

1. Solve each exponential equation algebraically. Leave answers in exact form.

$$a) 4^{2x} = \frac{1}{256}$$

$$4^{2x} = 4^{-4}$$

$$2x = -4$$

$$\boxed{x = -2}$$

$$b) 5^{x-1} = \left(\frac{1}{25}\right)^{x-4}$$

$$5^{x-1} = 5^{-2(x-4)}$$

$$x-1 = -2x+8$$

$$3x-1 = 8$$

$$3x = 9$$

$$\boxed{x = 3}$$

$$c) 16^{2x-3} = 32^{x+3}$$

$$2^{4(2x-3)} = 2^{5(x+3)}$$

$$8x-12 = 5x+15$$

$$3x-12 = 15$$

$$3x = 27$$

$$\boxed{x = 9}$$

$$d) \left(\frac{1}{9}\right)^{2x} = \left(\frac{1}{27}\right)^{x+1}$$

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

$$-4x = -3x-3$$

$$-x = -3$$

$$\boxed{x = 3}$$

$$e) \left(\frac{1}{8}\right)^{2x+1} = \sqrt[4]{16^{x-3}}$$

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

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

$$-6x-3 = \frac{1}{4}(x-3)$$

$$-6x-3 = \frac{1}{4}x - \frac{3}{4}$$

$$-7x-3 = -\frac{3}{4}$$

$$-7x = 0$$

$$\boxed{x = 0}$$

$$f) 125\sqrt{5} = 25^{x-2}$$

$$5^3 \cdot 5^{1/2} = 5^{2(x-2)}$$

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

$$3\frac{1}{2} = 2x-4$$

$$\frac{7}{2} + 4 = 2x$$

$$\frac{7}{2} + \frac{8}{2} = 2x$$

$$\frac{15}{2} = 2x$$

$$\boxed{x = \frac{15}{4} = 3\frac{3}{4}}$$

2. Sketch the graph of each function below. Clearly label at least 3 points and any asymptotes.

a) $y = 3^x$

x-int: n/a

y-int: 1

asyp: $y=0$

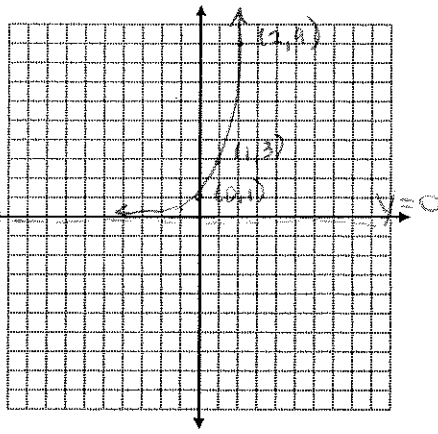
domain: $x \in \mathbb{R}$

range: $y > 0$

increasing

or

decreasing?



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

x-int: $1/2$

y-int: $-2^{9/4}$

asyp: $y = -3$

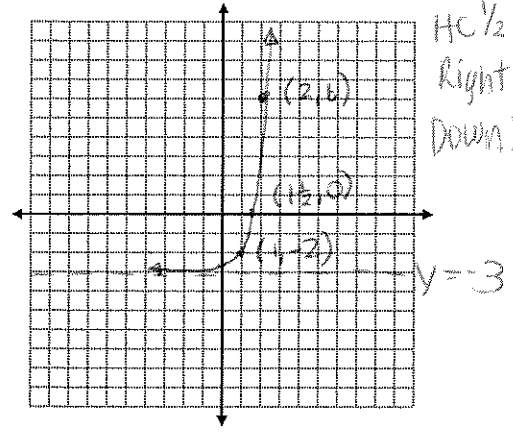
domain: $x \in \mathbb{R}$

range: $y > -3$

increasing

or

decreasing?



HC $1/2$
Right 1
Down 3

c) $y = \left(\frac{1}{3}\right)^x$

x-int: n/a

y-int: 1

asyp: $y=0$

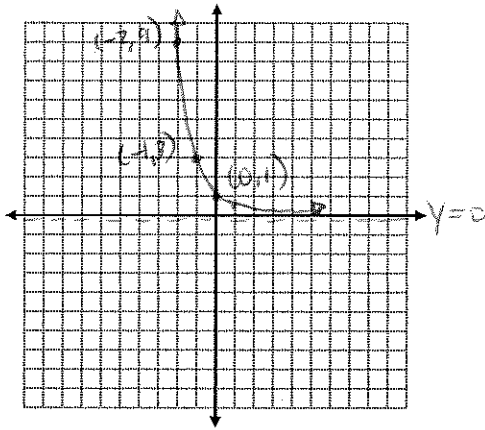
domain: $x \in \mathbb{R}$

range: $y > 0$

increasing

or

decreasing?



d) $y = 2\left(\frac{1}{3}\right)^{x+2}$

x-int: n/a

y-int: $2/9$

asyp: $y=0$

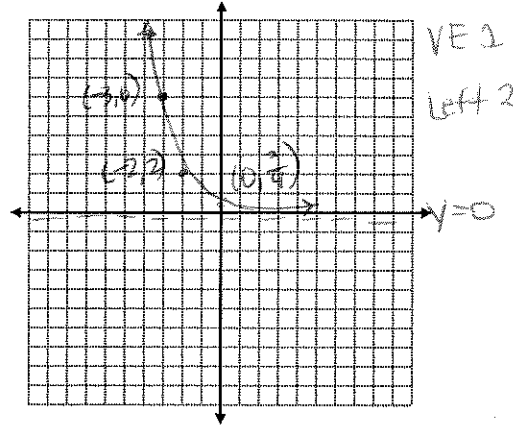
domain: $x \in \mathbb{R}$

range: $y > 0$

increasing

or

decreasing?



VE 1
Left 2

e) $y = 2^x$

x-int: n/a

y-int: 1

asyp: $y=0$

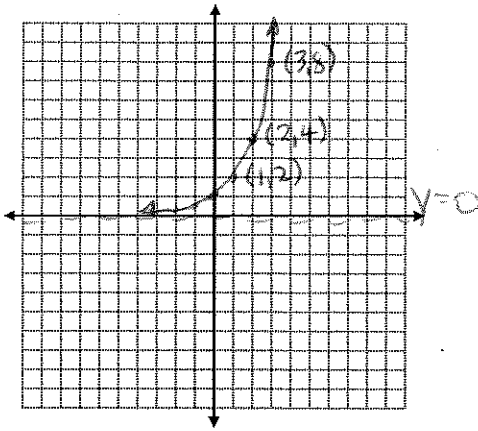
domain: $x \in \mathbb{R}$

range: $y > 0$

increasing

or

decreasing?



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

x-int: n/a

y-int: 5

asyp: $y=1$

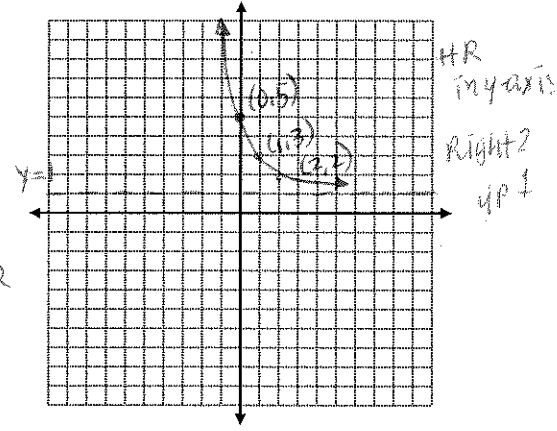
domain: $x \in \mathbb{R}$

range: $y > 1$

increasing

or

decreasing?



HR
in y-axis
Right 2
up 1

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

x-int: n/a

y-int: 1

asyp: $y=0$

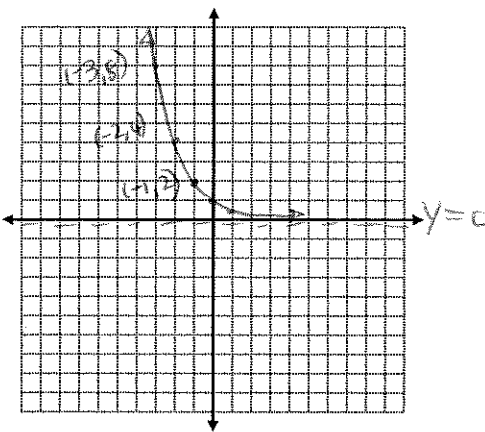
domain: $x \in \mathbb{R}$

range: $y > 0$

increasing

or

decreasing?



h) $y = -\left(\frac{1}{2}\right)^{\frac{1}{2}x} + 2$

x-int: -2

y-int: 1

asyp: $y=2$

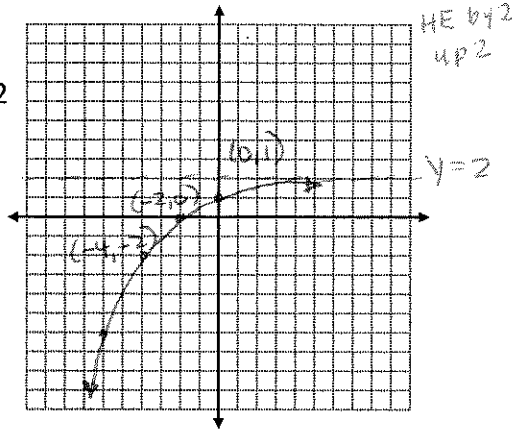
domain: $x \in \mathbb{R}$

range: $y < 2$

increasing

or

decreasing?



VR in x-axis
HE by 2
up 2