

NAME: \_\_\_\_\_

*P.I. A.N.5: Solve algebraic problems arising from situations that involve proportionality/direct variation*

1. If 5 boxes of mints cost \$20.50, how much will 7 boxes of mints cost?  
[A] \$24.60                      [B] \$36.90  
[C] \$32.80                      [D] \$28.70
2. Which of the following proportions could be used to find the cost of 10 notebooks if 3 notebooks cost \$1.98?  
[A]  $\frac{10}{\$1.98} = \frac{n}{3}$                       [B]  $\frac{n}{3} = \frac{10}{\$1.98}$   
[C]  $\frac{3}{\$1.98} = \frac{10}{n}$                       [D]  $\frac{3}{10} = \frac{n}{\$1.98}$
3. Write a proportion to describe the following: the school store sells 6 pencils for \$0.99. At this rate, how much would 16 pencils cost? Solve your proportion.  
[A] \$2.98                      [B] \$2.64  
[C] \$3.79                      [D] \$1.65
4. In a mixture of gold and platinum, 500 ounces of gold were required to make 1375 ounces of the mixture. How much platinum was required to make 2255 ounces of the mixture?  
[A] 1476 ounces                      [B] 1230 ounces  
[C] 1435 ounces                      [D] 820 ounces
5. Game wardens use experiments to help determine the number of fish in a lake. Suppose 20 fish are caught, tagged, and released back into the lake. Two weeks later 60 fish are caught, of which 2 are found to have tags. Using this information, estimate the number of fish in the lake.  
[A] 600    [B] 18    [C] 78    [D] 1,200
6. In a random sample of 500 customers at a fast food restaurant, it was determined that 190 customers ordered a salad. If the restaurant typically has 900 customers in a day, how many of these customers will probably order a salad?  
[A] 380    [B] 180    [C] 10 556    [D] 342
7. A new movie opened the other day. So far, 500,000 people have seen it. The producers of the movie need to know if the people liked it. They ask 5,000 people who saw the movie at random and 3,500 enjoyed the movie. Predict the total number of people that enjoyed the movie.  
[A] 350,000                      [B] 175,000  
[C] 14,300                      [D] 33,300
8. A survey indicated that 5 out of 7 doctors used brand X aspirin. If 3500 doctors were surveyed, how many used brand X?  
[A] 700 used brand X  
[B] 500 used brand X  
[C] 2500 used brand X  
[D] 1000 used brand X
9. A survey indicated that 8 out of 9 doctors used brand X aspirin. If 4500 doctors were surveyed, how many used brand X?
10. If 3 boxes of raisins cost \$12.60, how much will 8 boxes of raisins cost?
11. According to Ohm's Law, the electric current  $I$ , in amperes, in a circuit varies directly as the voltage  $V$ . When 30 volts are applied, the current is 3 amperes. What is the current when 80 volts are applied?

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12. Marisa is researching information about martial artists. She found that 6 out of 10 martial artists practice every day. There are 100 martial artists at a school. Predict how many practice every day. What is the sample size?

13. Data collected in one area of the Bridger Mountains by the Montana Department of Fish, Wildlife, and Parks are given below.

Date	Conditions	Number of Deer Marked in February of Given Year	Total Deer Counted	Marked Deer Counted
3/79	Patchy snow, $-7^{\circ}\text{C}$	101	1173	65
3/80	Patchy snow, $-4^{\circ}\text{C}$ ; deer scattered	83	1017	42
3/81	Mostly bare, dry, $1^{\circ}\text{C}$ ; deer scattered	60	1212	32
3/82	Light snow cover, $1^{\circ}\text{C}$ ; deer at low elevation	36	1707	30
3/83	Mostly bare, $-4^{\circ}\text{C}$ ; deer at low elevation	89	1612	68
3/84	Bare, dry, $6^{\circ}\text{C}$ ; large deer groups at low elevation	59	1590	37
3/85	Mostly bare, dry; deer at low elevation	54	1417	42
3/86	Mostly bare, dry; deer at low elevation	110	1608	85
3/87	2 cm snow cover; deer normally distributed	83	1469	52

Using the chart above, calculate the estimate of deer populations for the years 1984 and 1985. What factors could account for the change from one year to the next?

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Refer to the chart above. What is the estimate of deer population for the period 3/81? What would the estimate be if the number of deer marked that February was doubled?

- [1] D
- [2] C
- [3] B
- [4] C
- [5] A
- [6] D
- [7] A
- [8] C
- [9] 4000 used brand X
- [10] \$33.60
- [11] 8 amperes
- [12] 60. The sample size is 10.
- 1984--2,536; 1985--1,821. Answers will vary and may include (1) extreme weather conditions reducing the population; (2) more hunting permits distributed in 1985 than in 1984; (3) a possible “hot streak” in 1984 or “cold streak” in 1985 of marked deer counted,
- [13] etc.
- $$\frac{32}{1212} = \frac{60}{x}; \text{ gives } x = 2,272.5 \approx 2,273$$
- $$\frac{32}{1212} = \frac{120}{x}; \text{ gives } x = 4,545$$
- As you can see by solving the proportions above, when the total number of deer marked is doubled, the total population estimate is doubled as well.
- [14] doubled as well.