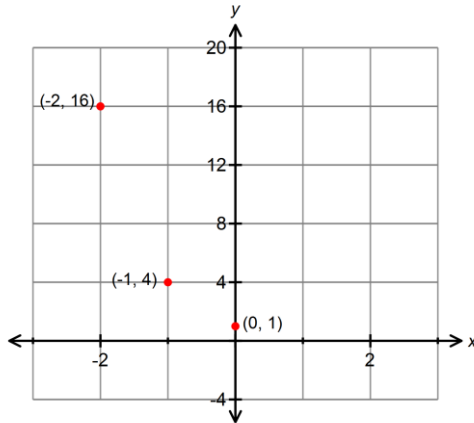


1. Which function of the form $y = c^x$ represents the graph shown below?



A) $y = (4)^x$

B) $y = \left(\frac{1}{4}\right)^x$

C) $y = (2)^x$

D) $y = \left(\frac{1}{2}\right)^x$

2. What is the range of the exponential function $y = -(5)^{2(x-4)} + 3$?

A) $y > 3, y \in R$

B) $y > -3, y \in R$

C) $y < 3, y \in R$

D) $y < -3, y \in R$

3. What is the y-intercept of the function $y = 4(3)^{2(x+1)} - 5$?

A) (0, 19)

B) (0, 139)

C) (0, 31)

D) (0, -8)

4. Which transformations of $y = (4)^x$ produces the function $y = (4)^{0.25x+1}$?

A) horizontal translation 1 unit left, horizontal stretch factor $\frac{1}{4}$

B) horizontal translation 1 unit left, horizontal stretch factor 4

C) horizontal translation 4 unit left, horizontal stretch factor $\frac{1}{4}$

D) horizontal translation 4 unit left, horizontal stretch factor 4

5. Which describes the function $y = 3(2)^{-x} + 4$?

- A) exponential decay, horizontal asymptote $y = 4$
- B) exponential decay, horizontal asymptote $y = -4$
- C) exponential growth, horizontal asymptote $y = 4$
- D) exponential decay, horizontal asymptote $y = -4$

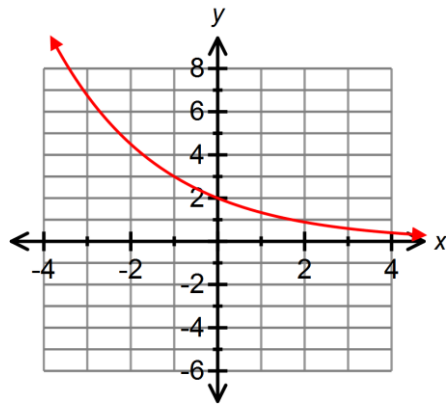
6. The graph of $y = 2^x$ is transformed according to the mapping rule $(x, y) \rightarrow (x, -2y + 1)$.

Which statement best describes the graph that results?

- A) reflected on the x -axis, vertically stretched by a factor of $\frac{1}{2}$, and translated vertically 1 unit up
- B) reflected on the x -axis, vertically stretched by a factor of $\frac{1}{2}$, and translated vertically 1 unit down
- C) reflected on the x -axis, vertically stretched by a factor of 2, and translated vertically 1 unit up
- D) reflected on the x -axis, vertically stretched by a factor of 2, and translated vertically 1 unit down

7. Which equation best represents the graph shown?

- A) $y = \left(\frac{2}{3}\right)^x$
- B) $y = \left(\frac{3}{2}\right)^x$
- C) $y = 2\left(\frac{2}{3}\right)^x$
- D) $y = 2\left(\frac{3}{2}\right)^x$



8. Which best represents the transformation of $y = \left(\frac{1}{2}\right)^x$ using the mapping rule

$(x, y) \rightarrow (x + 1, 2y - 3)$?

- A) $\frac{1}{2}(y + 3) = \left(\frac{1}{2}\right)^{x-1}$
- B) $\frac{1}{2}y + 3 = \left(\frac{1}{2}\right)^{x-1}$
- C) $2(y - 3) = \left(\frac{1}{2}\right)^{x+1}$
- D) $2(y + 3) = \left(\frac{1}{2}\right)^{x-1}$

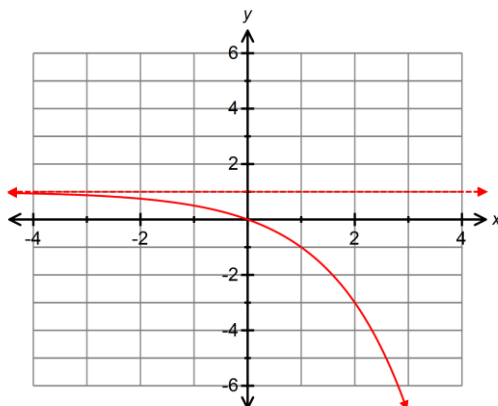
9. Which equation best represents the graph shown?

A) $y = 2^{-x} - 1$

B) $y = 2^{-x} + 1$

C) $y = -(2)^x - 1$

D) $y = -(2)^x + 1$



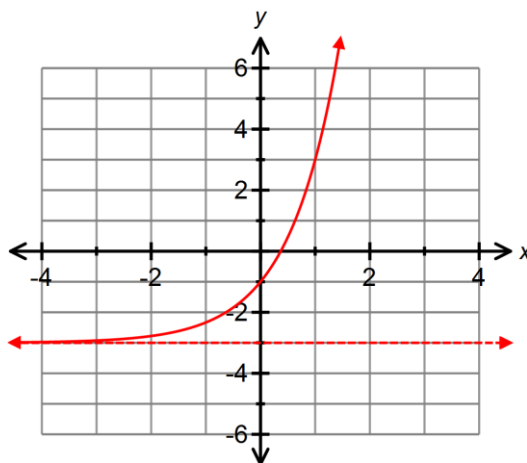
10. Which equation best represents the exponential function shown?

A) $y = a(c)^x - 3, \quad a > 0, c > 1$

B) $y = a(c)^x - 3, \quad a > 0, 0 < c < 1$

C) $y = a(c)^x + 3, \quad a > 0, c > 1$

D) $y = a(c)^x + 3, \quad a > 0, 0 < c < 1$



11. Which mapping rule transforms $y = \left(\frac{1}{5}\right)^x$ to $y = \left(\frac{1}{5}\right)^{4x+8}$?

A) $(x, y) \rightarrow (4x + 8, y)$

B) $(x, y) \rightarrow \left(\frac{1}{4}x - 2, y\right)$

C) $(x, y) \rightarrow (4x - 2, y)$

D) $(x, y) \rightarrow \left(\frac{1}{4}x - 8, y\right)$

12. Simplify: $\frac{(8^{n-2})4^n}{2^{n+1}}$

A) 2^{4n-5}

B) 2^{5n-3}

C) 2^{5n-6}

D) 2^{4n-7}

13. Solve for x : $4^x(2^{x+3}) = 16^{2x-5}$

A) $-\frac{23}{5}$

B) $-\frac{15}{2}$

C) $\frac{15}{2}$

D) $\frac{23}{5}$

14. Mary bought a new house for \$120 000 that appreciates by 5% per year. Which function models the value, V , of the house after t years?

A) $V = 120\,000(0.05)^x$

B) $V = 120\,000(0.95)^x$

C) $V = 120\,000(1.50)^x$

D) $V = 120\,000(1.05)^x$

15. Sketch and label the graph of the function $y = -2(4)^{3(x-1)} + 2$. Identify the domain, range and the equation of the horizontal asymptote.

16. Solve for x :

(i) $\sqrt{3} = 9^x$

(ii) $\left(\frac{1}{2}\right)^{3x-4} = 16^{4-x}$

(iii) $(9^{2x})(3^x) = 81^{3x+2}$

(iv) $48 = 6(2)^{x-1}$

(v) $\left(\frac{1}{3}\right)^{2x} = 9^{\frac{1}{2}(x-4)}$

(vii) $5^{2x-3} = \left(\frac{1}{125}\right)^x$

(viii) $\frac{1}{9} = \left(\sqrt[3]{3}\right)^{x-1}$

17. For $f(x) = 9^{-2x+1} - 5$, find x if $f(x) = 22$

18. Solve for x : $(128)^{x+3} = 2(16)^{2x-5}$

19. A radioactive substance has a half-life of 92 hours. If 48g were present initially, how long will it take for the substance to decay to 3g? Show algebraically.

$$\left[A(t) = A_0 \left(\frac{1}{2}\right)^{\frac{t}{h}} \right]$$