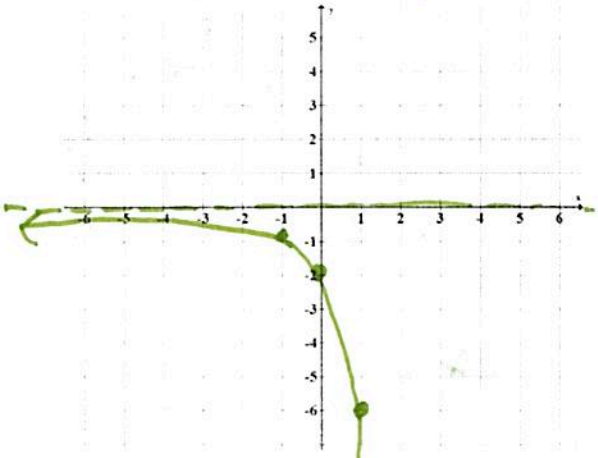


Asymptote: $y = 1$

Domain: $\mathbb{R}$

Range: $y > 1$

2. $y = -2(3)^x$ V. stretch; V. Reflect



Asymptote: $y = 0$

Domain: $\mathbb{R}$

Range: $y < 0$

Identify the key attributes given the following functions:

3. $y = -4\left(\frac{1}{2}\right)^x - 6$

Transformations:
V. Reflection
V. stretch
Down 6

Critical Point: $(0, -10)$

Asymptote: $y = -6$

Domain: $\mathbb{R}$

Range: $y < -6$

4. $y = 3^{x+5} - 4$

Transformations:
left 5; Down 4

Critical Point: $(-5, -3)$

Asymptote: $y = -4$

Domain: $\mathbb{R}$

Range: $y > -4$

5. $y = -\frac{1}{2}(2)^{x-3} + 1$

Transformations:
V. Reflection
V. Compression
Right 3; up 1

Critical Point: $(3, 1/2)$

Asymptote: $y = 1$

Domain: $\mathbb{R}$

Range: $y < 1$

Apply the following transformations to the following function to write the new function and the new key attributes for the following functions:

6. $y = \left(\frac{1}{4}\right)^{x-4} + 6$

Transformations: Right 4 Up 6

Left 5, Down 2

New Equation: $y = \left(\frac{1}{4}\right)^{x+1} + 4$

Critical Point: $(-1, 5)$

Asymptote: $y = 4$

Domain: $\mathbb{R}$

Range: $y > 4$

7. $y = 3(2)^{x+1} - 4$

Transformations:

X-Axis Reflection, Right 2, Down 3

New Equation: $y = -3(2)^{x-1} + 1$

Critical Point: $(1, -2)$

Asymptote: $y = 1$

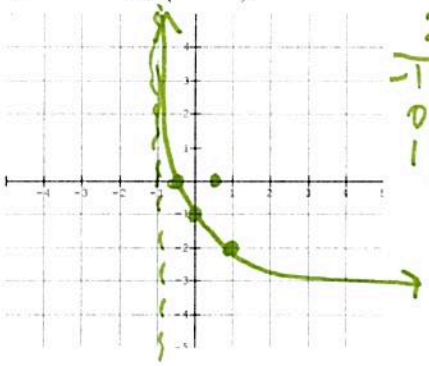
Domain: $\mathbb{R}$

Range: $y < 1$

Log Functions & Key Attributes

Given the following functions: graph and identify the key attributes.

8. $y = -\log_2(x+1) - 1$

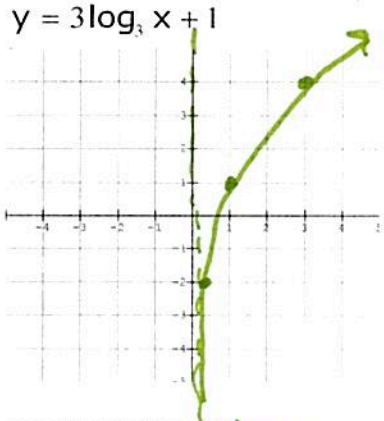


Asymptote: $x = -1$

Domain: $x > -1$

Range: $\mathbb{R}$

9. $y = 3\log_3 x + 1$



Asymptote: $x = 0$

Domain: $x > 0$

Range: $\mathbb{R}$

Identify the key attributes given the following functions:

10. $y = -2\log_2(x+2)$

Transformations:
V. Stretch
V. Reflection
left 2

Critical Point: (-1,0)

Asymptote: x = -2

Domain: x > -2

Range: ℝ

1,0
1,0
-2
-1,0

11. $y = -\log x + 2$

Transformations:
V. Reflection
up 2

Critical Point: (1,2)

Asymptote: x = 0

Domain: x > 0

Range: ℝ

1,0
x -1
1,0
+2
1,2

12. $y = \frac{1}{3}\log_4(x-4) - 2$

Transformations:
V. Compression
Right 4
Down 2

Critical Point: (5,-2)

Asymptote: x = 4

Domain: x > 4

Range: ℝ

1,0
1,0
+4 -2
5,-2

Apply the following transformations to the following function to write the new function and the new key attributes for the following functions:

13. $y = \log(x)$

Transformations:

Left 5, Up 3

New Equation: $y = \log(x+5)+3$

Critical Point: (-4,3)

Asymptote: x = -5

Domain: x > -5

Range: ℝ

1,0
-5 +3
-4,3

14. $y = \log(x) + 3$

Transformations:

Right 4, Down 2

New Equation: $y = \log(x-4)+1$

Critical Point: (5,1)

Asymptote: x = 0 +4

Domain: x > 4

Range: ℝ

1,0
+4 +1
5,1

Converting & Inverses: Exponentials & Logs

Find $f(x)^{-1}$ of the following functions:

15. $f(x)=4^{x+2}$

$x=4^{y+2}$

$\log_4 x = y+2$

$y=\log_4(x)-2$

16. $f(x)=2^{x-2}+3$

$x=2^{y-2}+3$

$x-3=2^{y-2}$

$\log_2(x-3)=y-2$

$y=\log_2(x-3)+2$

17. $f(x)=e^{x}-2$

$x=e^{y}-2$

$x+2=e^{y}$

$\ln(x+2)=y$

18. $f(x)=\log_3(x+2)-1$

$x=\log_3(y+2)-1$

$x+1=\log_3(y+2)$

$3^{x+1}=y+2$

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

19. $f(x)=\log x+3$

$x=\log y+3$

$x-3=\log y$

$10^{x-3}=y$ or $y=10^{x-3}$

20. $f(x)=\ln(x+2)$

$x=\ln(y+2)$

$e^{x}=y+2$

$y=e^{x}-2$

Using Properties of Logs

Condense the following (make sure to simplify):

21. $5\log x-4\log y$

$\log \frac{x^5}{y^4}$

22. $\log_5 4+\frac{1}{3}\log_5 x$

$\log_5 4x^{1/3}$ or $\log_5 4\sqrt[3]{x}$

23. $2\log_7 4-\log_7 x+\frac{2}{3}\log_7 8$

$\log_7 \frac{16\cdot 8^{2/3}}{x}$

$\log_7 \frac{16\cdot 4}{x}=\log_7 \frac{64}{x}$

24. $3\log_2 8$

$\log_2 8^3$

$\log_2 (2^3)^3$

$\log_2 (2)^9$

9

25. $\log_2 5+\log_2 10-\log_2 25$

$\log_2 \frac{5\cdot 10}{25}$

$\log_2 \frac{50}{25}=\log_2(2)=1$