

Name: _____ Date: _____ Period: _____

Practice: Transforming Random Variables

1. Use the table below to find the new mean, variance, and standard deviation for each.

	Mean	SD
X	120	12
Y	300	16

- | | | | | |
|--|---|--|---|---|
| a) $0.8Y$
Mean: $0.8(300) = ?$
Var = $(0.8)^2(300)^2 = ?$
St Dev: <i>Did you square root?</i> | b) $2X - 100$
Mean: $2(120) - 100$
Var = $2^2(120)^2 = ?$
<i>The "-100" doesn't change the spread!</i> | c) $X + 2Y$
Mean: $120 + 2(300)$
Var = $(120)^2 + 2^2(300)^2$
St Dev: <i>Did you square root?</i> | d) $3X - Y$
<i>You got this!</i>
Var: $3^2(120)^2 + (300)^2$
<i>Always ADD variance! Think Pythag!</i> | e) $Y_1 + Y_2$
<i>Just double Y!</i> |
|--|---|--|---|---|

2. Calloway's Nursery selling vegetable seeds in packets of 20 estimates that the mean number of seeds that will actually grow if 18, with a standard deviation of 1.2 seeds. You buy 5 different packets.

a) How many bad seeds do you expect to get? **10 seeds**b) What's the standard deviation? **2.68 seeds**c) What assumption do you have to make about the seeds? **That they are independent.**

3. The amount of cereal that can be poured into a small bowl varies with a mean of 1.5 ounces and a standard deviation of 0.3 ounces. A large bowl holds a mean of 2.5 ounces and a standard deviation of 0.4 ounces. You open a new box of cereal and pour one large and one small bowl.

(*Hint: See#33, p.383. Yes, it's an odd number...so, you can...yup, check your work!)

a) How much more cereal do you expect to be in the large bowl?

b) What's the standard deviation of this difference?

c) If the difference follows a Normal model, what's the probability the small bowl contains more cereal than the large one?

d) What are the mean and standard deviation of the total amount of cereal in the two bowls?

e) If the total also following a Normal model, what's the probability that you poured out more than 4.5 ounces of cereal in the two bowls together?

4. A consumer organization inspecting new cars found that many had appearance defects (dents, scratches, paint chips, etc.). While none had more than three of these defects, 7% had three defects, 11% two, and 21% one. Find the expected number of appearance defects in a new car and standard deviation. (*Hint: See #17, p.382. Yes, it's an odd number too.)
5. The American Veterinary Association claims that the annual cost of medical care for dogs averages \$100, with a standard deviation of \$30, and for cats averages \$120, with a standard deviation of \$35.
- What's the expected difference in the cost of medical care for dogs and cats?
 - What's the standard deviation of that difference?
 - If the difference in costs follows a Normal model, what's the probability that medical expenses are higher for someone's dog than for her cat?
6. When figure skaters need to find a partner for "pair figure skating," it is important to find a partner who is compatible in weight. The weight of figure skaters can be modeled by a normal distribution. For male skaters, **the mean is 170 lbs.** with a standard deviation of 10 lbs. For female skaters, the **mean is 110 lbs.** with a standard deviation of 5 lbs. Let the random variable X = the weight of female skaters and the random variable Y = the weight of male skaters. The weight of a pair of figure skaters (a male and a female) can be thought of as a new random variable. Let the random variable $W = X + Y$. What is the **mean** of this new random variable W ?
- 110 lbs.
 - 140 lbs.
 - 170 lbs.
 - 280 lbs**
 - Not here
7. Let the random variable X represent the amount of money Isabel makes babysitting in a randomly selected week in the summer. Assume that X is Normal with mean \$240 and standard deviation \$60. The probability is approximately 0.6 that, in a randomly selected week, Isabel will make less than...
- \$144
 - \$216
 - \$255
 - \$30
 - \$360
- INVNorm!!!! Area = 0.6**