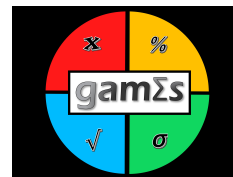


GAMES Practice Problems – Exponents, Factors, and Fractions



1. Are the following equalities true or false? If false, explain why it is false and correct expression.

- (a) $\frac{x+y}{a+b} = \frac{x+y}{a} + \frac{x+y}{b}$
- (b) The following cannot be simplified further: $\frac{-x}{-x-y}$
- (c) $x^2 = 36$ implies $x = 6$
- (d) $\sqrt{x^2 + y^2} = x + y$
- (e) $2x^{-1} = \frac{1}{2x}$
- (f) $\sqrt{x^2 - y^2} = \sqrt{(x - y)(x + y)}$
- (g) $x - (5 - a) = x - 5 - a$
- (h) $-4^2 = 16$
- (i) $x^2 + 4 = (x + 2)^2$
- (j) $\sqrt{45} = 3\sqrt{5}$
- (k) $u = 8 + x^{1/2}$ implies that $u^2 = 64 + x$

2. Expand and simplify the following as much as possible:

- (a) $3^3 3^5$
- (b) $4^{-3} 4^{-8} 4^{22}$
- (c) $(3x^3)^2$
- (d) $(-2x^3 y)^3$
- (e) $\frac{r^{21} r^3}{r^5 r^1}$
- (f) $\frac{q^\gamma (hq)^\alpha}{q^{2\gamma+3\alpha} h^\gamma}$
- (g) $\frac{(x+1)^3 (x+1)^{-2}}{(x+1)^2 (x+1)^{-3}}$
- (h) $\frac{2a^3 b^3}{3a^2 c^3} - \frac{4b^3}{9b^2 c^3}$

- 3. Your favourite political party received 30% of the votes in constituency A with a population of 250,000. They received 20% of the votes in constituency B with a population of 150,000. What fraction of the overall (popular) vote did your favourite political party receive?
- 4. Pinewood had a crime rate of 11% and a population of 8,000 while Oakwood had a population of 12,000. If the overall crime rate is 8%, what is the crime rate in Oakwood?
- 5. Region A, B, and C have an Unemployment rate of 11%, 4%, and 21%, respectively. Region B has twice the population of the region A, and Region C has twice the population of Region B. What is the overall unemployment rate?

6. Leslie Soro invested \$50,000 in stock A and \$150,000 in stock B. Her total return on stock A was 20 % while the return on stock B was 12 %. What was her total percentage return for the year?
7. Leslie Soro invested \$50,000 in stock A and \$150,000 in stock B. Her total return was 20 % while the return on stock B was 12 %. What was the return on stock A?
8. Leslie Soro invested \$1,000,000 and had a total return of 20 %. She invested in Stock A and Stock B. The return on stock A was 18 % and the return on stock B was 30 %. How much did she invest in stock B?
9. An insurance company can process 5 claims in 17 minutes. How many claims could the provider process in 8 hours?
10. Orange Inc. produces smartphones. Tintin Co. provides $\frac{1}{8}$ of components while Tonton Co. provides $\frac{8}{12}$ of the components. What fraction of components have not been provided?
11. Broadly, Canada has three sectors of employment: manufacturing, services, agriculture. If one out of 50 workers are in agriculture and 6 out of 10 workers are in the services industry, what fraction of workers are in manufacturing?
12. A hospital is half full of patients. After 300 patients are discharged, it is $\frac{1}{3}$ full. What is the maximum capacity of the hospital?
13. A construction firm prepaid \$49,275 to be used for acquiring building materials. Each day, the firm acquired materials worth \$135. If there was \$35,910 left in the pre-paid account, how many days have passed?
14. Environmental, social, and governance (ESG) are a number of standards that socially conscious investors prefer. Hedge fund A contains 70 percent ESG approved investments while Hedge fund B contains 95 percent. Yokohama Investments wants to invest \$180 million and have a total ESG of 80 percent. How much of each hedge fund should they buy?
15. It takes 8 workers 12 days to complete a task. How many workers will be needed to complete the task in 16 days?
16. The perimeter of a rectangle is 36 meters-squared while the length of the rectangle is 3 meters less than twice the width. What is the length and width of the rectangle?



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