BECA / Huson / 11.1 IB Math SL Name: Solutions
29 November 2018

Homework: Exponents and radicals

Do these problems without a calculator. Answer the first page on loose leaf paper.

Simplify, leaving no negative or fractional exponents.

1. $4^{-1}x^{-2} \times \dfrac{8}{9}x^4y^{-3} = \dfrac{2x^2}{9y^3}$

2. $\dfrac{x\sqrt{25x^4}}{\sqrt[3]{7x^{-6}}} = \dfrac{5x^5}{\sqrt[3]{7}}$

3. $x^3y^{-3} \div x^{-4}y^2 = \dfrac{x^7}{y^5}$

4. $(-a^2)^2 = a^4$

5. $\dfrac{6}{5}(x^{-2}y)^2 \times \dfrac{1}{3}(x^4y^{-1}) = \dfrac{2}{5}y$

6. $125^{\frac{4}{3}} = 625$

7. $(1.21)^{\frac{1}{2}} = 1.1$

8. $36^{\frac{1}{4}} = \sqrt{6}$

9. $\sqrt[3]{\dfrac{x^6y^{-12}}{z^{-3}}} = \dfrac{x^2z}{y^4}$

10. Let $f(x) = x^2 - 4$.
    (a) Rewrite this function in vertex form and state the vertex as an ordered pair.
    $f(x) = (x-0)^2 - 4$. Vertex: $(0, -4)$
    (b) $g(x) = f(x+5) + 2$. Write $g(x)$ in vertex form.
    $g(x) = (x+5)^2 - 2$.
    (c) State the geometric transformation that maps f into g.
    Translate left five units and up two units.
    (d) Find $f^{-1}(x)$
    $f^{-1}(x) = \sqrt{x+4}$

11. Let $f(x) = (x-2)^2 - 3x$ and $g(x) = 3x - 2$. Find $(f \circ g)(x)$
    $f(g(x)) = ((3x-2)-2)^2 - 3(3x-2) = 9x^2 - 33x + 22$

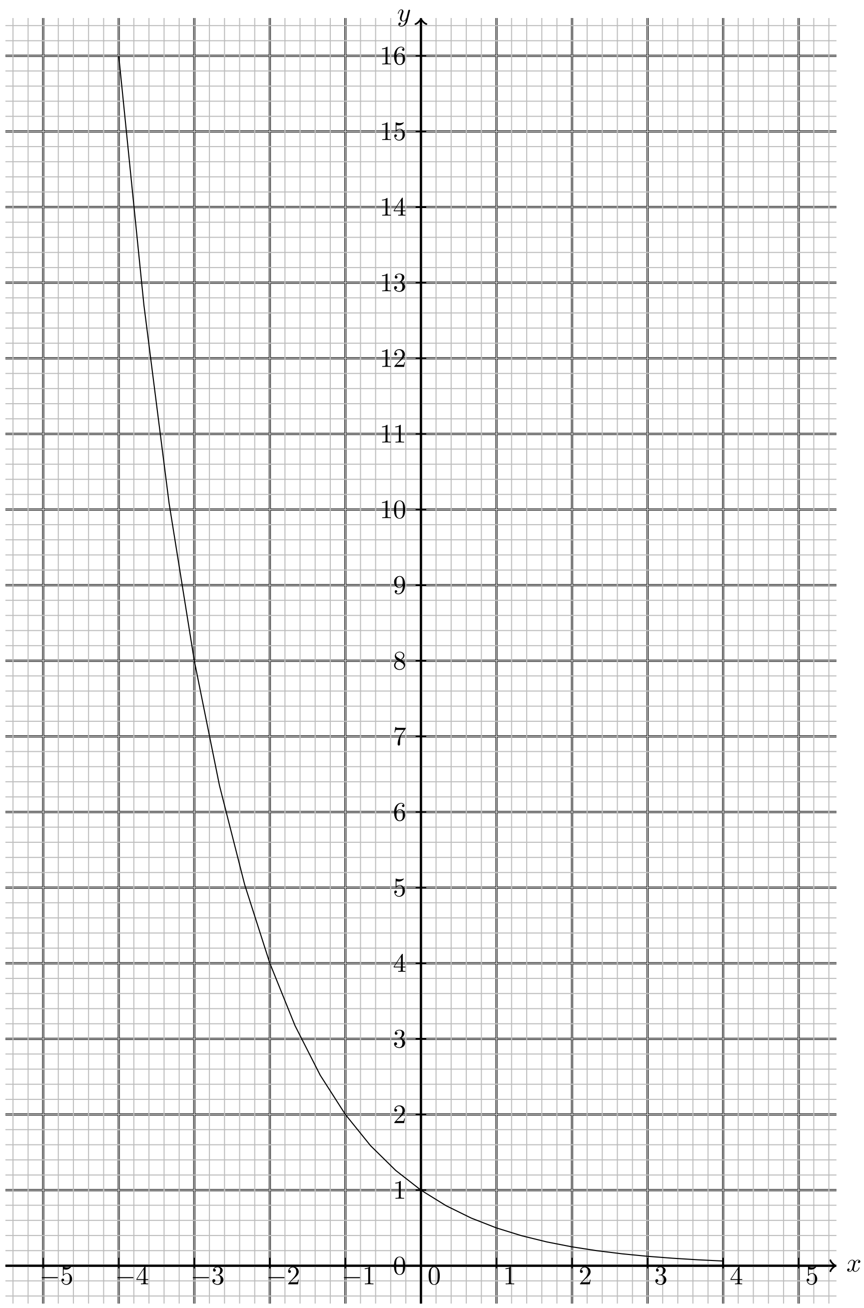
12. Let $f(x) = (\frac{1}{2})^x$, for $-4 \leq x \leq 4$.

(a) On the grid below, graph f.

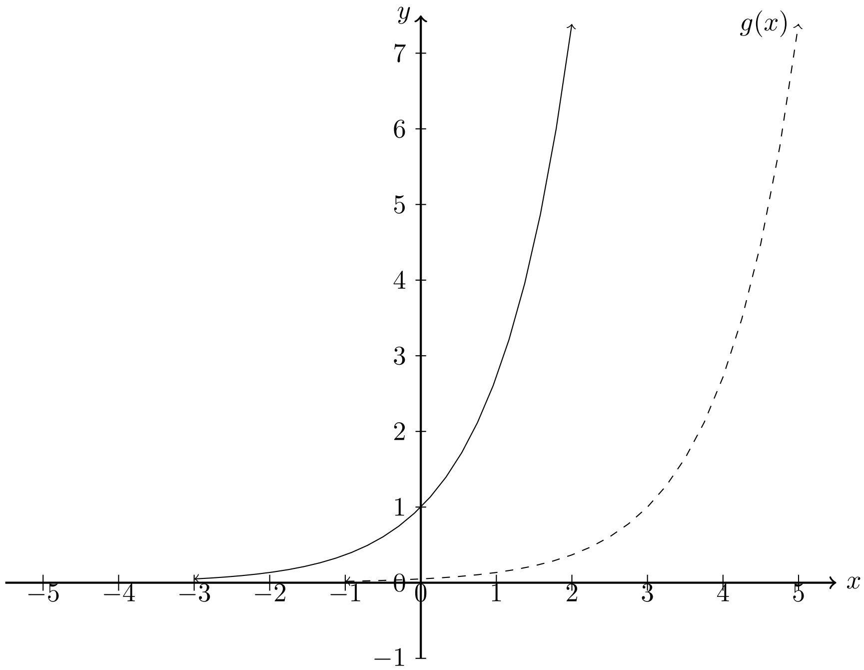
(b) Write down the value of $f(0)$.
$f(0) = 1$

(c) Using the graph, solve for $f(x) = \frac{1}{4}$.
$f(2) = \frac{1}{4}$, therefore $x = 2$

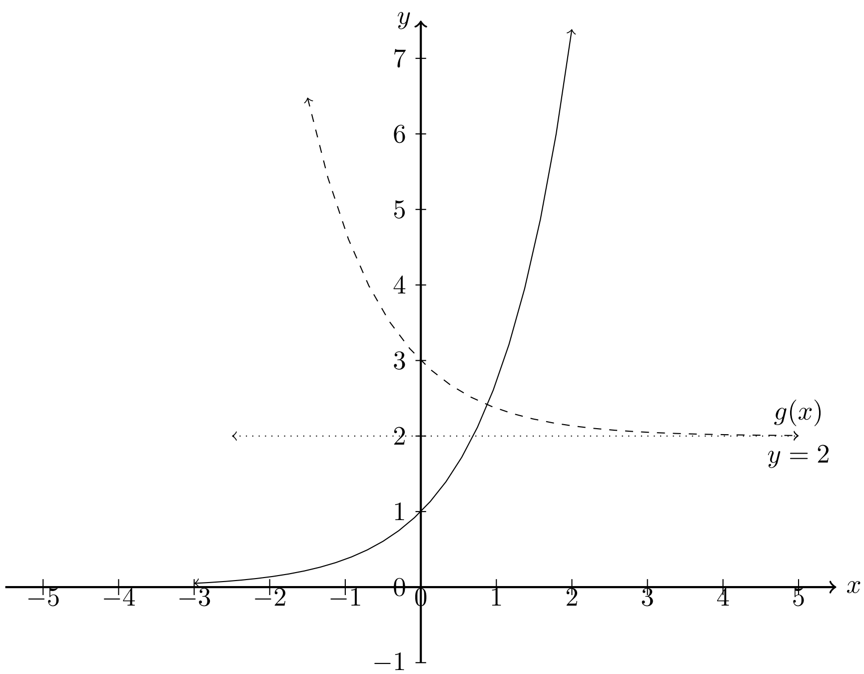
(d) What is the value of $f^{-1}(8)$?
$f^{-1}(8) = -3$



13. The function $f(x) = e^x$ is shown on the graph. Sketch $g(x) = f(x - 3)$.



14. The function $f(x) = e^x$ is shown on the graph. Sketch $g(x) = f(-x) + 2$. Plot and label the asymptote.



15. Graph the function $f(x) = x^2 - 4$ over the domain $x \geq 0$ on the grid below.

   (a) Label the y-intercept as an ordered pair.

   (b) Label the point representing the solution to the equation $f(x) = 0$ as an ordered pair.

   (c) Write down the value of $f^{-1}(-3)$ and label the point $(f^{-1}(-3), -3)$.

   $f^{-1}(-3) = 1$

   (d) Graph the inverse function, $f^{-1}(x)$.