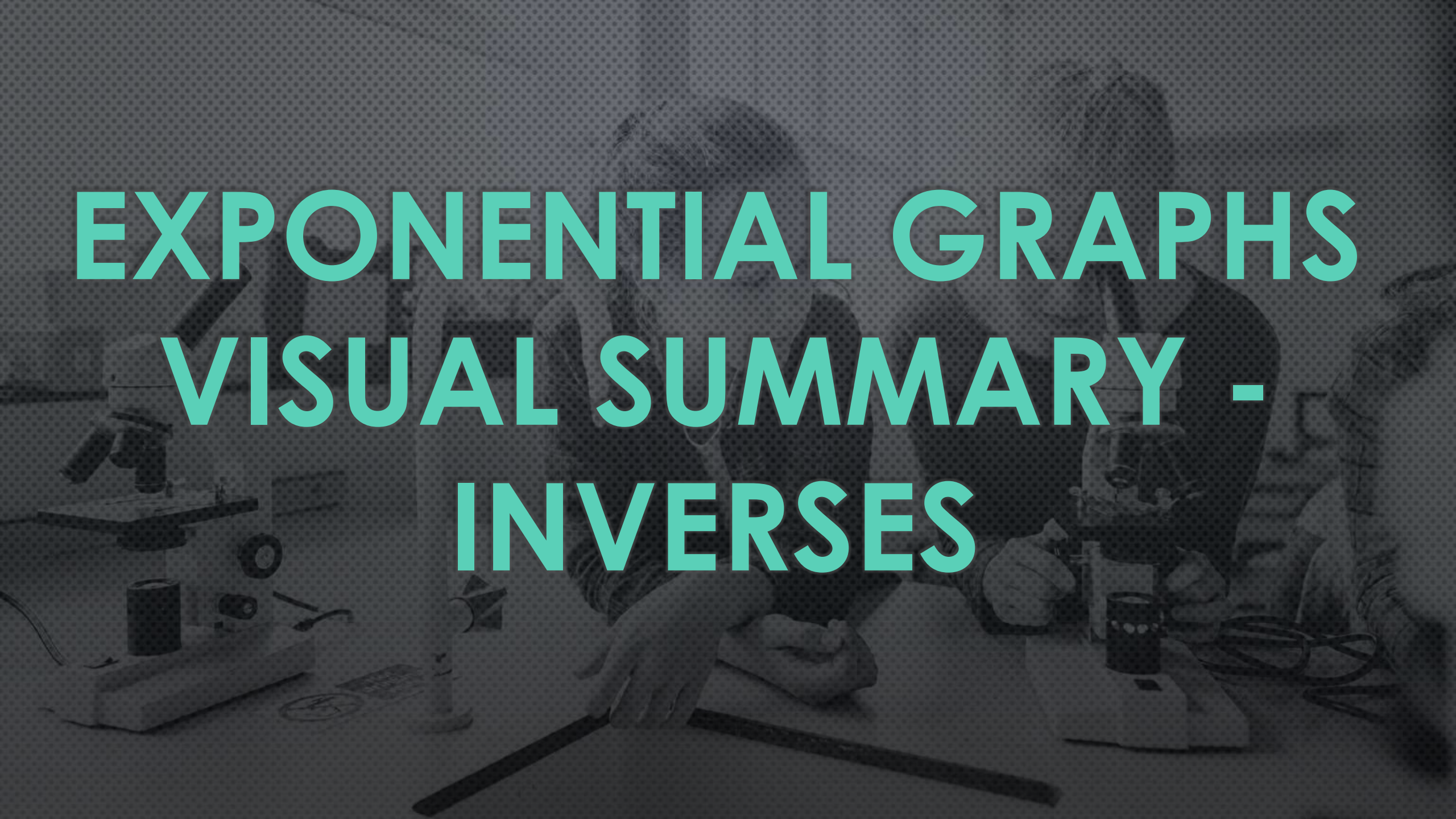
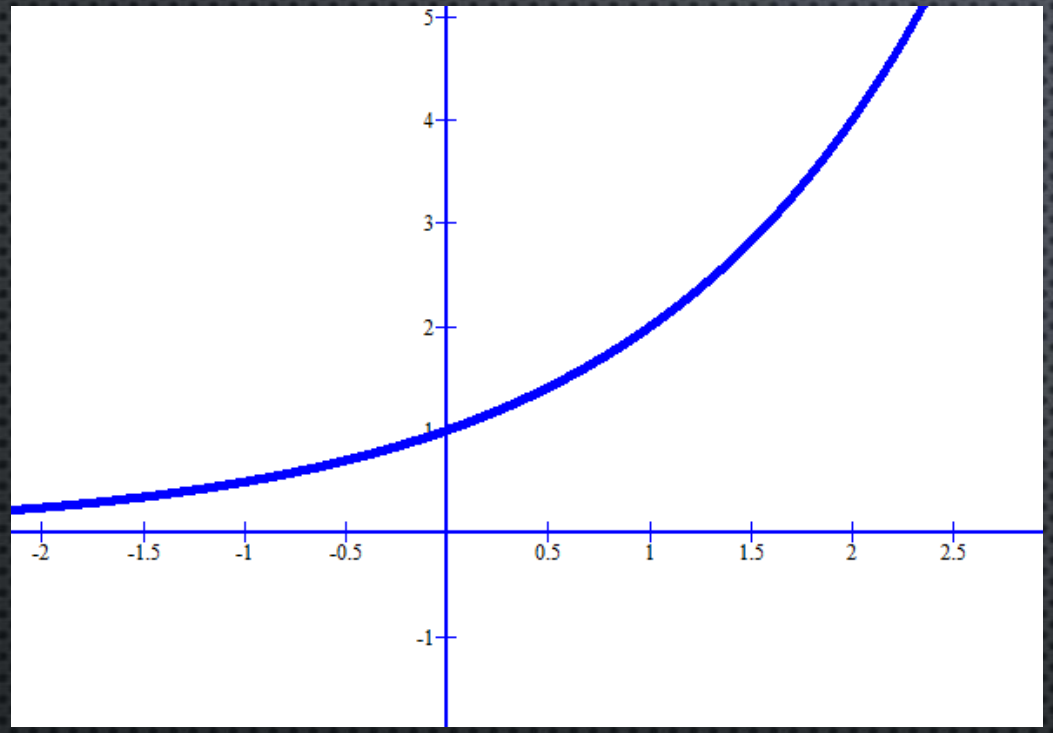
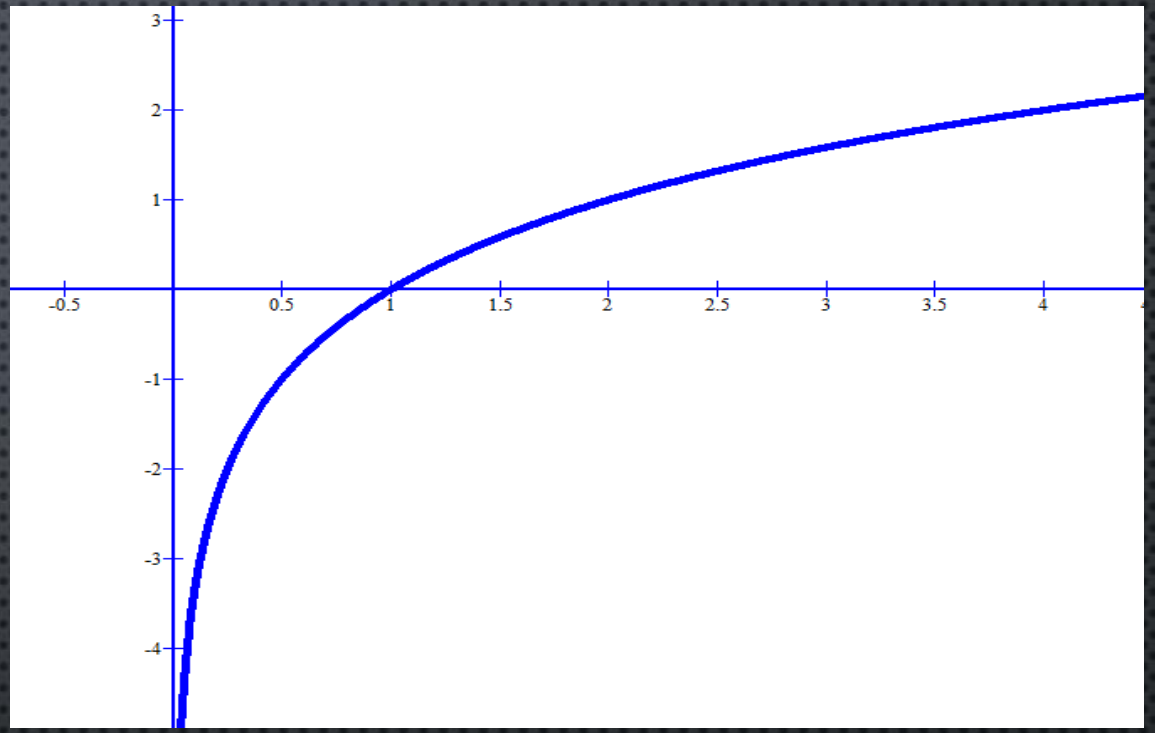


EXPONENTIAL GRAPHS VISUAL SUMMARY - INVERSES

GRAPHS – EXPONENTIAL GRAPHS INVERSES



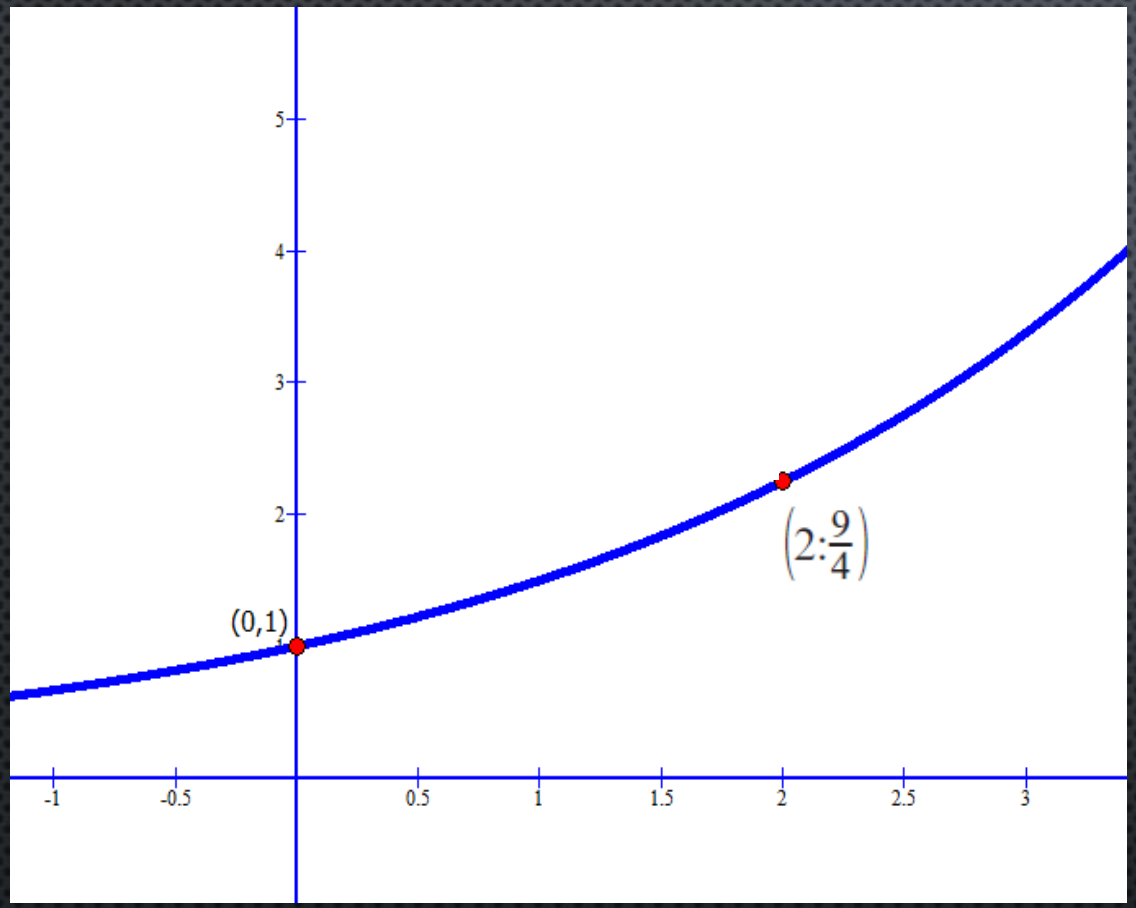


$y = 2^x$
Asymptote: y=0 (x-axis)
Y-Intercept (when x=0): (0 ; 1)
X-Intercept (when y=0): Does not exist
Domain: $x \in \mathbb{R}$
Range: $y > 0$

x becomes y and y becomes x in an inverse function
$x = 2^y$ is the same as $y = \log_2 x$
Asymptote: x=0
(Y-Intercept (when x=0): Does not exist
X-Intercept (when y=0): 1 ; 0)
Domain: $x > 0$ **Range:** $y \in \mathbb{R}$

REMEMBER
x becomes y and y becomes x)

GRAPHS – EXPONENTIAL GRAPHS INVERSES



Example 1 (Mixed Question)

The curve of an exponential function is given by $f(x) = k^x$ and cuts the *y*–axis at A (0; 1) while B $\left(2;\frac{9}{4}\right)$ lies on the curve.

Determine

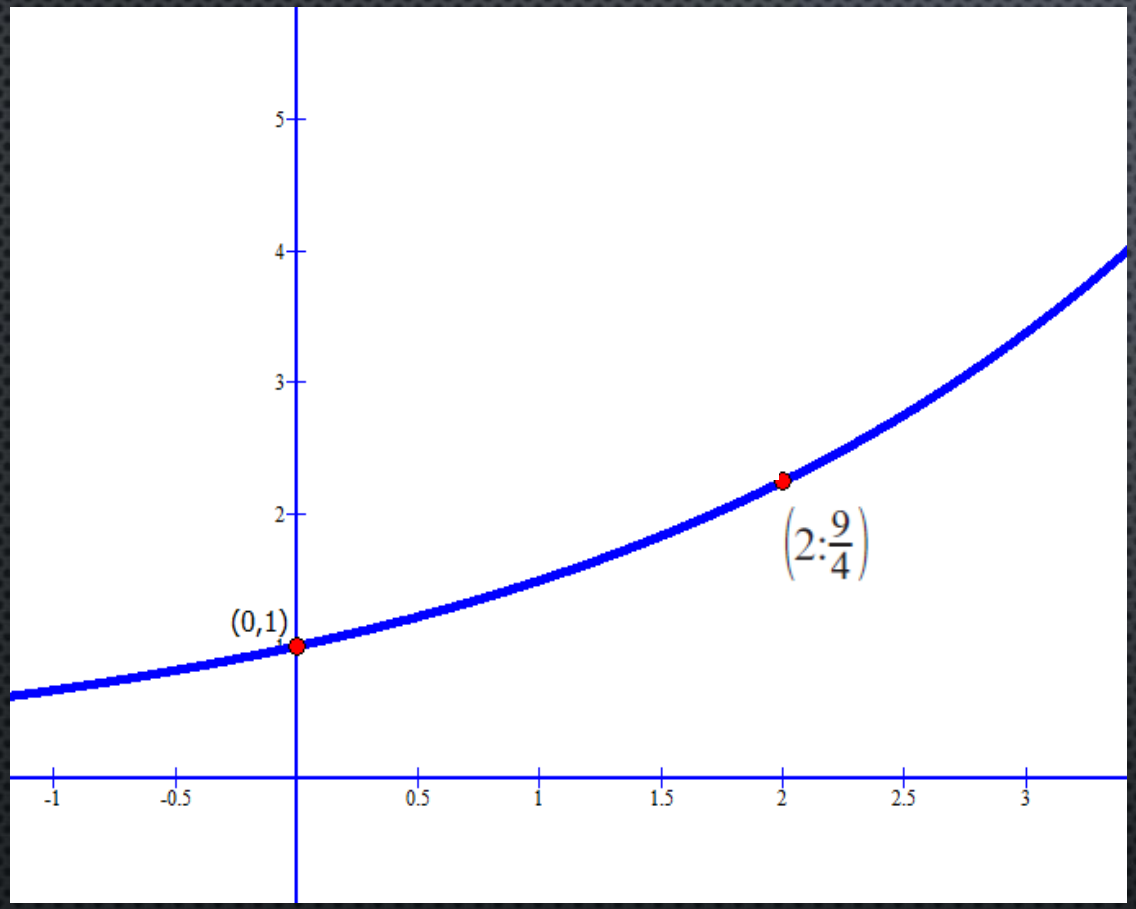
1.1 the equation of the function *f*.

1.2 the equation of the asymptote of *h* if $h(x) = -f(x)$.

1.3 the range of *h*.

1.4 The equation of the function *g* of which the curve is the reflection of the curve of *f* in the line $y = x$.

GRAPHS – EXPONENTIAL GRAPHS INVERSES



Answers to Example 1 (Mixed Question)

The curve of an exponential function is given by $f(x) = k^x$ and cuts the y–axis at A (0; 1) while B $\left(2;\frac{9}{4}\right)$ lies on the curve.

ANSWERS

1.1 the equation of the function *f*.

$y = k^x$

SUBSTITUTE $\left(2;\frac{9}{4}\right)$ into the equation to get k.

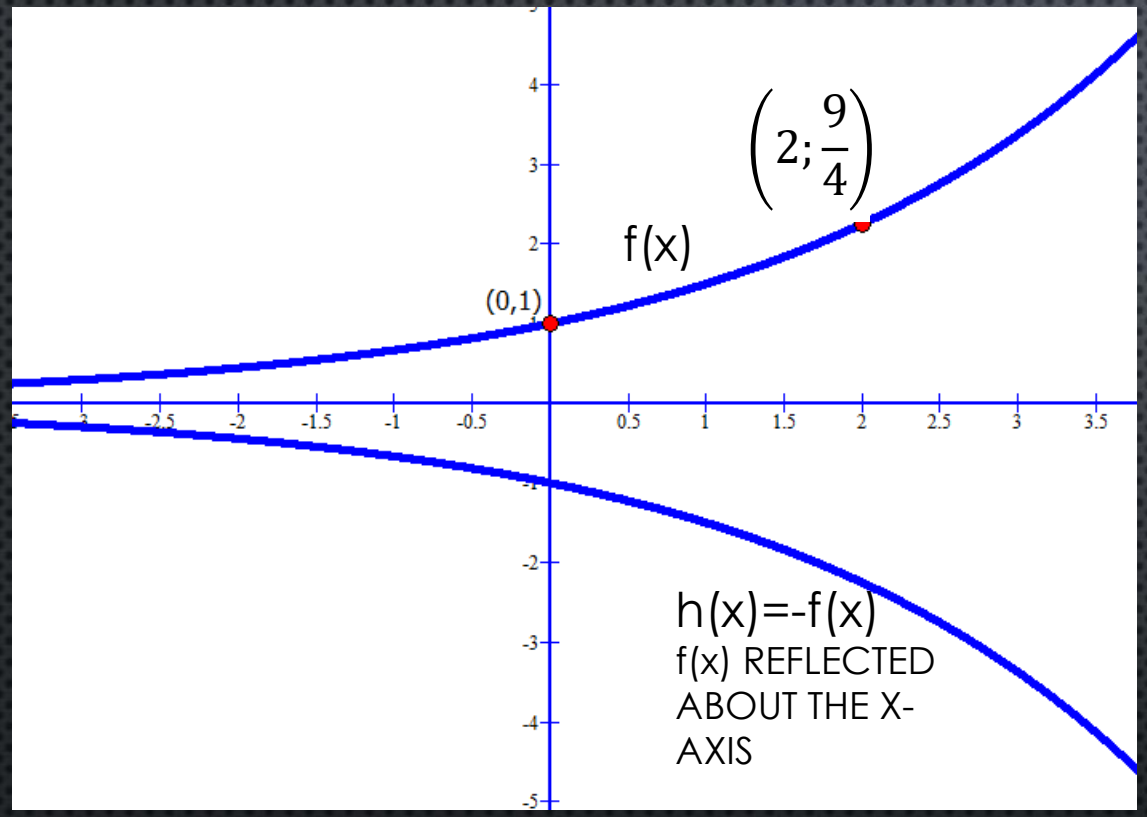
$\frac{9}{4} = k^2$

$\sqrt{\frac{9}{4}} = k$

$\frac{3}{2} = \mathrm{k}$

$\therefore f(x) = \frac{3}{2}^x$

GRAPHS – EXPONENTIAL GRAPHS INVERSES



Answers to Example 1 (Mixed Question)

The curve of an exponential function is given by $f(x) = k^x$ and cuts the y–axis at A (0; 1) while B $\left(2;\frac{9}{4}\right)$ lies on the curve.

ANSWERS

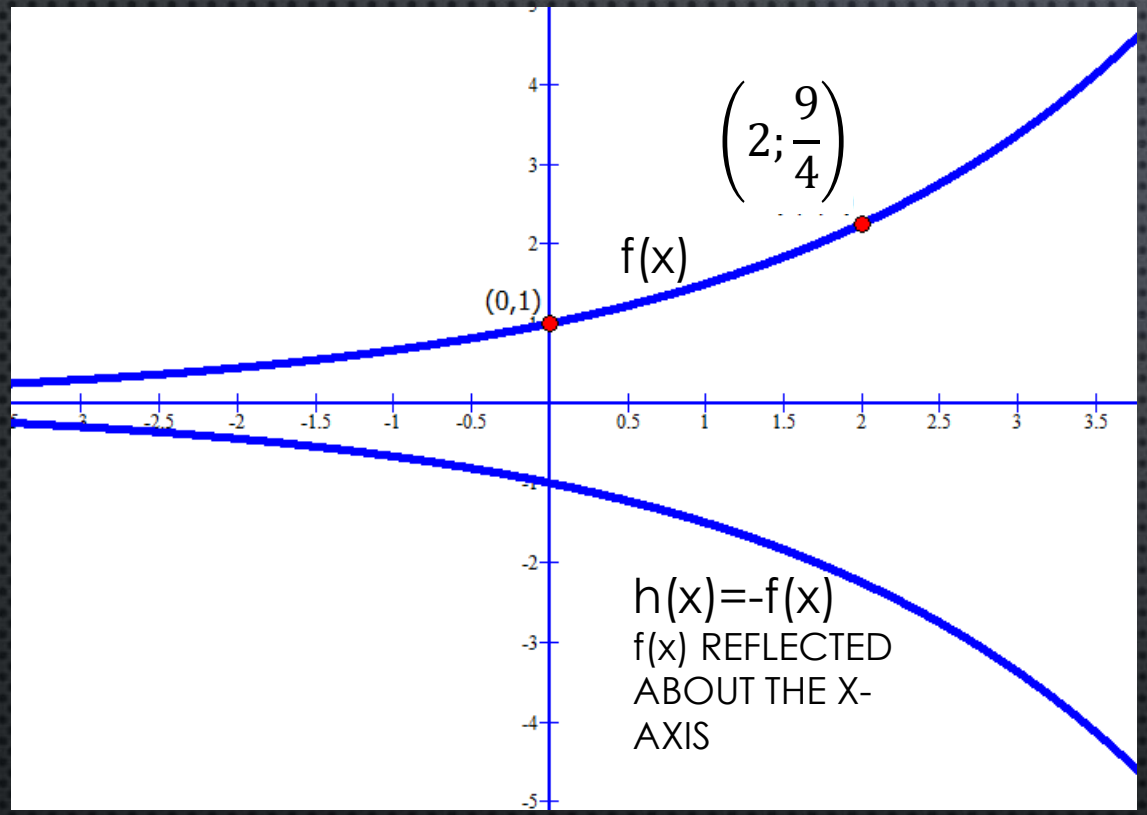
1.2 the equation of the asymptote of *h* if $h(x) = -f(x)$.

$$f(x) = \frac{3}{2}^x$$

$$h(x) = -(\frac{3}{2}^x)$$

ASSYMPTOTE IS THE X-AXIS y=0

GRAPHS – EXPONENTIAL GRAPHS INVERSES



Answers to Example 1 (Mixed Question)

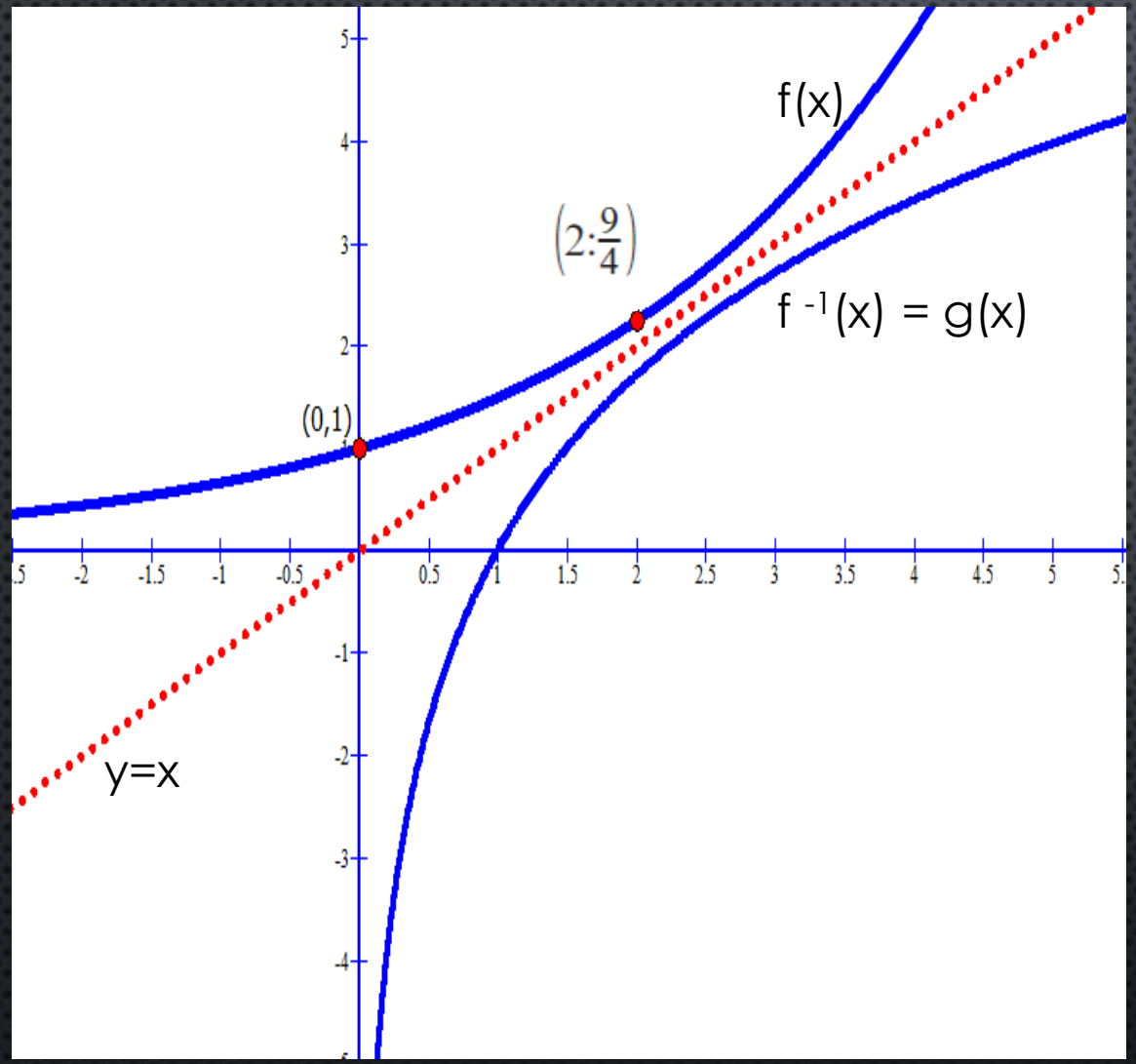
The curve of an exponential function is given by $f(x) = k^x$ and cuts the y–axis at A (0; 1) while B $\left(2;\frac{9}{4}\right)$ lies on the curve.

ANSWERS

1.3 the range of *h*.

ASYMPTOTE IS y=0
ALL VALUES BELOW THAT LINE (y=0) IS THE RANGE
Therefore y< 0

GRAPHS – EXPONENTIAL GRAPHS INVERSES



Answers to Example 1 (Mixed Question)

The curve of an exponential function is given by $f(x) = k^x$ and cuts the *y*–axis at A (0; 1) while B $\left(2;\frac{9}{4}\right)$ lies on the curve.

ANSWERS

1.4 The equation of the function *g* of which the curve is the reflection of the curve of *f* in the line *y* = x.

REFLECTION OF THE CURVE IN THE LINE y=x IS THE INVERSE OF THE FUNCTION

$f(x) = \frac{3}{2}^x$

$g(x) = f^{-1}(x)$

THE INVERSE OF A FUNCTION IS WHERE x BECOMES y AND y BECOMES x.

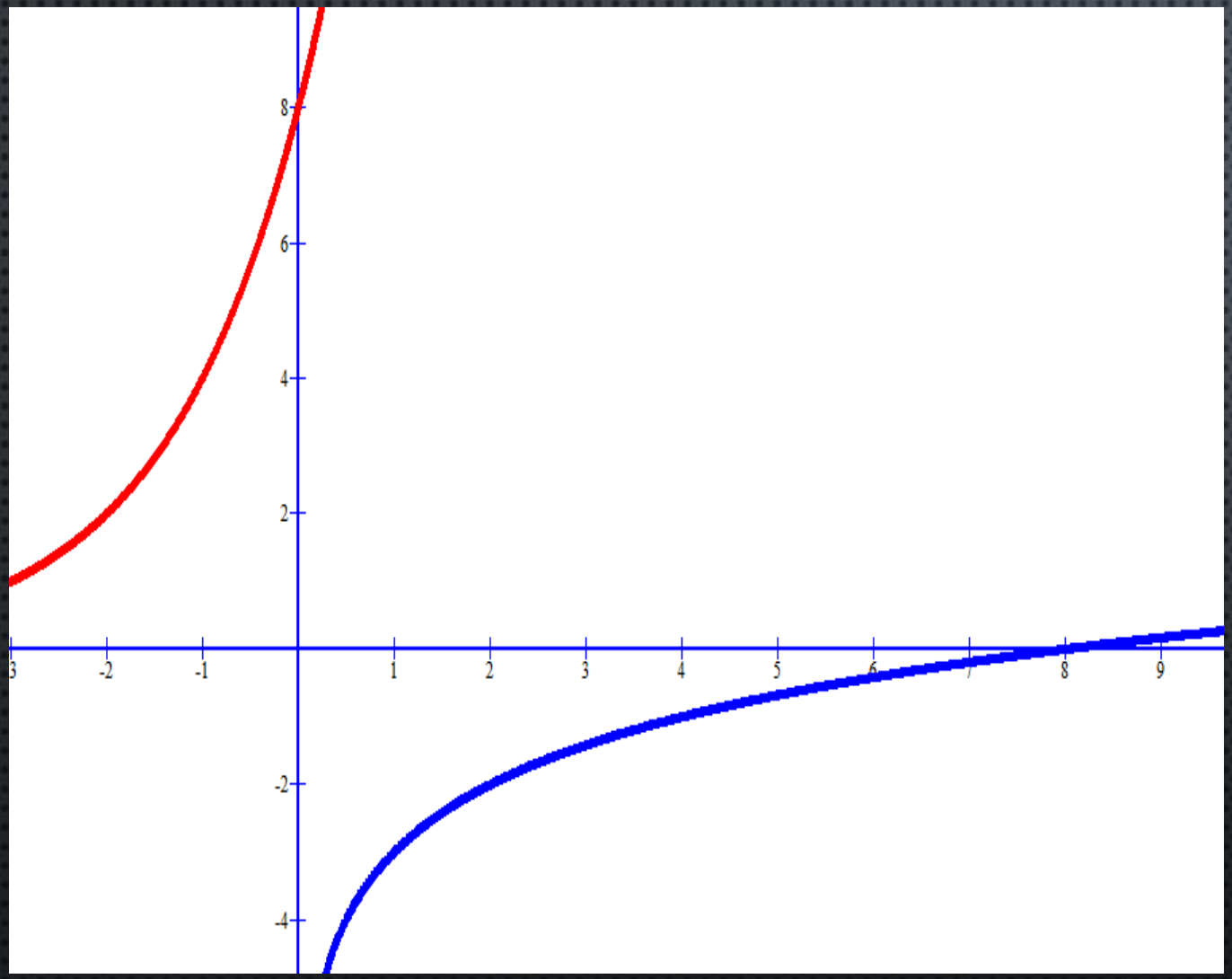
$y = \frac{3}{2}^x$

$x = \frac{3}{2}^y$

$y = \log_{\frac{3}{2}} x$

$\therefore g(x) = \log_{\frac{3}{2}} x$

GRAPHS – EXPONENTIAL GRAPHS INVERSES



$f(x) = 2^{x+3}$

DETERMINE THE INVERSE

$y = 2^{x+3}$

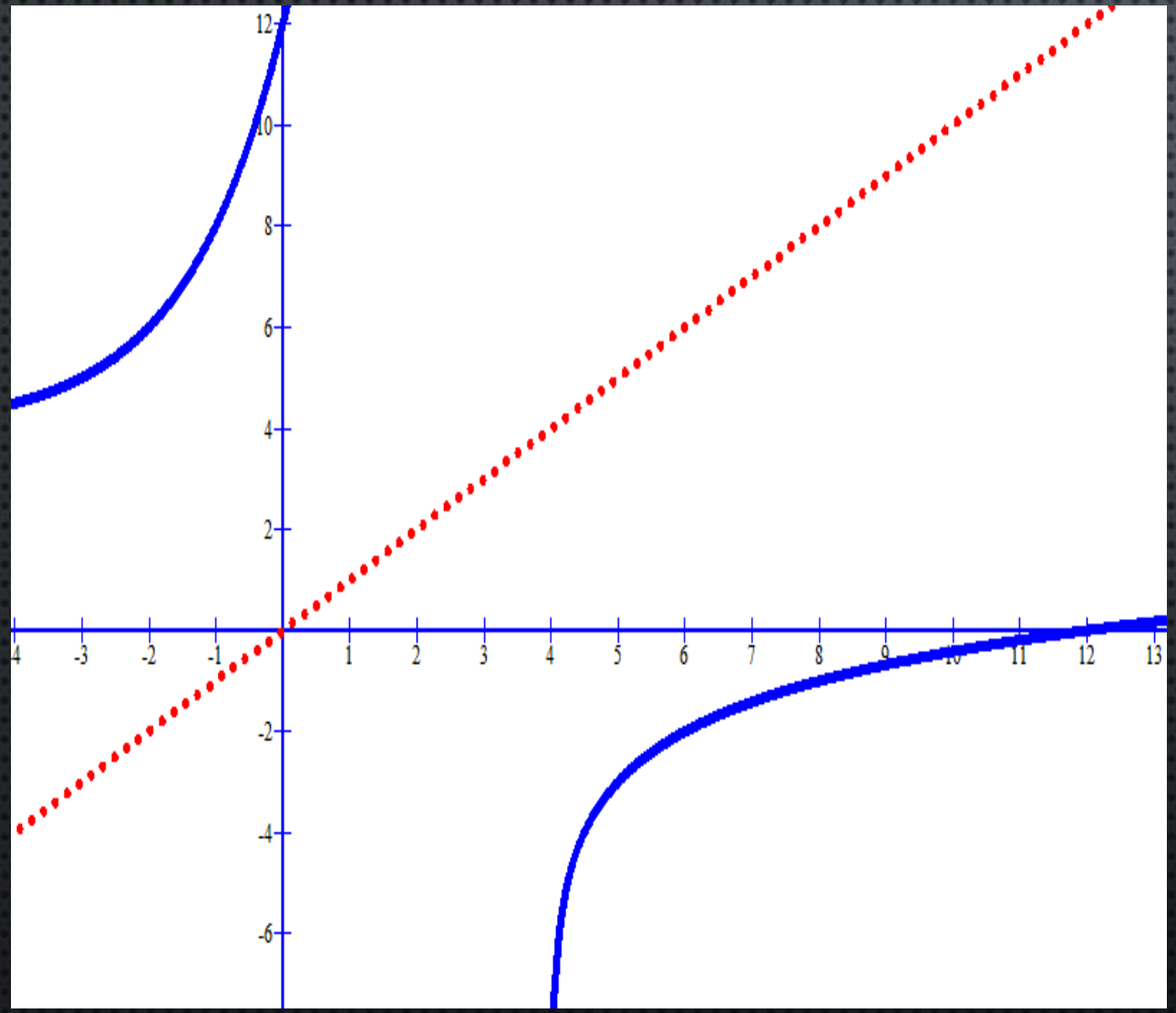
x becomes y and y becomes x

$x = 2^{y+3}$

$y + 3 = \log_2 x$

$y = \log_2 x - 3$

GRAPHS – EXPONENTIAL GRAPHS



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

DETERMINE THE INVERSE

$y = 2^{x+3} + 4$

x becomes y and y becomes x

$x = 2^{y+3} + 4$

$x - 4 = 2^{y+3}$

$y + 3 = \log_2(x - 4)$

$y = \log_2(x - 4) - 3$