

Show all work for credit. Give exact answers whenever possible.

- _____ 1. A chemist has two solutions: one is 25% acid and the other is 60% acid. How many liters of each solution must be mixed to obtain 12 liters of a 40% acid solution?.
- _____ 2. The product of two consecutive odd integers is 323. Find the all possible integers.
- _____ *3. A factory produces a batch of products in 6 hours with Machine A. Machine B can produce the same batch in 4 hours. If both machines work together, how long will it take to complete the batch?
- _____ 4. A person invests \$3,000 in an account that earns 6% annual interest, compounded yearly. How much money will be in the account after 3 years?
- _____ 5. A baseball is hit into the air with an initial velocity of 60 ft/sec from a height of 4 feet. The height in feet after t seconds is given by the equation:

$$h(t) = -16t^2 + 60t + 4$$

How long does it take for the baseball to hit the ground?

- _____ 6. A boat travels 36 miles upstream in the same time it takes to travel 54 miles downstream. If the speed of the current is 3 mph, find the speed of the boat in still water.
- _____ 7. Solve the following system of linear equations.
- $$3x - 2y = 8$$
- $$5x + 3y = 1$$
- _____ *8. The cost per unit of a product, $C(x)$, is given by $C(x) = \frac{x^2+5x+6}{x+2}$ and the revenue per unit, $R(x)$, is given by $\frac{x^2-4}{x-1}$. Find and simplify the Cost to Revenue Ratio $\left(\frac{R(x)}{C(x)}\right)$ and state any domain restrictions,
- _____ 9. Expand and simplify $(2x - 3)^3$
- _____ 10. Simplify the following expression $\frac{\sqrt{72}+\sqrt{50}}{\sqrt{8}}$
- _____ 11. The population growth of a city since 2020 is modeled by the function $P(t) = 5000(1.03)^t$. Predict the population in the year 2030.