BECA / Huson / 11.1 IB Math SL Name:
9 November 2017

Quiz: Exponents and radicals

Do these problems without a calculator. Answer in the space provided.

Simplify, leaving no negative or fractional exponents.

1. $3x^{-2}y \times 2x^3y^{-1}$

2. $\sqrt{a^4b}$

3. $x^{\frac{1}{2}} \times (\frac{y}{z^3})^2$

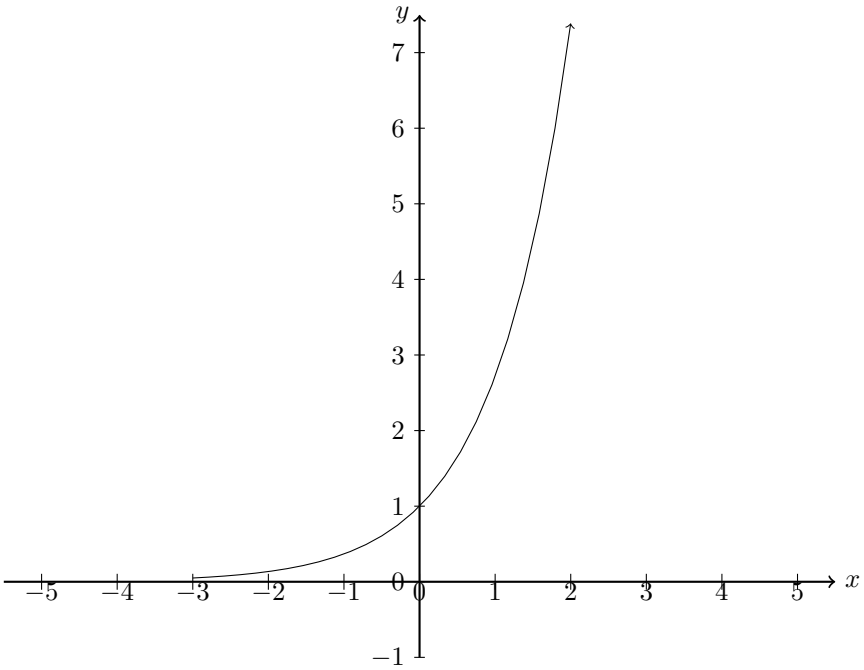
4. $(a^6b^2)^{\frac{1}{3}} \div a^{-1}b$

5. Let $f(x) = \sqrt{x} - 16$ and $g(x) = (x-4)^4$

   (a) Find $(f \circ g)(x)$

   (b) Find $f^{-1}(x)$

6. The function $f(x) = e^x$ is shown on the graph. Sketch $g(x) = -f(x-4) + 3$. Plot and label the asymptotes.



7. $(\frac{1}{x^{-2}} - 4)^2 \times \frac{1}{5}x^{-4}y^3$
8. $\frac{x^2\sqrt{12x^6}}{xy\sqrt[5]{32x^{-5}}}$
9. $a^3b^{-3} \div a^{-4}b^{\frac{1}{2}}$
10. $\frac{6}{5}(x^{-2}y)^2 \times \frac{1}{3}(x^4y^{-1})$
11. $25^{\frac{3}{2}}$
12. $\sqrt[3]{\frac{16a^9b^{-3}}{z^{-4}}}$
13. $\sqrt{20}$
14. $\sqrt{12x^4}$
15. $4\sqrt{x} - 3\sqrt{x}$
16. $\frac{1}{2}\sqrt{ab^2} + \frac{3}{2}b\sqrt{a}$
17. $x^2\sqrt{xy^3} + 3y\sqrt{xy}$
18. $(x^2 + x - 5)(x - 1)$
19. $(2x^2 - 4x + 1)(3x - 1)$
20. Let $f(x) = (4x + 8)^2 - 3x$ and $g(x) = \frac{1}{2}x - 2$. Find $(f \circ g)(x)$

Express each item as fractions with rational denominators.

21. $\frac{1}{\sqrt{2}}$
22. $\frac{1 - x}{\sqrt{x}}$
23. $\frac{7}{3 + \sqrt{5}}$
24. $\frac{x^2 - 3}{x - \sqrt{3}}$

25. Let $f(x) = x^2 - 5x + 4$ and $g(x) = x - 1$

(a) Rewrite f in vertex form and state the vertex as an ordered pair.

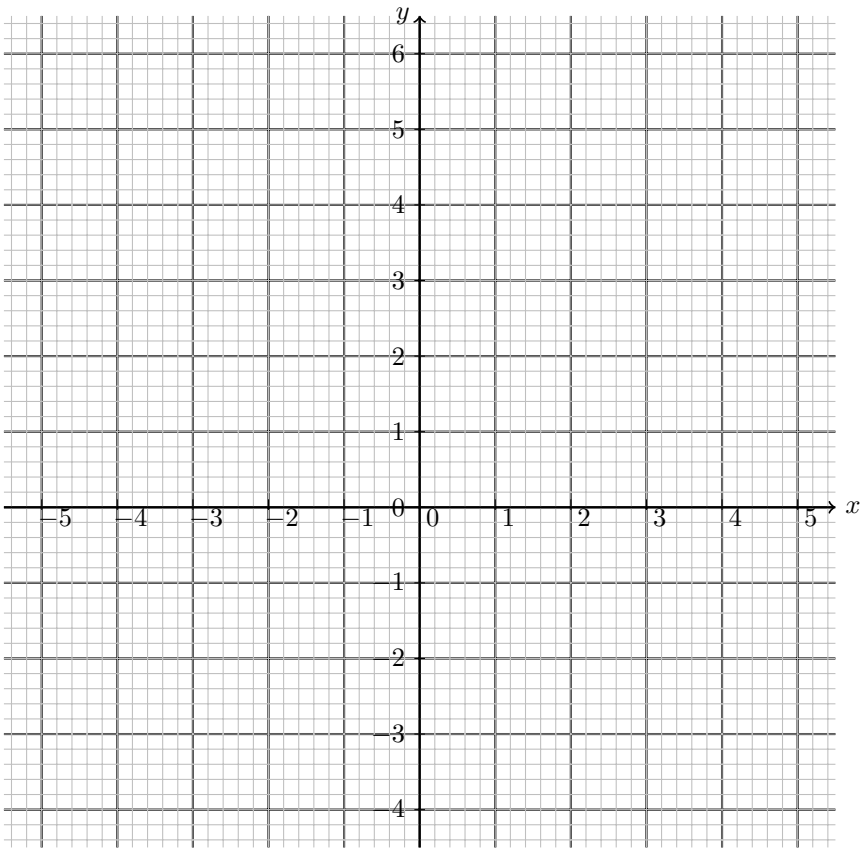
(b) Factor the function f and write down its roots.

(c) Graph the function f, labeling it. Mark the intercepts and graph the axis of symmetry as a dotted line, labeling it with its equation.

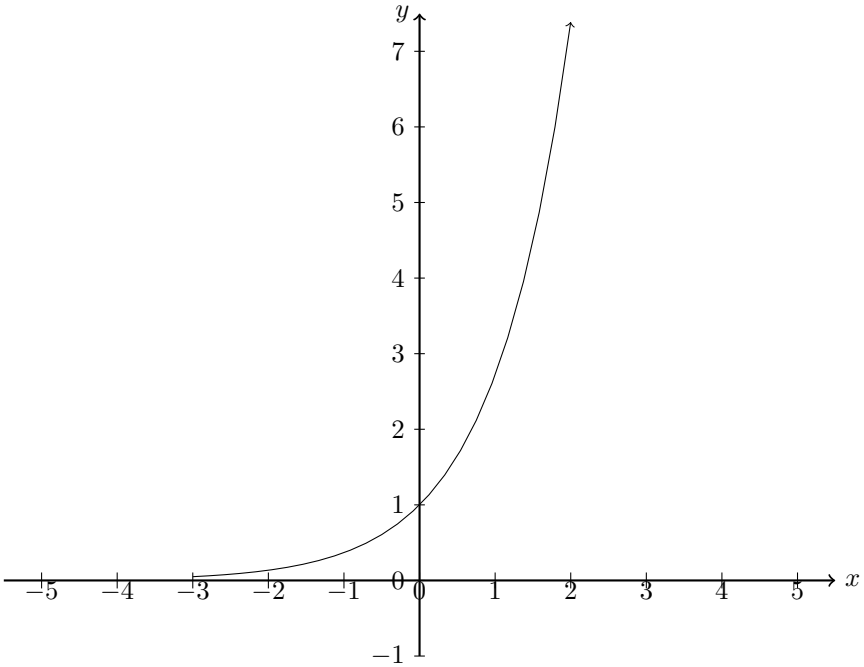
(d) Graph g and label it with its name or equation.

(e) Mark the intersections of f and g as ordered pairs.

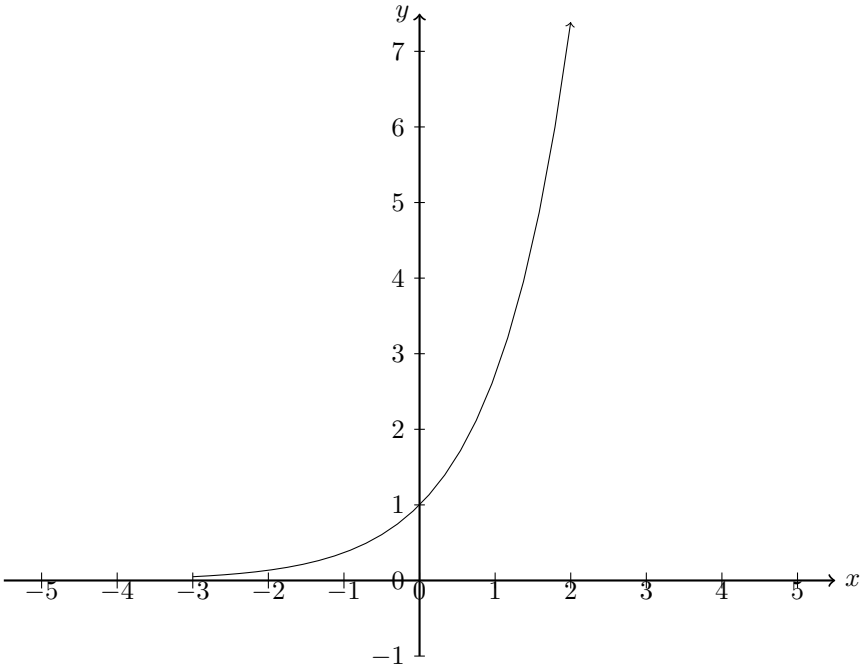
(f) Select one of the solutions and show that it satisfies the system by substituting it into both functions.



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



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



28. 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 $(f^{-1}(-3), -3)$.

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