Exp function have ~~variables~~ x for a power

Exponential Function
A function that can be rewritten in the form $y = a \cdot b^x$, where a is non-zero, b is positive, and $b \neq 1$.
a: initial value at x= 0
b: base

Base: Positive #
Power has to be x

Which of the following are exponential functions? For those that are exponential functions, state the initial value and the base. For those that are not, explain.

A) $f(x) = (3)^x$

Initial Value (x=0) → $f(0) = 3^0$
$f(0) = 1$

Base = 3

B) $g(x) = 6x^{-4} = \frac{6}{x^4}$

not exp power is a constant

$h(x) = 7 \cdot (-1) \cdot 2^x$

C) $h(x) = -2 \cdot (1.5)^x$

Initial Value = $-2 \cdot 1.5^0$
$= -2 \cdot (1)$
$= -2$

Base = 1.5

D) $h(x) = 7 \cdot -2^x$

Initial Value $h(0) = 7 \cdot -2^0$
$= -7$

Base = 2

E) $f(x) = 5 \cdot 6^x$

Not exp b/c power is a constant

F) $h(x) = 7 \cdot (-2)^x$ Not Exp

Initial Value $h(0) = 7 \cdot (-2)^0$
$= 7 \cdot 1$
$= 7$

Base = (-2)

Compute the exact value of the function without using a calculator

A) $2 \cdot 4^x$ when x = 0

$2 \cdot 4^0 = 2 \cdot (1) = 2$

B) $2 \cdot 4^x$ when x = -3

$2^1 \cdot 4^{-3} = \frac{2}{4^3} = \frac{2}{64} = \frac{1}{32}$

C) $-2 \cdot 4^x$ when x = 1/2

denominator is your root

$-2 \cdot 4^{1/2} = -2\sqrt{4^1}$
$= -2(2)$
$= -4$

D) $3 \cdot 8^x$ when x = -2/3

$3 \cdot 8^{-2/3} = \frac{3}{8^{2/3}} = \frac{3}{\sqrt[3]{8^2}}$
$= \frac{3}{\sqrt[3]{64}} = \frac{3}{4}$

$y = a \cdot b^x$

Initial Value

Determine a formula for the exponential function g(x) and h(x) whose values are given in the table

x	g(x)
-2	4/9
-1	4/3
0	4
1	12
2	36

x	h(x)
-2	128
-1	32
0	8
1	2
2	1/2

$g(x) = a \cdot b^x$

$g(x) = 4 \cdot b^x$

$g(x) = 4 \cdot (3)^x$

$y = 4 \cdot (3)^x$

$h(x) = 8 \cdot \left(\frac{1}{4}\right)^x$

$h(x) = 8 \cdot (4)^{-x}$

Given 2 points on the graph of an exponential function, find the formula

A) (0, 2) (2, 18) — Initial; x, y

x	y
0	2
2	18

$y = a \cdot b^x$

$y = 2 \cdot b^x$

$\frac{18}{2} = \frac{2 \cdot b^2}{2}$

$\sqrt{9} = \sqrt{b^2}$

$3 = b$

$y = 2 \cdot (3)^x$

B) $(0, 3)$ $\left(3, \frac{3}{e}\right)$ — y

x	y
0	3
3	$\frac{3}{e}$

$y = a \cdot b^x$

$y = 3 \cdot b^x$

$\frac{\left(\frac{3}{e}\right)}{3} = \frac{3 \cdot b^3}{3}$

$\sqrt[3]{\frac{1}{e}} = \sqrt[3]{b^3}$

$\sqrt[3]{\frac{1}{e}} = b$

$\frac{\left(\frac{3}{e}\right)}{3} = \frac{3}{e} \div 3$

$= \frac{3}{e} \cdot \frac{1}{3}$

$= \frac{3}{3e}$

$= \frac{1}{e} = e^{-1}$

$y = a \cdot b^x$

$y = 3 \left(\sqrt[3]{\frac{1}{e}}\right)^x$

$y = 3 \left(\sqrt[3]{e^{-1}}\right)^x$

$y = 3 \left(e^{-1/3}\right)^x$

$y = 3e^{-1/3x}$