

# 3U Exponential Functions

So Back

Name: Say Say

1. Simplify each of the following, expressing with positive exponents.

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

[6]

4.5

$$\begin{aligned} &= \frac{3^{-5} \cdot x^{-10}}{y^{15}} \\ &= \frac{1}{y^{15} \cdot 3^5 \cdot x^{10}} \\ &= \frac{1}{y^{15} \cdot 243 \cdot x^{10}} \end{aligned}$$

d)  $[(2x^2)^{-2}]^{-3}$

$$\begin{aligned} &= (2^{-2} x^{-4})^{-3} \\ &= 2^6 x^{12} \end{aligned}$$

Solve all the exponents.

e)  $\frac{(mn^3)^{-\frac{1}{2}}}{m^{\frac{1}{2}} n^{-\frac{5}{2}}}$

← keep as 1/2

$$\begin{aligned} &= \frac{m^{-\frac{1}{2}} n^{-\frac{3}{2}}}{m^{\frac{1}{2}} n^{-\frac{5}{2}}} \\ &= \frac{n^{-1.5}}{m^{\frac{1}{2} - (-\frac{1}{2})} n^{-\frac{5}{2}}} \\ &= \frac{n^{-1.5}}{m^1 n^{\frac{5}{2} - 1.5}} \\ &= \frac{n^{-1.5}}{m n^1} \\ &= \frac{1}{m n^{1.5}} \end{aligned}$$

[8]

①

umm.....

f)  $\frac{(-2yx^5)^3}{8y^{-3}x^{10}}$

$$\begin{aligned} &= \frac{-2^3 y^3 x^{15}}{8 y^{-3} x^{10}} \\ &= \frac{-8 y^3 x^{15}}{8 y^{-3} x^{10}} \\ &= \frac{-y^3 x^5}{y^{-3} x^0} \\ &= \frac{-y^3 x^5}{y^{-3} x^0} \\ &= -y^6 x^5 \end{aligned}$$

2. For the following function (i) State the base(parent) function(f(x)), (ii) state the equation of the **asymptote**, (iii) the **y-intercept** and (iv) write in the form  $y = a \cdot f(b(x-c)) + d$

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

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

(ii)  $y = -4$

(iii)  $y\text{-int} = -4$

(iv)  $y = 2 \left( 3 \left( 2x - 4 \right) \right) - 4$

Sorry it gets worse

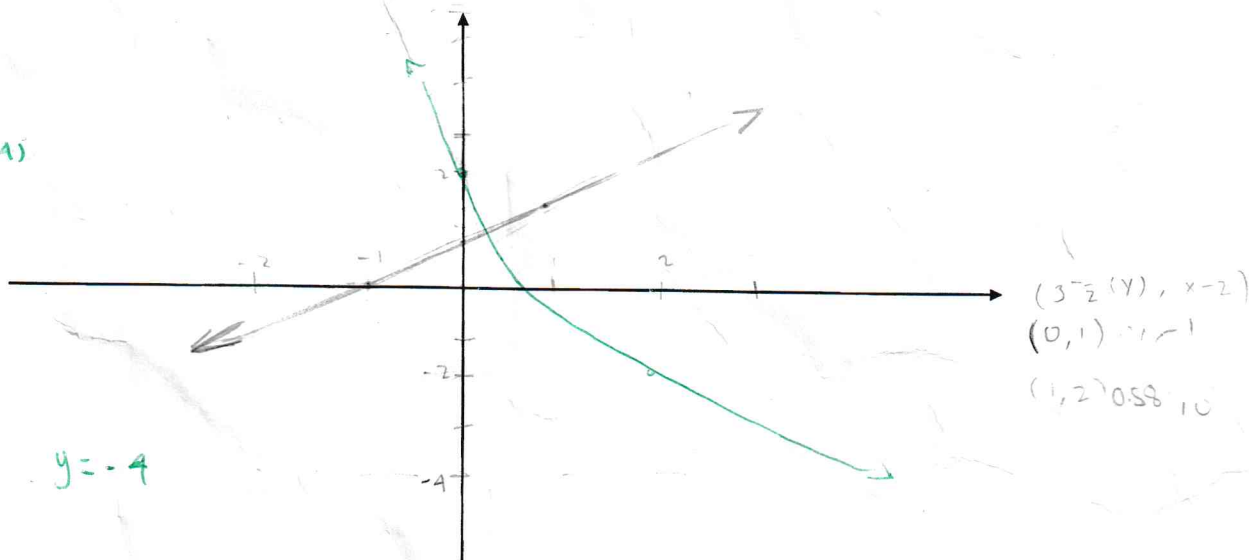


5.5  
18

3. Graph and label the function (c) in question 2. (Identify at least 2 key points and the asymptote on the graph.) (show and use pointwise formula) *I did that the first time*

[4]

$(x, y) \rightarrow (-2x + 2, 2y - 4)$   
 $(0, 1) \rightarrow (2, -2)$   
 $(1, 3) \rightarrow (0, 2)$



$y = -4$

4. A computer loses its value each month after it is purchased. Its value (in \$) as a function of time  $m$  (in months) is modeled by  $V(m) = 1500(0.95)^m$ . *need therefore:*

BRUH

0.5

[1]

- (a) What is the initial value of the computer? Show mathematically.

$V(0) = 1500$

$V(m) = 1500(0.95)^m$  *Per cent*  
 $= 1500(1) = 1500$  *time*  
*initial value*

- (b) What is the rate of depreciation? (Express as a %)

[1]

0

$95\% \quad \frac{95}{100} = 0.95$

*I have no idea what im doing.*



- (c) Determine the value of the computer after 2 years.

[1]

0.5

$V(m) = 1500(0.95)^{24}$

*After 2 year  
value of computer  
would be \$1353.75*

- (d) In which month after it is purchased does the computer's value fall below \$900? (hint: if you are 16 years old (and past your birthday) then you are in your 17th year.) *nope*

[2]

$900 = 1500(0.95)^m$  *146.25  
2 years*

$\frac{9}{15} = 0.95^m$

$h = \log\left(\frac{3}{5}\right)$

$\frac{\log\left(\frac{3}{5}\right)}{\log(0.95)}$  *It would take*

$= 9.96$

*9 years  
12075*

*6 years  
1061.25*

*8 years  
915*

*3 month  
896.72*

*8 years and about 3 month for the  
price to fall below 900 dollars*

*9/1*

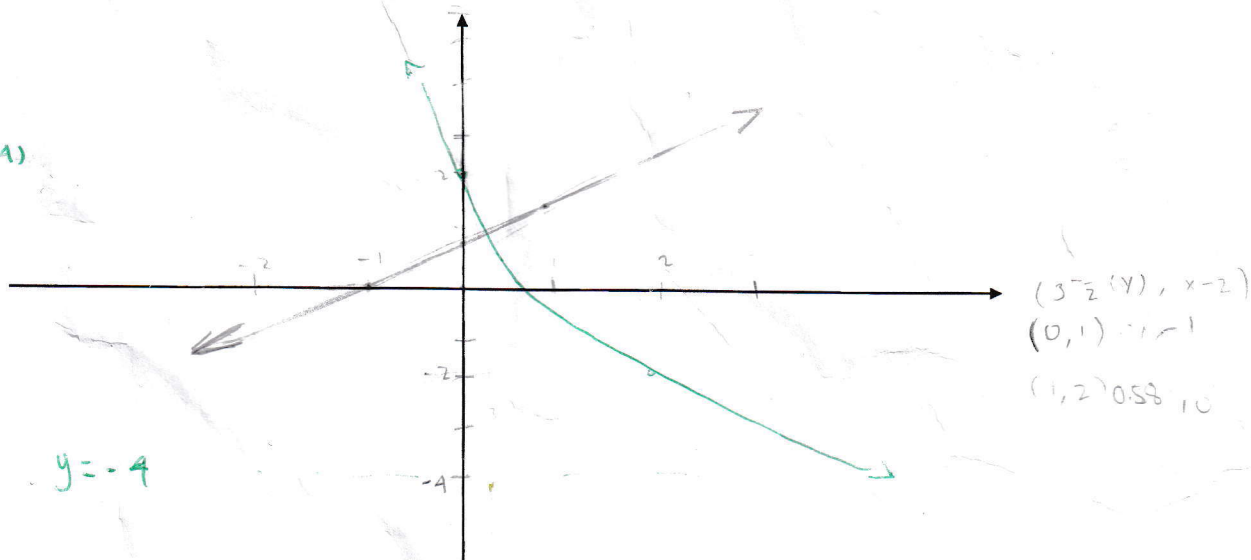
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$$y = -4$$

4. A computer loses its value each month after it is purchased. Its value (in \$) as a function of time  $m$  (in months) is modeled by  $V(m) = 1500(0.95)^m$ . *need therefore.*

(a) What is the initial value of the computer? Show mathematically.

$$V(0) = 1500$$

$$V(m) = 1500(0.95)^m$$

$$= 1500(1) = 1500$$

(b) What is the rate of depreciation? (Express as a %)

$$95\%$$

$$\frac{95}{100} = 0.95$$

*I have no idea what im doing.*

(c) Determine the value of the computer after 2 years.

$$V(m) = 1500(0.95)^{24}$$

*After 2 year value of computer would be \$1353.75*

(d) In which month after it is purchased does the computer's value fall below \$900? (hint: if you are 16 years old (and past your birthday) then you are in your 17th year.)

nope

[2]

$$900 = 1500(0.95)^m$$

$$\frac{9}{15} = 0.95^m$$

$$h = \log\left(\frac{3}{5}\right)$$

*It would take*

$$= 9.96$$

*Answer*  
1275

*6 years*

*106.25*

*8 years*

*915*

*3 month*

*896.72*

*8 years and about 3 month for the price to fall below 900 dollars*

$$\frac{1}{9}$$