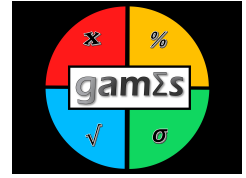


GAMES Practice Problems – GAMES Practice Problems – Fractal Powers, Systems of Equations and Introductory Functions



1. Solve for x

- (a) $\sqrt{x} = 9$
- (b) $\sqrt{x}\sqrt{16} = 2$
- (c) $\sqrt{x+2} = 4$
- (d) $\sqrt{4}\sqrt{6} = x^{1/2}$

2. Simplify the following expressions.

- (a) $(16x^{4a}y^{8b}z^{16c})^{1/4}$
- (b) $\frac{(x+1)^{3/2}}{(x+1)^{4/5}}$
- (c) $\frac{8\sqrt[3]{x^2}\sqrt[4]{y}\sqrt{1/z}}{-2\sqrt[3]{x}\sqrt{y^5}\sqrt{z}}$
- (d) $\left(\left(\left(\left(a^{1/2}\right)^{2/3}\right)^{3/4}\right)^{4/5}\right)$
- (e) $y^{1/2}y^{2/3}y^{3/4}y^{4/5}$
- (f) $\frac{((3a)^{-1})^{-2}(2a^{-2})^{-1}}{a^{-3}}$

3. Solve the following system of equations

(a)

$$\begin{aligned}2x + 4y &= 7 \\13x - 11y &= -10\end{aligned}$$

(b)

$$\begin{aligned}4.25x + 3.75y &= -9 \\2x + y &= -5\end{aligned}$$

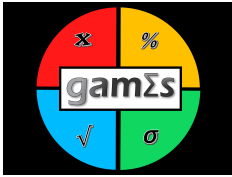
(c)

$$\begin{aligned}\frac{3}{x} + \frac{4}{y} &= 3 \\ \frac{6}{x} - \frac{4}{y} &= 0\end{aligned}$$

(d)

$$\begin{aligned}\frac{3}{x} - \frac{3}{y} &= 2 \\ \frac{1}{2x} + \frac{6}{y} &= -7\end{aligned}$$

4. The current machine in a factory costs \$250 an hour to operate. Purchasing a new machine would cost \$200,000 but would only cost \$100 an hour to operate. How long would you have to use the new machine to make the cost worthwhile?
5. A firm uses inputs Q to process output. Process A uses $32Q^{3/2}$ to produce units of output. Process B produces $4Q^3$ units of output. For which quantity, Q , do both processes produce the same amount of Y ?
6. You are considering which smart phone plan to purchase. Each month, Ropers' plan costs \$99 per month for unlimited data. Ball charges a flat fee of \$85 plus \$0.50 for each 100 megabytes of data. What quantity of data would have the same cost under each plan?
7. A firm purchased imported goods from two countries. The pre-tax cost of goods from country A was \$1500 more than in country B. The tax on imports from country A is 7 percent, and the tax on imports from country B is 3.5 percent. The total import tax paid was \$551.25. How much did the imported goods cost before taxes?
8. As a supervisor at a clothing retailer, you observe that worker A can complete a task in 14 minutes. When worker A and worker B work on the task together, it takes 6 minutes to complete. How much time would it take for worker B to complete the task herself?
9. A firm owns two facilities that produce vaccines. Facility A can produce 30 vaccines per hour. Facility B can produce 20 vaccines per hour. The firms use their two facilities for a total of forty-five hours resulting in output of 1100 vaccines. For how long was each factory used?
10. The sum of two consecutive whole numbers squared is equal to 25. Use two equations to find the value of the two numbers.
11. Find two numbers whose sum is 66 and whose difference is 24.
12. Two managers share an expense account with \$600,000 in it. The first manager spends \$1500 a day. The second manager spends \$1000 a day. How long before the funds are exhausted?
13. A professional basketball is a sphere with a radius of approximately 12 centimetres. The equation for the surface area of a sphere is $4\pi r^2$.
 - (a) What is the surface area of a professional basketball?
 - (b) The marketing team wants to make tiny novelty basketballs that are $1/3$ the size of pro basketballs. What is the surface area of these balls?
14. A French restaurant has a fixed-price menu. The cost of two meals and four drinks is \$168 while the cost of 20 meals and 17 drinks is \$1289. What is the cost of each drink and meal at the restaurant?
15. Orange, a technology firm, plans to build 50% fewer headphones than earbuds. The revenue from a headphone is \$40 and the revenue from an earbud is \$120. The firm expects revenue of \$840,000.
16. A couple have \$100,000 to save for a new home. They invest their money into two savings accounts: the first earns 1.11% interest, and the second earns 2.3% interest. They earned \$1460 total in interest. How much did the couple invest in each account?



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