9.1 Practice – Exponential Growth

Name: Solutions

No graphing calculator for these problems!

Next to each function, write "yes" if it is an **exponential** function. If the answer is "no", write an explanation why not.

1) $y = -6(3)^x$

Yes

2) $y = 3\left(\frac{5}{2}\right)^{-x}$

Yes

3) $y = 7x^{-3}$

No. The variable is not in the exponent.

4) $y = 3(-4)^x$

No. The base can't be negative.

5) $y = 92x^{103}$

No. The variable is not in the exponent.

6) $y = 14(-8)^x$

No. The base can't be negative.

7) $y = -5(12)^{2x}$

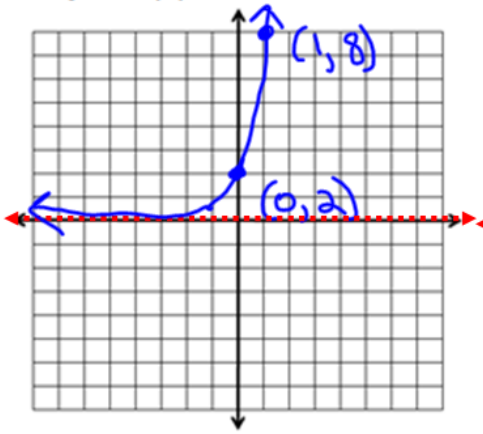
Yes.

8) $y = 13(32)^{-2x}$

Yes.

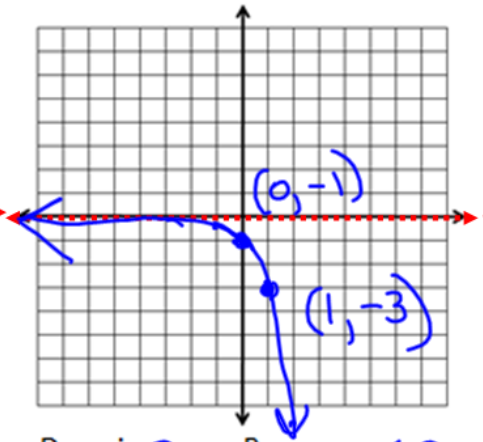
For 9 -17, sketch the graph of each exponential function by doing the following: Sketch the asymptote, label at least **two distinct coordinate points** on each graph, and write the domain and range of each function.

9. $y = 2(4)^x$



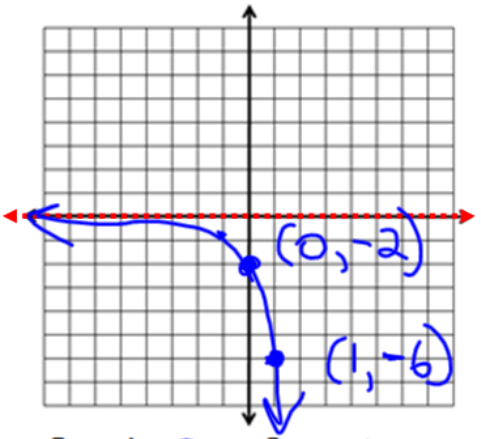
Domain: $\mathbb{R}$ Range: $y > 0$

10. $y = -(3)^x$



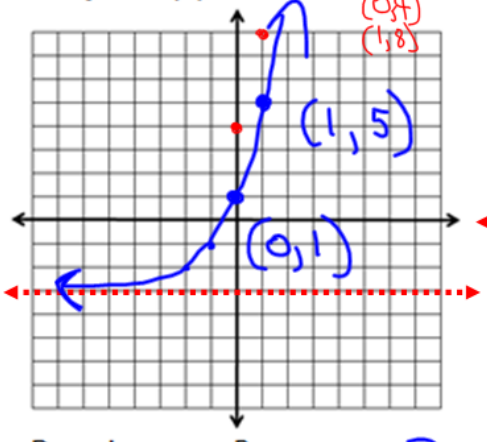
Domain: $\mathbb{R}$ Range: $y < 0$

11. $y = -2(3)^x$



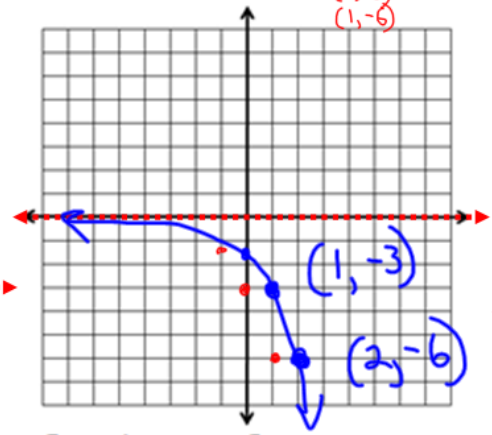
Domain: $\mathbb{R}$ Range: $y < 0$

12. $y = 4(2)^x - 3$



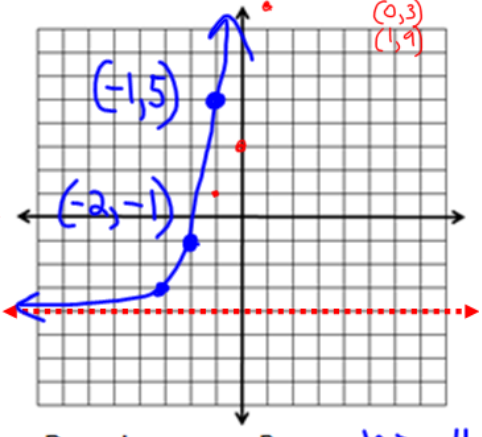
Domain: $\mathbb{R}$ Range: $y > -3$

13. $y = -3(2)^{x-1}$



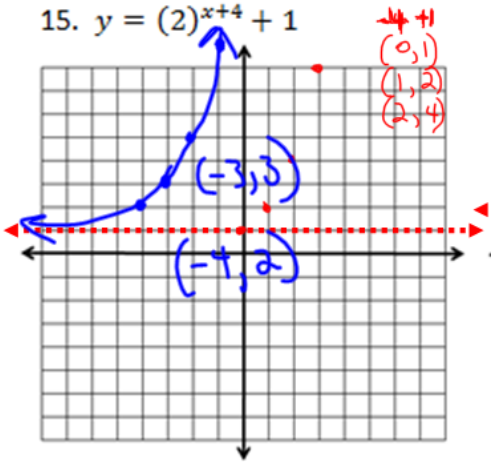
Domain: $\mathbb{R}$ Range: $y < 0$

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



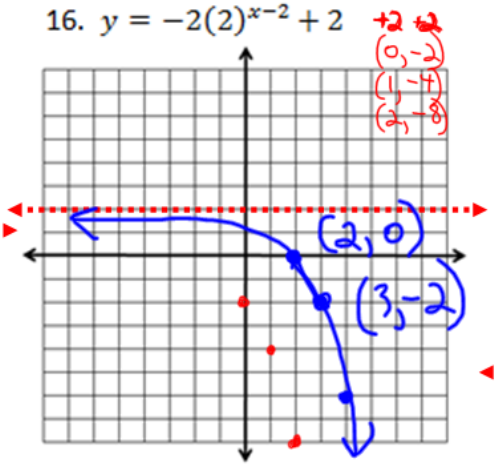
Domain: $\mathbb{R}$ Range: $y > -4$

15. $y = (2)^{x+4} + 1$



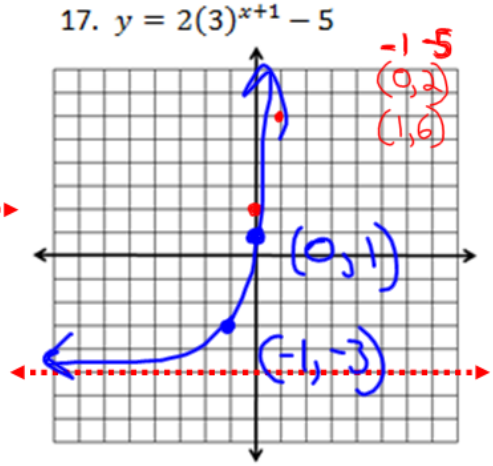
Domain: $\mathbb{R}$ Range: $y > 1$

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



Domain: $\mathbb{R}$ Range: $y < 2$

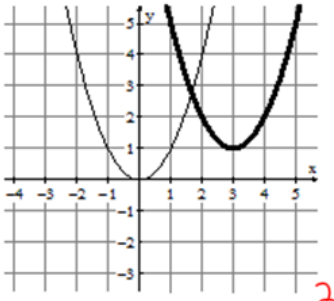
17. $y = 2(3)^{x+1} - 5$



Domain: $\mathbb{R}$ Range: $y > -5$

Algebra Skillz:

1. Below are graphs of $f(x) = x^2$ (thin line) and its translation (bold line). Write an equation of the translation.



$g(x) = (x-3)^2 + 1$

Simplify the fraction by rationalizing the denominator.

2. $\frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

3. $\frac{3}{2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{3\sqrt{3}}{2 \cdot 3}$

$\frac{\sqrt{3}}{2}$

Solve by factoring.

4. $x^3 - 7x^2 + 12x = 0$

$x(x^2 - 7x + 12) = 0$

$x(x-3)(x-4) = 0$

$x = 0, 3, \text{ or } 4$

5. $6x^2 + 13x - 5 = 0$

$(2x+5)(3x-1) = 0$

$x = -\frac{5}{2}$ or $x = \frac{1}{3}$

SAT Prep:

1. Simplify: $(3^{2x+3})(3^{x-6})$

(A) $(3)^{3x-3}$

(B) $(3)^{2x^2-18}$

(C) $(9)^{2x^2-9x-18}$

(D) $(9)^{3x-3}$

$2x+3+x-6$

3^{3x-3}

2. If $f(x) = 4(3)^{x-1} + 2$, find $f(0)$.

$f(0) = 4(3)^{0-1} + 2$

$= 4(3)^{-1} + 2$

$= 4 \cdot \frac{1}{3} + 2$

$\frac{4}{3} + \frac{6}{3}$

$\frac{10}{3}$