APPENDIX II
SELF-ASSESSMENT QUIZ

These questions are designed to prompt readers to self-assess their understanding of the contents of this guide. All information needed to answer the questions is found in the section indicated. The correct answers are located at the end of this section. An answer form is provided to allow other people to use this quiz or to test yourself before reading the guide and then repeat to see how much you have learned.

SECTION I – INTRODUCTION, NORMAL LACTATION AND FLOCK HEALTH

1) What characteristics are used to assess milk quality?

   a) somatic cells
   b) drug residues
   c) flavour, colour, smell
   d) level of bacteria
   e) freezing point
   f) all of the above

2) What is the most important reason for poor udder health?

   a) weather
   b) mastitis
   c) udder conformation
   d) producer knowledge
   e) ewe breeding

3) Define what udder health means:

4) Milk is produced in what part of the udder?

   a) gland cistern
   b) lobar ducts
   c) secretory cells in alveoli
   d) teat cistern

5) *True or False:* Mastitis rarely causes permanent damage to the secretory cells in the udder.

6) What hormone produced by the ewe, is required for milk let-down?

   a) progesterone
   b) oestrogen
   c) epinephrine
   d) oxytocin

7) What happens when ewes are not prepped properly prior to attaching the milking machine?

a) milk-out time is increased
b) peak milk flow is delayed
c) the teat sphincter may become damaged from over-milking
d) mastitis- causing bacteria may enter the damaged teat end
e) all of the above

8) *True or False:* A dairy ewe does not require a dry period (a period in which it doesn't lactate) between lactations.

9) *True or False:* A ewe's total milk production during lactation depends on the timing of maximum peak milk and the persistency of the lactation.

10) *True or False:* First lactation ewes have similar peak milk levels and persistency as ewes that have lambed more than once.

11) The best time to vaccinate for clostridial diseases and caseous lymphadenitis to ensure that lambs receive antibodies via colostrum is

a) At lambing
b) 4 weeks prior to lambing
c) Annually at any point in their production cycle
d) At weaning
e) At shearing time

12) *True or False:* If a vaccine label states that the primary series requires two doses 4 weeks apart, the second dose is not necessary for the vaccine to work.

13) When investigating an abortion, diagnosis of the cause is best achieved by:

a) submitting both the placenta and fetus
b) submitting two fetuses
c) starting the ewe flock on antibiotics
d) submitting a frozen placenta
e) submitting blood from the ewes which aborted

14) *True or False:* Many of the causes of abortion in sheep can be transmitted to humans and cause them to become ill.

15) Poor ewe nutrition in the last trimester of pregnancy will harm:

a) the likelihood of its lambs to survive
b) the amount of colostrum produced
c) the quality of colostrum produced
d) the ewe's ability to milk well during lactation
e) all of the above

16) *True or False:* Sheep are very prone to copper toxicity and should never be fed cattle mineral.

17) Pregnancy toxaemia is caused by:

a) insufficient protein in the late gestation diet
b) insufficient energy in the early lactation diet
c) insufficient energy in the late gestation diet
d) insufficient energy and protein in the diet

18) Hypocalcaemia (milk fever) in sheep usually occurs:

a) at lambing
b) 6 to 2 weeks before lambing
c) 1 to 2 weeks after lambing
d) at peak lactation

19) The optimal colostrum requirement for a lamb is:

a) 100 ml/kg body weight in the first 24 hours of life
b) 50 ml/kg body weight within 6 hours of birth and another 50ml/kg 6 hours later
c) 400 ml within 12 hours of birth
d) 50 ml/kg body weight within an hour of birth and 200 ml/kg body weight in the first 24 hours of life

20) If a ewe does not have enough colostrum to feed lambs, the following may be used as a replacement:

a) thawed frozen sheep colostrum
b) a commercial colostrum replacement product for lambs
c) cow colostrum
d) any of the above

21) *True or False:* Off-flavours in milk may be associated with high levels of vitamin E in the feed.

22) *True or False:* Over-conditioned ewe lambs will produce less milk as adults and are less fertile.

23) *True or False:* Melengestrol acetate (MGA) should never be used in lactating dairy ewes because it is passed in the milk and when consumed by women, can affect their reproductive cycles.

24) *True or False:* Milk and meat withdrawal times for dewormers used in dairy sheep are the same as for cattle.

SECTION II – MASTITIS: WHAT CAUSES IT AND HOW IT IS DETECTED

25) Inflammation of the udder (mastitis) can be caused by:

a) bacteria
b) viruses
c) systemic illness in the ewe
d) injury to the udder
e) all of the above

26) Costs associated with mastitis include:

a) the value of discarded milk
b) lost milk production
c) losses associated with poor cheese production
d) premature culling
e) all of the above

27) Signs of acute severe clinical mastitis include:

a) fever (≥ 40.5°C)
b) dehydration (sunken eyes)
c) off feed
d) udder is hot or cold to the touch
e) abnormal appearing milk
f) all of the above

28) *True or False:* Ewes with gangrenous mastitis often survive with the udder returning to normal milk production.

29) Signs of moderate clinical mastitis include:

a) changes to the appearance of the milk and udder, ewe is healthy
b) changes to the appearance of the milk and udder, ewe is sick
c) changes to the appearance of the milk only
d) udder and milk appear normal, ewe is sick

30) Subclinical mastitis means
a) The ewe is ill with mastitis, but we need to take its temperature to detect infection
b) The udder is infected, but milk production is not harmed
c) The udder is infected, and milk production is harmed but can't be detected without using tests
d) The udder is infected, milk production is harmed and the tests cannot detect the infection.

31) The most common form of mastitis is:

a) clinical mastitis
b) gangrenous mastitis
c) subclinical mastitis
d) agalactia

32) *True or False:* Subclinical mastitis is diagnosed using tests that either culture the milk or detect somatic cells.

33) Contagious mastitis bacteria are usually transferred at milking from:

a) milker's hands
b) towels that are used on multiple ewes
c) milk remaining in teat cup liners of milking machines
d) all of the above

34) *True or False: Staphylococcus aureus* mastitis is very treatable during lactation.

35) *True of False: Staphylococcus aureus* mastitis is commonly a subclinical, chronic infection resulting in high somatic cell counts.

36) Which of the following is **NOT** true about nursing lambs and mastitis?
a) Bites from lambs may cause scarring of the teat cistern and blockage of milk
b) Soremouth (orf, contagious ecthyma) infections of lambs may also result in teat infections in ewes
c) A single nursing lamb will keep both glands evacuated milk and so lowers the risk of mastitis
d) Staphylococci infections can be transmitted from ewe to ewe by nursing lambs
e) None of the above, all are true.

37) *True or False:* Coagulase negative staphylococci are the most common cause of subclinical mastitis in sheep.

38) *True or False:* Maedi visna virus targets the udder and causes damage and scarring of the udder and decreased milk production

39) Environmental mastitis bacteria are usually found where the animal is housed and can be transmitted through:

a) bedding
b) manure
c) water sources
d) flies
e) udders and teats not properly prepped for milking
f) all of the above

40) Risk factors for mastitis in ewes include:

a) poor udder preparation
b) lactation number
c) teat biting by lambs
d) days in milk
e) poor ventilation
f) dirty bedding
g) all of the above

41) *True or False:* Udder shape and size are not risk factors for a ewe developing mastitis.

42) Which of the following is NOT a risk factor for mastitis
a) Using disposable gloves when hand-milking
b) Using pulsation rates of 150 cycles/minute
c) High vacuum levels
d) Low vacuum reserve
e) Machine stripping

43) *True or False:* Somatic cells are mainly white blood cells that are excreted into milk and defend the udder from bacterial infection.
44) *True or False:* A somatic cell count measures the approximate level of infection in the udder.

45) *True or False:* As somatic cell counts increase, so does the amount of milk lost.

46) Ewe somatic cell count values over this number are associated with subclinical mastitis:

a) > 150,000 cells/ml
b) > 400,000 cells/ml
c) > 600,000 cells/ml
d) > 800,000 cells/ml

47) *True or False:* The California Mastitis Test is a practical tool that can be used on-farm to detect ewes that have increased somatic cell counts.

48) *True or False:* The higher the somatic cell count, the less gelling of the CMT/milk solution that occurs.

49) When collecting a milk sample for culture, the following should be performed to decrease the chance of a contaminated sample:

a) wear gloves
b) remove excess dirt or manure from the udder
c) clean and dry the teats using a single service towel or wipe
d) remove the first 4-5 strips of milk from the teat to be sampled
e) clean teat end with alcohol swabs until clean
f) all of the above

50) *True or False:* Milk samples can be sent fresh to a lab on ice or frozen for one month before culturing.

51) Milk culture results that return as having "No Growth" may be due to:

a) the infection having been cleared by the ewe's immune system at the time of sampling
b) non-bacterial infections (eg. viruses)
c) the ewe recently being treated with antibiotics and it is preventing bacterial growth in the milk
d) the volume of milk sent for culturing was too small
e) all of the above

52) *True or False:* Culturing bulk tank milk samples can tell you about milking equipment hygiene but also mastitis infections occurring in ewes.

SECTION III – MILKING MANAGEMENT

53) *True or False:* Pre-dipping is done to decrease the level of environmental bacteria on the teats.

54) *True or False:* Using the same cloth towels, paper towels or udder wipes prior to milking on more than one ewe is an acceptable practice.

55) *True or False:* Udder preparation prior to milking is important because it stimulates milk let-down and removes dirt and bacteria from the teats.

56) *True or False:* Attaching milking units to wet teats will lower bacterial levels in the milk.

57) *True or False:* Mastitis in ewes can be detected more quickly by stripping fore-milk into a strip cup.

58) *True or False:* Human hands are a risk factor for spreading contagious mastitis pathogens.

59) Milking units should be attached within this time after udder preparation:

a) immediately
b) < 30 seconds
c) <60 seconds
d) <90 seconds

60) *True or False:* Over-milking a ewe causes teat end damage and increases the risk of mastitis.

61) *True or False:* Maintenance of milking equipment on a regular basis does not need to be performed since it has little impact on udder health.

62) *True or False:* Teat cup liner slips may cause milk flow to reverse, resulting in milk droplets being forced at high speed towards the teat end.

63) *True or False:* Machine-stripped ewes take longer to milk out in general than ewes that are not machine-stripped.

64) *True or False:* Removing milking units while the vacuum is still on will not damage teat ends.

65) Which of the following post-dip practices is NOT recommended for dairy ewes:
   a) Disinfectants suitable for post-dipping must be labeled as such
   b) When applying a post-dip, only the teat end needs to be covered.
   c) Post-dip cups contaminated with bedding is not suitable for use and should be discarded
   d) Post-dips should never be diluted with water
   e) Spray dipping is a suitable method but requires increased care to assure that the entire teat is sufficiently covered.

66) After milking, the teat sphincter is open and relaxed and does not close for approximately?

   a) 5 minutes
   b) 20 minutes
   c) 30 minutes
   d) 45 minutes

67) *True or False:* To lower the risk of environmental bacteria entering the teat sphincter following milking, offer fresh water or feed to encourage ewes to stand.

68) Iodine residues in the milk can be minimized by:

   a) properly applying teat dips
   b) using only Health Canada approved teat dips
   c) properly drying teats after dips have been applied
   d) all of the above

69) It is a good idea to milk ewe lambs first:

   a) to save time in the parlour as milk-out times will be more consistent among these animals
   b) to ensure they are comfortable in the parlour and not bullied by older ewes
   c) to prevent exposure to contagious mastitis bacteria carried by older ewes
   d) all of the above

70) *True or False:* A good way to manage ewes known to be infected with a contagious mastitis pathogen is to milk these animals last to prevent spread to uninfected ewes.

SECTION IV – PROPER MAINTENANCE AND USE OF MILKING EQUIPMENT

71) In Ontario, dairy sheep are milked:

   a) in parlours
   b) into buckets
   c) by hand
   d) all of the above

72) *True or False:* Parallel milking parlours are the most common type seen on dairy sheep operations in Ontario.

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73) *True or False:* When trying to bring nervous or stubborn ewes into the parlour, shouting and physical force work best.

74) Disadvantages of feeding concentrate in the parlour include:

a) poor rumen health due to slug feeding
b) ewes may develop laminitis
c) lower milk production in ewes that can not eat enough concentrate
d) all of the above

75) *True or False:* Low-line pipeline systems provide a constant downwards flow of milk to the line, which allows for stable vacuum.

76) What is/are the basics of cleaning a milking system?

a) time
b) temperature
c) chemical concentration
d) physical action
e) all of the above

77) In the correct order, the key steps involved in the milking equipment cleaning process are:

a) pre-rinse, acid-rinse, hot wash, sanitize
b) pre-rinse, hot wash, acid-rinse, sanitize
c) hot wash, pre-rinse, acid-rinse, sanitize
d) pre-rinse, hot wash, sanitize, acid-rinse

78) *True or False:* Rinsing milking equipment surfaces removes 90-95% of milk solids.

79) In the pre-rinse cycle, the water temperature should start at:

a) 39°C to 48°C
b) 47°C to 62°C
c) 43°C to 49°C
d) 30°C to 37°C

80) *True or False:* The purpose of the hot (chlorinated alkaline detergent) wash cycle is to remove fat, protein and bacteria from the milking system.

81) Which of the following statements is true regarding water temperature
a) The start temperature of the hot wash cycle should be 71°C to 76°C and not less than 49°C at the end
b) The start temperature of the hot wash cycle should be 71°C to 76°C and end temperature is not a concern
c) The start and end temperature of the hot wash cycle should not be less than 49°C.

82) *True or False:* Hard water does not decrease the effectiveness of dairy cleaning products.

83) *True or False:* The purpose of the acid-rinse cycle is to remove detergent residues, neutralize alkali residues, prevent mineral deposits and suppress bacterial growth.

84) *True or False:* The acid-rinse cycle shortens the life of inflations and gaskets.

85) *True or False:* The purpose of the sanitizing cycle prior to the next milking is to disinfect the system by eliminating bacteria that may grow on surfaces between milkings.

86) *True or False:* The sanitizing cycle should be run no more than 30 minutes prior to milking.

87) *True or False:* Bulk tanks are often more difficult to clean than pipelines and may require some manually cleaning.

88) *True or False:* Milk containers used for freezing milk must be clean and completely dry before stacking to prevent molds and bacteria from growing and contaminating milk later on.

89) *True or False:* The chemicals used for cleaning and sanitizing the milking system are corrosive, can damage skin and are very dangerous if ingested.

90) Cleaning failures of the milking system may result in:

a) biofilms
b) protein films
c) mineral films
d) fat films
e) all of the above

91) If a cleaning problem is suspected, the following equipment can be used to start the investigation:

a) a thermometer to check water temperatures
b) a strong flashlight for examining milk contact surfaces
c) pH paper to check acidity and alkalinity
d) all of the above

92) *True or False:* The recommended claw vacuum at peak flow is 9.5 to 11.5 inches of mercury.

93) The recommended pulsation rate for dairy sheep is:

a) 90 to 180 cycles/minute (120 cycles/minute commonly recommended)
b) 50 to 120 cycles/minute (95 cycles/minute commonly recommended)
c) 140 to 200 cycles/minute (170 cycles/minute commonly recommended)
d) 80 to 220 cycles/minute (150 cycles/minute commonly recommended)

94) *True or False:* Milklines should have a continuous and even fall towards the receiver jar, with a minimum of 5mm of drop for every metre of pipe.

95) *True or False:* The flow of milk inside the milkline should be at a level of greater than 50% to prevent slugging of milk and liner slips.

96) *True or False:* The cleanliness of the milk filter reflects udder preparation and health.

97) *True or False:* Inflations may harbour bacteria if they become worn and cracked

98) Rubber used in milk inflations breaks down with:

a) time
b) exposure to heat and cold
c) use
d) chemicals
e) all of the above

99) A blue rainbow haze on the inside surfaces of the bulk tank may indicate which of the following:
a) a protein film.
b) a biofilm
c) milkstone
d) a fat film

SECTION V – MILK QUALITY

100) The quality of milk will influence its:

a) taste
b) shelf-life
c) the quality and quantity of cheese produced
d) its safety for human consumption
e) all of the above

101) *True or False:* Milk processors do not have the right to reject milk if it doesn't meet their "in-house" standards.

102) *True or False:* The acceptable upper limit for bulk tank somatic cell count level for dairy sheep milk in the United States and Quebec is 750,000 cells/ml.

103) *True or False:* Standard plate count (SPC) is a measure of the total number of bacteria in a raw milk sample.

104) *True or False:* In Ontario, the standard plate count allowable level in goat milk is <50,000 CFU/ml.

105) High bacterial counts in milk:

a) cause the milk to spoil faster
b) can be a public health risk
c) can interfere with cheese-making
d) all of the above

106) *True or False:* Elevated standard plate count (SPC) is associated with poor milking and equipment hygiene.

107) *True or False:* Standard plate count and somatic cell count both occasionally increase at the same time when the flock has a high prevalence of subclinical mastitis caused by environmental pathogens.

108) *True or False:* Pasteurization will fix poor milk quality.

109) High bacterial counts in milk may be due to:
a) milk stone in milk line or bulk tank
b) improperly cleaned buckets
c) bulk tank milk temperature >4°C
d) improperly prepped teats and udders
e) all of the above + many more reasons!

110) *True or False:* Coliform counts are a measure of the number of coliform bacteria (e.g. *E. coli*) in raw milk.

111) *True or False:* Elevated coliform counts are usually due to udders or milking units contaminated with manure.

112) *True or False:* Excess water in the milk is monitored by measuring the freezing point.

113) Bulk tank milk samples are tested for which of the following chemicals:

a) antibiotics
b) dewormers
c) anti-inflammatory drugs
d) treatments for external parasites
e) all of the above

114) *True or False:* When an intramammary antibiotic product is used to treat one half of the udder, milk from the other half can still be milked into the bulk tank.

115) *True or False:* When an intramammary antibiotic product labelled for cattle is used in dairy sheep, the cattle milk withdrawal time can be followed.

SECTION VI – TREATMENT AND CONTROL OF MASTITIS

116) *True or False:* In Canada, there are no approved veterinary medicines for use in lactating dairy sheep, where the milk is for human consumption.

117) Which of the following constitutes extra-label drug use in sheep when the drug is labelled for use in sheep?

a) different dose than on the label
b) different duration than on the label
c) different frequency than on the label
d) different route of administration than on the label
e) different class of animal than on the label
f) different indication than on the label
g) all of the above

118) *True or False:* Unapproved bulk active pharmaceutical ingredients and compounded drugs are considered extra-label drug use by Health Canada.

119) *True or False:* It is okay for your flock veterinarian to give you verbal directions/instructions on using a drug in an extra-label manner.

120) The milk withdrawal time following use of an intramammary product approved for dairy sheep from another country will be:

a) longer than on the label
b) the same as on the label
c) unknown, have your veterinarian contact CgFARAD prior to using
d) shorter than on the label

121) *True or False:* Giving too large a volume of a drug in one spot may increase a milk withdrawal time.

122) *True or False:* Milking once/day versus twice/day will not affect a milk withdrawal time.

123) *True or False:* The Canadian Sheep and Lamb Food Safe Farm Practices program has guidelines specifically written for dairy sheep operations

124) *True or False:* A drug that has expired 8 months ago will still work as well as one that hasn't expired.

125) *True or False:* Veterinarians can dispense drugs without having seen the animal to be treated, nor having visited the farm

126) *True or False:* Testing milk on-farm for antibiotic residues can be a good screening tool to avoid shipping potentially contaminated milk.

127) On-farm antibiotic test kits can be used on:

a) milk from buckets
b) individual animal milk samples
c) bulk tank milk samples
d) all of the above

128) Testing an individual ewe for antibiotic residues in milk may be recommended if:

a) the ewe was treated with more than one drug at once
b) a ewe lambed earlier than expected and was given a dry period mastitis treatment
c) ewes are added to the flock with an unknown treatment history
d) an extra-label drug was given to the ewe
e) all of the above

129) *True or False:* On-farm test kits are as accurate as those used in laboratories.

130) Which of the following methods is not recommended for keeping track of treatments on animals?

a) recording on treatment charts in a binder
b) recording treatments on a piece of paper towel
c) recording treatments on a whiteboard or chalkboard in the parlour
d) recording treatments in a computer program

131) *True or False:* Milking treated animals last or into a separate bucket is a good way to ensure treated milk does not enter the bulk tank.

132) *True or False:* Drugs that need to be refrigerated can stay at room temperature for several hours without harming the effectiveness of the drug.

133) *True or False:* Intramammary products for lactating dairy ewes and dry treatment should be stored separately to avoid accidently using a dry treatment product in a lactating animal.

134) Which of the following is true with regards to storage of livestock medicines?

a) direct light or sunlight can damage certain drugs
b) do not keep drugs in the door of the refrigerator as it can be much warmer than the rest of the fridge
c) never keep drugs on a window shelf as excessive heat can damage the drug
d) all of the above

135) *True or False:* Inserting a used needle into a bottle of antibiotics can contaminate the drug with bacteria making it ineffective.

136) *True or False:* If a drug is labelled for use in the muscle (intramuscular injection), you can still give the drug via a teat cannula into the udder (intramammary).

137) *True or False:* If an on-farm test kit shows positive for drug residues in the bulk tank, drain the milk and completely sanitize the milking system (milkers, pipes, tank) before milking again.

138) *True or False:* A teat end does not need to be disinfected prior to giving an intramammary treatment.

139) *True or False:* Do not fully insert the tip of the mastitis tube into the teat opening.

140) *True or False:* When treating a ewe for mastitis, using half of an intramammary tube is just as effective as using the whole tube.

141) When treating a ewe with mastitis, treating the uninfected gland is not recommended because:

a) overuse of antibiotics can cause yeast infections
b) it is an additional cost to use a second tube
c) overuse of antibiotics can lead to antimicrobial resistance
d) all of the above

142) The chance of curing a ewe with *Staphylococcus aureus* mastitis through the use of intramammary antibiotics is improved if:

a) the ewe is in early lactation
b) the ewe is younger
c) the ewe has recently become infected with the bacteria
d) the ewe is treated while dry rather than lactating
e) all of the above

143) Using a dry treatment product in dairy sheep has been shown to:

a) cure existing mastitis infections
b) decrease somatic cell counts
c) prevent new infections in the dry period
d) increase milk production in the next lactation
e) all of the above

144) *True or False:* Ewes are at an increased risk of acquiring new infections in the first few days of the dry period when the keratin plug is still forming.

145) *True or False:* Mastitis seen in early lactation may be due to infections acquired during the dry period.

146) *True or False:* Selective treatment of ewes at dry-off is best done in flocks with a low prevalence of mastitis, consistently low somatic cell count and good environmental management.

147) *True or False:* Blanket treatment of ewes means that only ewes with udder problems are treated with antibiotics at dry-off.

148) *True or False:* Dirty, wet environments increase the risk of mastitis in summer and winter.

149) *True or False:* Identifying 2 cases of *Staphylococcus aureus* clinical mastitis in the flock likely means that there are more ewes subclinically infected.

150) *True or False:* Ewes with a chronic history of mastitis or those that do not respond to treatment are good candidates for culling.

SECTION VII – MONITORING UDDER HEALTH AND GOAL SETTING

The recommendation is to fill out Table VII.2, including goal setting and current status by reviewing your records.

ANSWER GUIDE

SECTION I
1. f
2. b
3. See Section I page 1
4. c
5. False
6. e
7. e
8. False
9. True
10. False
11. b
12. False
13. a
14. True
15. e
16. True
17. c
18. b
19. d
20. d
21. False
22. True
23. True
24. False

SECTION II
25. e
26. f
27. f
28. False
29. a
30. c
31. c
32. True
33. d
34. False
35. True
36. c
37. True
38. True
39. f
40. g
41. False
42. b
43. True
44. True
45. True
46. b
47. True
48. False
49. f
50. True
51. e
52. True

SECTION III
53. True
54. False
55. True
56. False
57. True
58. True
59. c
60. True
61. False
62. False
63. True
64. False
65. b
66. c
67 True
68. d
69. d
70. True

SECTION IV
71. d
72. True
73. False
74. d
75. True
76. e
77. b
78. True
79. c
80. True
81. a
82. False
83. True
84. False
85. True
86. True
87. True
88. True
89. True
90. e
91. d
92. True
93. a
94. True
95. False
96. True
97. True
98. e
99. a

SECTION V
100. e
101. a
102. True
103. True
104. True
105. d
106. True
107. True
108. False
109. f
110. True
111. True
112. True
113. e
114. False
115. False

SECTION VI
116. True
117. g
118. True
119. False
120. c
121. True
122. False
123. True
124. False
125. False
126. True
127. d
128. e
129. False
130. b
131. True
132. False
133. True
134. d
135. True
136. False
137. True
138. False
139. True
140. False
141. d
142. e
143. e
144. True
145. True
146. True
147. False
148. True
149. True
150. True