

All answers must be exact (i.e. they may contain π , radicals, fractions, terminating or repeating decimals, but they may NOT contain decimal approximations). Fractions must be expressed in lowest terms and radicals must be expressed in simplest radical form.

1. _____ A rancher needs to create a rectangular corral adjacent to his barn. If he has 118 feet of fencing, what total dimensions for the corral will give him the maximum area for the corral, assuming that the barn serves as one side of the corral.
2. _____ Taylor painted a 3 character identification label on a boat. If the first two characters must be digits and the last a letter, and no digits can be reused, then how many possible identifications can she create?
3. _____ Determine the length and width of a rectangle with a perimeter of 60 units and a diagonal of $\sqrt{468}$ units.
4. _____ A candy maker want to save money by decreasing the volume of their chocolate bar. The current dimensions are 8 inches by 4 inches by $\frac{1}{2}$ inch. If they hold the thickness the same, and they want to reduce the length and width by the same amount, what reduction in length and width will yield a candy bar with a volume of 15 cubic inches?
5. _____ A theater regularly sells its capacity of 400 seats with prices of \$11 per ticket. The owner thinks that sales will decrease at a rate of 20 people for each \$2 increase in price. What price should he set (to the nearest cent) to maximize his revenue?
6. _____ A pool is $\frac{1}{4}$ full. If 120 gallons are added, then the pool will be $\frac{5}{8}$ full. How many gallons will the pool hold?
7. _____ What number added to 25% of itself and then doubled is equal to 60?
8. _____ Three rides at an amusement park run for 120 seconds, 180 seconds, and 200 seconds, respectively. If all of the rides start at 10:00 am, when will they start simultaneously again?
9. _____ A motor boat travels upstream at 40 mph and downstream at 62 mph. How far is a round trip that takes 4 hours?
10. _____ A cashier has \$170 in \$5 and \$10 bills. With a total of 23 bills, how many of each denomination are there?