

## Quiz 1 - 2/08/2022

(I) Sketch a graph of the function

$$f(x) = \begin{cases} 3 - x, & \text{if } x < 0 \\ 2^x, & \text{if } 0 \leq x \leq 2 \\ x^2, & \text{if } x > 2 \end{cases}$$

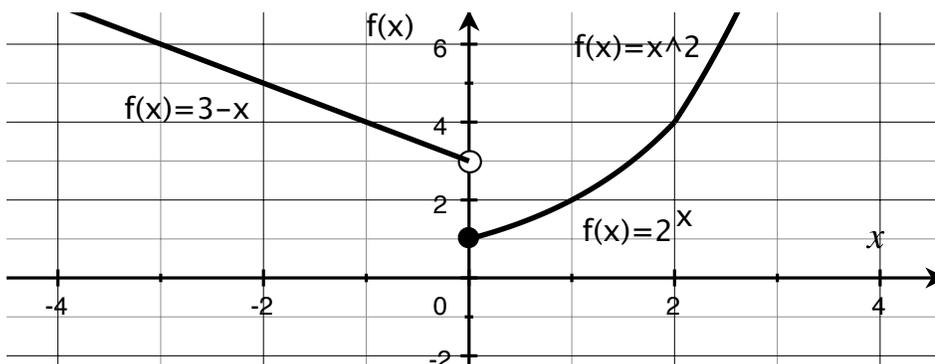
Graph must be neat, approximately to scale, include detailed labels, and indicate open/closed intervals wherever needed.

(II) Use the laws of exponents to simplify and rewrite the expression:

$$\frac{\sqrt{x^3} \sqrt{y}}{\sqrt[3]{x y}}$$

**Solution**

(I) The graph is shown below



(II) Rewrite square-roots and other roots to get

$$\frac{\sqrt{x^3} \sqrt{y}}{\sqrt[3]{x y}} = \frac{(x^3 y^{1/2})^{1/2}}{(x y)^{1/3}} = \frac{x^{3/2} y^{1/4}}{x^{1/3} y^{1/3}} = x^{7/6} y^{-1/12}$$

$$\text{Answer: } \frac{\sqrt{x^3} \sqrt{y}}{\sqrt[3]{x y}} = \frac{x^{7/6}}{y^{1/12}} \quad \text{OR} \quad \frac{\sqrt[6]{x^7}}{\sqrt[12]{y}}$$

**Grading:** Total points possible = 6.

0.5 pt - Any reasonable attempt.

3.5 pt for (I): 1.5pt = correct shape and location of 3 pieces.

1pt = complete & clear labels on axes.

1pt = correct open/closed circles at  $x = 0$ .

2 pt for (II): 1pt = translate radicals to exponents correctly.

1pt = correctly simplify result.