

2017 NC State Horse Bowl Contest Junior Division Round 1

- 1) Q: What is the name for the wooden or metal frame of a saddle?**
A: Saddle tree
S: H&H2001(29)
- 2) Q: Describe the color "sorrel."**
A: Reddish or copper-red; the mane and tail are usually the same color as the body
S: AYHCYL(B117-2)
- 3) Q: What part of a bridle or halter goes over the head of a horse?**
A: The headstall
S: BH(59)
- 4) Q: Which teeth are used for grinding?**
A: Molars
S: HS2001(10)
- 5) Q: What breed is known for performing the running walk?**
A: Tennessee Walking Horse
S: H&H2001(5)
- 6) Q: In what hand should you carry the halter when you are preparing to catch a horse?**
A: Left hand
S: BH(21)
- 7) Q: Which gait is characterized by a slow, naturally flat-footed, four beat gait? It is also known as the foundation gait.**
A: Walk
S: H&H2001(17)

- 8) **Q: Any bit with reins attached to the end of shanks is classified as what type of bit?**
A: Curb bit
S: BH(35)
- 9) **Q: Describe the proper way to use a hoof pick when cleaning out a horse's feet.**
A: Smoothly pull the pick from the heel toward the toe
S: BH(26)
- 10) **Q: In horse judging terminology, what term describes a horse with correct alignment of the bones and ligaments?**
A: Structurally correct or structural correctness
S: 4-HJM(9)
- 11) **Q: Toe, quarter and heel are specific areas of what part of the horse?**
A: Hoof
S: H&H2001(46)
- 12) **Q: What is the term for a registered mark of identification that is typically located on the hip, neck, or cheek?**
A: Brand
S: H&H2001; Newhor(4, 37)
- 13) **Q: When working with a back cinch on a western saddle, which should be fastened first, the front or back cinch?**
A: Front
S: BH(29)
- 14) **Q: What is the most commonly used tool for estimating a horse's body weight?**
A: Heart girth tape
S: AYHCYL(A303-2)

TOSS UP WITH A BONUS ATTACHED

15) Q: What term describes a horse whose upper incisors overhang the lower incisors?

A: Parrot-mouthed or overshot jaw

S: HS2001(15)

BONUS QUESTION

16) Q: Name three of the four pieces that make up a halter.

A: 1) Crownpiece 2) cheekpiece 3) noseband 4) throatlatch

S: BH(20)

17) Q: What is the physical shape or build of a horse called?

A: Conformation

S: BH(58)

18) Q: Why are low, flat withers not desirable?

A: They don't hold a saddle well

S: H&H2001(10)

19) Q: When grooming a horse, what brush should you not use on the face and legs?

A: Curry comb

S: BH(25)

TOSS UP WITH A BONUS ATTACHED

20) Q: How many beats are in the walk?

A: 4

S: Griffiths(70)

BONUS QUESTION

21) **Q: Name five grooming tools.**

A: 1) Curry comb (rubber or metal) 2) hoof pick 3) hard brush (or dandy, rice root, or corn brush) 4) soft brush (body brush) 5) mane and tail comb 6) sponge 7) cloth 8) sweat scraper 9) clippers 10) scissors

S: BH; 4HHM; Newhor; H&H2001(25; 5; 77, 34; 36)

22) **Q: How often should a horse be reshod or have his shoes reset?**

A: Every 4 to 6 weeks

S: H&H2001(49)

23) **Q: Describe the forelock.**

A: The hair that covers the forehead and grows from the poll area; the part of the mane that hangs down over the face

S: Newhor(112)

24) **Q: A horse that has black eyes, skin, and hooves with black points is considered what color?**

A: Black

S: H&H2001(4)

TOSS UP WITH A BONUS ATTACHED

25) **Q: According to the *NC 4-H Horse Program Rules and Regulations Manual*, what specific personal appointment is a mandatory protective item for riders in the Western Horse and Pony division?**

A: USEF approved helmet

S: 4-HR&R(59)

BONUS QUESTION

26) **Q: In addition to the five basic coat colors, there are five additional coat color variations. What are they?**

A: 1) Dun or buckskin 2) grey 3) palomino 4) pinto or paint 5) roan

S: H&H2001(7)

27) Q: What do you call an abnormality which may detract from the appearance of the animal, but does not affect it's serviceability?

A: Blemish

S: 4-HJM(7)

28) Q: The three areas most sensitive to touch on the horse are where?

A: Around the eyes, ears and nose

S: BH(9)

29) Q: What is the base coat color of a blue roan?

A: Black

S: Griffiths(47)

30) Q: The most popular reason people want horses is for pleasure riding. Give another need or use for horses.

A: Breeding, work, or racing

S: AYHCYL(A322-1)

31) Q: What is the term used for an equine's mother?

A: Dam

S: Griffiths(23)

32) Q: How many beats are in the trot?

A: 2

S: H&H2001(18)

END OF ROUND 1

2017 NC State Horse Bowl Contest Junior Division Round 2

- 1) Q: What breed carries the genes for the genetic disorder called "lethal white foal syndrome?"**
A: Paint or pinto horses
S: Griffiths(98)
- 2) Q: What side of the horse should you mount from?**
A: Left or near side
S: H&H2001(20)
- 3) Q: When referring to horses, what is the definition of a hand?**
A: A unit by which a horse is measured; equal to 4 inches
S: H&H2001; Newhor(46; 129)
- 4) Q: What is the most accurate method of determining a horse's age?**
A: Looking at the teeth
S: HS2001(12)
- 5) Q: When referring to breed organizations, what do the initials POA stand for?**
A: Pony of the Americas
S: Newhor(215)
- 6) Q: What part of the horse's mouth does the bit rest on?**
A: The bars
S: H&H2001(29)
- 7) Q: Describe the color of a healthy horse's gums?**
A: Medium-pink (not white or red)
S: Griffiths(163)

- 8) **Q: The sex of the foal is determined by which parent?**
A: Sire
S: Griffiths(74)
- 9) **Q: What does it mean when a horse is said to be "head shy?"**
A: It is sensitive around the head and may jerk away when touched
S: HS2001(4)
- 10) **Q: What breed of pony originated in Wales?**
A: Welsh Pony
S: H&H2001(12)
- 11) **Q: Describe a horse with a thrifty condition.**
A: Healthy, active, vigorous
S: H&H2001(9)
- 12) **Q: What are the two categories of white markings?**
A: Face and leg markings
S: Griffiths(29)
- 13) **Q: What is the name of the joint located above the pastern?**
A: Fetlock
S: BH(12)
- 14) **Q: How many beats are in a running walk?**
A: 4
S: Griffiths(81)

TOSS UP WITH A BONUS ATTACHED

- 15) **Q: What judging term refers to the ability of the horse to maintain a correct and distinct foot fall pattern?**
A: Cadence
S: 4-HJM(12)

BONUS QUESTION

- 16) **Q: Name the four stages of the life cycle for most external and internal parasites.**
A: 1) Egg 2) larva 3) pupa 4) adult
S: Griffiths(184)
- 17) **Q: A white marking that extends from the cornet and includes fetlock is called what?**
A: Ankle
S: H&H2001(7)
- 18) **Q: What is a horse's normal body temperature in degrees Fahrenheit?**
A: 100 degrees (range of 99-101 degrees)
S: Griffiths(155)
- 19) **Q: How many pairs of chromosomes does a horse have?**
A: 32 pairs
S: Griffiths(16)

TOSS UP WITH A BONUS ATTACHED

- 20) **Q: What group registers and keeps records on Thoroughbred horses?**
A: The Jockey Club
S: H&H2001(2)

BONUS QUESTION

- 21) **Q: Name three common structural deviations of the head.**
A: 1) Parrot mouthed 2) monkey mouthed 3) pig eyed
S: 4-HJM(10)
- 22) **Q: Two part question: What was the original ancestor of the horse called and where did it originate?**
A: Eohippus, originated in North America
S: HS2001(4)

23) Q: What age and sex is a yearling colt?

A: A one year old male

S: Griffiths(23)

24) Q: How does the horse primarily grasp its food?

A: By the upper lip (prehensile lip)

S: HS2001(27)

TOSS UP WITH A BONUS ATTACHED

25) Q: Usually brown or red in color, what are the small flecks of color over the base coat color of an animal called?

A: Flea bits

S: Griffiths(39)

BONUS QUESTION

26) Q: Name the five types of nutrients required by horses.

A: 1) Water 2) energy 3) protein 4) vitamins 5) minerals

S: HS2001(32)

27) Q: What must a horse do to see faraway objects?

A: Lower its head

S: BH(8)

28) Q: What part of hay is the most nutrient dense?

A: The leaves

S: HS2001(38)

29) Q: What is a rowel?

A: The toothed wheel on a spur

S: H&H2001(29)

30) Q: What are the three main gaits of an english horse?

A: Walk, trot, canter

S: Griffiths(69)

31) Q: What is the base coat color of the red roan?

A: Bay

S: Griffiths(47)

32) Q: What is the horny growth located behind the fetlock called?

A: Ergot

S: H&H2001(9)

END OF ROUND 2

**2017 NC State Horse Bowl Contest
Junior Division Round 3**

- 1) Q: What female reproductive organ produces the egg?**
A: Ovary
S: HS2001(23)
- 2) Q: What breed of horse can be divided into trotters and pacers?**
A: Standardbred
S: AYHCYL(110)
- 3) Q: What is the average capillary refill time for a healthy horse?**
A: 1-3 seconds
S: Griffiths(163)
- 4) Q: The back of the horse is made up of primarily which type of vertebrae?**
A: Thoracic
S: Newhor(20)
- 5) Q: What is another name for tetanus?**
A: Lockjaw
S: HS2001(49)
- 6) Q: Name the muscular reproductive organ of the mare where the unborn foal develops.**
A: Uterus
S: HS2001(24)
- 7) Q: What is another name for the horse's chestnuts?**
A: Nighteyes
S: H&H2001(8)

- 8) **Q: What is the name for the mechanical process of chewing?**
A: Mastication
S: Griffiths(107)
- 9) **Q: How many basic horse coat colors are there?**
A: 5
S: H&H2001(4)
- 10) **Q: Name the 4-H Horse Show official whose duties are to interpret and clarify rules.**
A: Steward
S: 4-HR&R(7)
- 11) **Q: What term refers to a gait that the horse performs by natural impulses and does not require training?**
A: Natural
S: H&H2001(17)
- 12) **Q: What is the term for a rider older than 18 years who does not get paid for riding?**
A: Amateur
S: Newhor(7)
- 13) **Q: What term is used to describe the skill of the rider in using the correct form and aids to produce the desired performance of the horse?**
A: Equitation
S: H&H2001(20)
- 14) **Q: The western riding class at the State 4-H Horse Show is scored and judged according to rules set by what association?**
A: AQHA
S: 4-HR&R(63)

TOSS UP WITH A BONUS ATTACHED

15) Q: What term describes a hard swelling on the back surface of the rear cannon about 4 inches below the point of the hock?

A: Curb

S: HS2001(13)

BONUS QUESTION

16) Q: When discussing coat colors, give three locations known as the points of the horse?

A: 1) Mane 2) tail 3) lower legs 4) tips of the ears

S: Griffiths(36)

17) Q: The term "rat-tailed" is commonly used to describe the tail of which breed?

A: Appaloosa

S: Griffiths(51)

18) Q: What type of medicine is used to treat infectious diseases caused by bacteria?

A: Antibiotic

S: HS2001(33)

19) Q: What term refers to when the front part of the hoof wall is split?

A: Toe crack

S: 4-HHM(11)

TOSS UP WITH A BONUS ATTACHED

20) Q: What piece of equipment protects the back of the rear fetlocks from abrasion during sliding stops?

A: Skid boots

S: H&H2001(34)

BONUS QUESTION

- 21) Q: Name the three unique gaits of the Paso Fino.**
A: 1) Paso fino or fine walk 2) paso corto or short walk 3) paso largo or long walk
S: Griffiths(82)
- 22) Q: In reference to horse health, what do the initials "TPR" stand for?**
A: Temperature, pulse, and respiration
S: Griffiths(155)
- 23) Q: What is it called when you clip the horse's entire coat including the legs?**
A: Body clip
S: Newhor(34)
- 24) Q: What are often referred as the "building blocks" of the body?**
A: Amino acids
S: Griffiths(117)

TOSS UP WITH A BONUS ATTACHED

- 25) Q: What term describes a short, quick, choppy stride?**
A: Trappy
S: H&H2001(13)

BONUS QUESTION

- 26) Q: What are four micro-minerals required by the horse?**
A: 1) Cobalt 2) copper 3) iron 4) manganese 5) iodine 6) zinc 7) selenium
S: Griffiths(131)
- 27) Q: What is the purpose for the hair inside horses' ears?**
A: To help keep dirt and insects from entering the horse's inner ear
S: H&H2001(39)
- 28) Q: What nutrient acts as both a lubricant and regulator of body heat?**
A: Water
S: HS2001(28)

- 29) Q: At what age does a horse have a complete set of permanent incisors?**
A: 5 years
S: HS2001(14)
- 30) Q: In reference to diseases, what do the initials WNV stand for?**
A: West Nile virus
S: Griffiths(180)
- 31) Q: What is the pulse of an average adult horse at rest?**
A: 35 to 45 beats per minute (Griffiths) 45 to 60 beats per minute (HS2001)
S: Griffiths; HS2001(0)
- 32) Q: Name the breed of horse that is known for its colorful coat patterns and was developed by the Nez Perce Indians in the northwest United States.**
A: Appaloosa
S: Newhor(14)

END OF ROUND 3

**2017 NC State Horse Bowl Contest
Junior Division Round 4**

- 1) **Q: What is the proper genetic term for the outward appearance of the horse?**
A: Phenotype
S: Griffiths(93)
- 2) **Q: When a horse is cantering, what is it called when all four feet are off the ground?**
A: Period of suspension
S: Griffiths(74)
- 3) **Q: List two signs or symptoms of strangles.**
A: 1) Fever 2) increased respiration 3) nasal discharge 4) swollen lymph nodes 5) discharge from the eye 6) mucus is thick, yellow and significant 7) dry, painful cough 8) horse may stand with head lowered and neck outstretched 9) difficulty breathing
S: HS2001(49)
- 4) **Q: What is the scientific name for the species of the horse?**
A: Equus caballus
S: Griffiths(15)
- 5) **Q: Where is the major site of fiber digestion in the horse?**
A: Cecum
S: Griffiths(112)
- 6) **Q: What is another name for broom-tailed?**
A: Bang tailed
S: H&H2001(7)

- 7) **Q: What does the term "non-contagious" mean?**
A: A disease that is unable to be spread from one animal to another
S: Griffiths(167)
- 8) **Q: What are the two classes of vitamins?**
A: Fat soluble and water soluble
S: Griffiths(122)
- 9) **Q: What is a martingale used for?**
A: To help control the height of the horse's head
S: H&H2001(34)
- 10) **Q: What horse is known for performing the "slow gait?"**
A: American Saddlebred or five gaited horses
S: Griffiths(81)
- 11) **Q: What do you call the offspring of a male horse and a female donkey?**
A: Hinny
S: Griffiths(22)
- 12) **Q: Where do you usually find zebra marks on a horse?**
A: Around the knees, hocks, or lower legs
S: Griffiths(31)
- 13) **Q: How long is the horse's digestive tract in feet?**
A: Approximately 100 feet
S: HS2001(27)
- 14) **Q: In feet, how far apart are the poles set in the stake race?**
A: 80 feet
S: 4-HR&R(88)

TOSS UP WITH A BONUS ATTACHED

- 15) **Q: What breed was developed from saddle horses by settlers in the Ozarks?**
A: Missouri Fox Trotter
S: H&H2001(57)

BONUS QUESTION

- 16) **Q: Name the three breeds that can have a white coat color.**
A: 1) Arabians 2) thoroughbreds 3) Tennessee walking horses
S: Griffiths(45)
- 17) **Q: Which farrier instrument is commonly used to locate a painful area on the hoof?**
A: Hoof tester
S: Newhor(143)
- 18) **Q: If your horse needs to have a DNA test done, what kind of sample can be submitted in order to complete the test?**
A: Blood, mane hair, tail hair, coat hair
S: Griffiths(103)
- 19) **Q: What are the three most common roan colors?**
A: Blue roan, red roan, strawberry roan
S: Griffiths(47)

TOSS UP WITH A BONUS ATTACHED

- 20) **Q: What is the term for a bad habit of a horse grasping an object with their incisor teeth and sucking in air?**
A: Cribbing
S: HS2001(14)

BONUS QUESTION

- 21) **Q: Name the three thoroughbred Triple Crown races in order.**
A: 1) Kentucky Derby 2) Preakness Stakes 3) Belmont Stakes
S: Newhor(274)

22) Q: Name the NC State 4-H Horse Show class that is composed of four events, with each event counting equally toward the overall placement. The events are Western pleasure, English pleasure, Precision pattern, and Texas barrels.

A: Versatility

S: 4-HR&R(91)

23) Q: What are the two basic energy producing nutrients?

A: Carbohydrates and fats (lipids)

S: Griffiths(143)

24) Q: In what region of the world was the donkey most likely domesticated?

A: Middle East or Egypt

S: Griffiths(16)

TOSS UP WITH A BONUS ATTACHED

25) Q: Name the two types of vision horses possess?

A: Monocular and binocular

S: Griffiths(56)

BONUS QUESTION

26) Q: Name three important features of a stride.

A: 1) Balance 2) directness 3) height 4) length 5) rapidity 6) regularity

S: H&H2001(19)

27) Q: Calcium, magnesium, copper, and iron are all examples of what nutrient?

A: Minerals

S: HS2001(35)

28) Q: Define the term "serviceably sound."

A: A horse may have a structural problem or deviation, but it may have only a limited effect on the animal's ability to perform

S: 4-HJM(9)

- 29) **Q: How many X chromosomes does a mare have?**
A: 2
S: HS2001(21)
- 30) **Q: Name one of the Ranch division classes that is offered at the NC State 4-H Horse Show.**
A: 1) Ranch riding 2) ranch handling 3) ranch horsemanship 4) ranch rail pleasure
5) ranch trail 6) ranch reining
S: 4-HR&R(28)
- 31) **Q: What do you call the scoring units that are used to keep track of knockdowns, refusals, or other offenses committed by a competitor during a jumping round?**
A: Faults
S: Newhor(104)
- 32) **Q: Name the two main sources of forages?**
A: Dry forages (hay) and pastures (grass)
S: HS2001(37)

END OF ROUND 4

2017 NC State Horse Bowl Contest Junior Division Round 5

- 1) Q: What is an anthelmintic used for?**
A: To destroy parasitic worms or deworm a horse
S: HS2001(56)
- 2) Q: Name an exercise designed to teach the horse to move away from leg pressure.**
A: Leg yielding
S: Newhor(167)
- 3) Q: What internal parasite is being described: it is a large worm that affects mainly young horses and can be passed from dam to foal before birth. It causes digestive trouble, colic, and, occasionally, death.**
A: Ascarids, Roundworms or Parascaris Equorum
S: HS2001(57) 7 Newhor(16, 204)
- 4) Q: According to the Zoological classification of the modern horse, what Class does the horse belong to?**
A: Mammalia
S: Griffiths(15)
- 5) Q: What is the primary nerve of the eye?**
A: Optic nerve
S: Griffiths(214)
- 6) Q: What two macro-minerals are needed in balanced proportions to ensure proper bone growth, health, and strength?**
A: Calcium and phosphorus
S: Griffiths(132, 134)

- 7) **Q: This pulse rate is barely detectable in a healthy horse at rest but becomes strong and throbbing if there is an injury or laminitis in the foot.**
A: Digital pulse
S: Griffiths(161)
- 8) **Q: How many degrees of sight does a horse have?**
A: 350 degrees
S: Griffiths(55)
- 9) **Q: Bowel movements and excrement from the intestinal tract are known as what?**
A: Feces
S: Newhor(105)
- 10) **Q: What is the difference between white horses and grey horses?**
A: Skin pigmentation; a true white horse has pink skin and dark colored eyes while a grey has dark pigmented skin
S: Griffiths(45)
- 11) **Q: This term describes the practice of keeping biological or living things, both plants and animals, from being infected with agents that can cause health and disease issues.**
A: Biosecurity
S: Griffiths(193)
- 12) **Q: Horses have chestnuts on all four legs and donkeys only have chestnuts on the front legs. How many chestnuts do mules and hinnies have?**
A: 4
S: Griffiths(21)
- 13) **Q: Name the two major functions of the equine digestive tract**
A: Digestion and absorption
S: Griffiths(108)

14) Q: What type of colic can result from lack of water in the diet?

A: Impaction colic

S: Griffiths(116)

TOSS UP WITH A BONUS ATTACHED

15) Q: What structure on the ovary encompasses each egg prior to ovulation?

A: A follicle

S: HS2001(23)

BONUS QUESTION

16) Q: Name five vaccines recommended by veterinarians.

A: 1) Eastern equine encephalitis 2) western equine encephalitis 3) tetanus 4) rabies 5) influenza 6) West Nile virus 7) strangles

S: Griffiths(193)

17) Q: What is the device used on Western saddles to keep the front cinch and back cinch connected?

A: Connector strap

S: BH(58)

18) Q: Describe the condition of the foot from the following description: the heels of the feet, especially the front, are extremely low and narrow. This could be due to incorrect trimming or shoeing, failure to bear weight on the foot, or lack of moisture.

A: Contracted heels

S: 4-HJM; Newhor(11; 68)

19) Q: What is the major cause of sole bruises?

A: Concussion to the sole by rocks, gravel, or other hard object

S: AYHCYL(334)

TOSS UP WITH A BONUS ATTACHED

20) Q: How do you determine the effectiveness of your deworming program?

A: Have your veterinarian perform a fecal egg count

S: HS2001(59)

BONUS QUESTION

21) Q: Name six of the common structural deviations of the front legs from all views.

A: 1) Splay footed 2) pigeon toed 3) bench kneed 4) knock kneed 5) camped out 6) camped under 7) bow legged 8) buck kneed, over at the knee, or knee sprung 9) calf kneed or back at the knee 10) tied in at the knee

S: 4-HJM(10-11)

22) Q: Name the State 4-H Horse Show Division based on the following classes that are offered: Training Level Test 1, First Level Test 1, USDF Intro 1.

A: Dressage

S: 4-HR&R(12)

23) Q: This is a genetic disorder that causes muscle tremors, weakness, stiffness, and paralysis, during which the animal could stop breathing and die. It is usually seen in Quarter Horses with Impressive bloodlines.

A: Hyperkalemic periodic paralysis (HYPP)

S: Griffiths(98)

24) Q: At the State 4-H Horse Show, what is the penalty for knocking over a barrel during the barrel race?

A: 5 seconds are added to the final time

S: 4-HR&R(85)

TOSS UP WITH A BONUS ATTACHED

25) Q: A horse has how many individual chromosomes?

A: 64

S: Griffiths(88)

BONUS QUESTION

- 26) Q: Name the six parts that make up the horse's digestive tract.**
A: 1) Mouth 2) pharynx 3) esophagus 4) stomach 5) small intestine 6) large intestine
S: HS2001(27)
- 27) Q: What term describes a female horse that has had her ovaries surgically removed?**
A: Spayed
S: Griffiths(23)
- 28) Q: How many incisors are in both the top and bottom jaws of the horses mouth?**
A: 6 in both the lower and the upper jaw
S: AYHCYL(304A-1)
- 29) Q: What is the definition of a stride?**
A: The distance from one imprint to another imprint of the same hoof when completing one step
S: H&H2001(18)
- 30) Q: At the trot, horses with this gait variation seem to skim the surface of the ground. Such horses are often predisposed to stumbling.**
A: Daisy cutter
S: Newhor(77)
- 31) Q: What is the term for the rodeo version of cattle work where one cowboy ropes the steer's horns while the other ropes the heels?**
A: Team roping
S: Newhor(263)
- 32) Q: A horse called a "savage" has an excessive version of what vice?**
A: Biting
S: Newhor(50)

END OF ROUND 5

**2017 NC State Horse Bowl Contest
Junior Division Round 6**

- 1) Q: What are the primary organs of the endocrine system of the horse?**
A: Glands
S: Griffiths(213)
- 2) Q: What is the term for the combination of sperm mixed with fluids from the accessory glands?**
A: Semen
S: HS2001(24)
- 3) Q: For proper equitation, regardless of discipline, what four (4) things should align in the rider's body?**
A: Ear, shoulder, hip, and heel
S: BH(51)
- 4) Q: Including wolf teeth, how many teeth does a stallion or gelding have?**
A: 42
S: HS2001(16)
- 5) Q: Equus originated in North America but disappeared from the continent during what period of history?**
A: Ice Age
S: Griffiths(7)
- 6) Q: Chromosomes are contained in what part of the cell?**
A: Nucleus
S: Griffiths(86)

- 7) **Q: When using a conventional thermometer on a horse, you will need a string and a clothespin. Why?**
A: To prevent the thermometer from being sucked inside the horse (the thermometer should be tied to the clothespin, which is then pinned to the horse's tail)
S: Griffiths(157)
- 8) **Q: Similar to humans, horses can taste what four flavors?**
A: Bitter, sour, sweet, and salty
S: Griffiths(67)
- 9) **Q: You're judging a color class. What is the difference in how you will place this class in comparison to how you would place a halter class?**
A: This class is judged on coat color and pattern and conformation is not a factor
S: Newhor(62)
- 10) **Q: What is the average speed of the canter?**
A: 12 miles per hour
S: Griffiths(74)
- 11) **Q: Name the condition from the following description: excess granulation tissue that rises above the edges of a wound, forming a raw mound which makes further healing impossible without medication or surgery.**
A: Proud flesh
S: AYHCYL(0)
- 12) **Q: What disease is caused by a tumor on the pituitary gland?**
A: Cushing's disease
S: Griffiths(181)
- 13) **Q: A variety of worms that live inside the gut of the horse are classified as what type of parasite?**
A: Internal Parasites
S: HS2001(0)

14) Q: The adult bot fly most resembles what other insect?

A: Honeybee

S: HS2001(56)

TOSS UP WITH A BONUS ATTACHED

15) Q: What disease primarily effects the spinal cord and nervous system of the horse? A spinal tap is typically required for diagnosis.

A: Equine Protozoal Myeloencephalitis (EPM)

S: HS2001(49)

BONUS QUESTION

16) Q: In reference to horse health issues, describe the difference between a sign and a symptom and give an example of each.

A: 1) A sign is an objective, measurable evidence of a health issue; ex: temperature, pulse, respiration 2) A symptom is subjective evidence of a health issue as perceived by an observer; ex: lack of appetite, lessened activity level, pacing in circles

S: Griffiths(166)

17) Q: Which of the five nutrients makes up only 1% of the horse's dietary needs?

A: Vitamins

S: Griffiths(115)

18) Q: A soft, flabby swelling at the point of the elbow is called what?

A: Shoe boil

S: HS2001(13)

19) Q: Hormones from this endocrine gland are required for proper body metabolism and body heat?

A: Thyroid gland

S: Griffiths(138)

TOSS UP WITH A BONUS ATTACHED

20) Q: This nutrient is a vital component in all diets and should make up 8 to 15 percent of a horse's ration.

A: Protein

S: Griffiths(117)

BONUS QUESTION

21) Q: Name the entire zoological classification of the horse in order from kingdom to species.

A: 1) Kingdom: animalia 2) phylum: chordata 3) class: mammalia 4) order: perissodactyla 5) family: equidae 6) genus: Equus 7) species: Equus caballus

S: Griffiths(15)

22) Q: If you see your horse prick up its ears in a certain direction, why should you pay attention?

A: Horses can hear sounds in ranges that humans cannot

S: Griffiths(64)

23) Q: In what type of colic does a loop of bowel get trapped and lose blood supply?

A: Incarceration

S: HS2001(50)

24) Q: What breed would most likely exhibit aniridia?

A: Belgians

S: Griffiths(100)

TOSS UP WITH A BONUS ATTACHED

25) Q: What type of horse activity are Liverpool bits generally used for?

A: Driving, harness, or pulling

S: Newhor(170)

BONUS QUESTION

26) Q: TDN stands for total digestible nutrients. Name the three nutrients that are used in the calculation that determines a feed's TDN.

A: 1) Protein 2) carbohydrates 3) fat

S: HS2001(33)

27) Q: How is a foal's passive immunity obtained?

A: Through the colostrum from the mare

S: Griffiths(169)

28) Q: What is another name for equine encephalitis?

A: Sleeping sickness

S: Griffiths(177)

29) Q: How many species of bots are there?

A: 3

S: HS2001(56)

30) Q: What is the "precursor" needed by the horse for the production of vitamin A?

A: Beta-carotene

S: Griffiths(123)

31) Q: The horse has an excellent sense of hearing. What other sense does the horse use in conjunction with hearing?

A: Sight

S: AYHCYL(0)

32) Q: What breed association is represented by the initials AMHA?

A: The American Miniature Horse Association

S: H&H2001(56)

END OF ROUND 6

**2017 NC State Horse Bowl Contest
Junior Division Round 7**

- 1) Q: What do the initials DNA stand for?**
A: Deoxyribonucleic acid
S: Griffiths(87)
- 2) Q: In ranch riding classes, what is the penalty for blatant disobediences, such as biting, kicking, and rearing?**
A: -5 points
S: 4-HR&R(101)
- 3) Q: The term "seedy toe" refers to what?**
A: An infection of the white line of the hoof
S: Griffiths(183)
- 4) Q: What is the term for when the toe of the front foot hits the hairline of the hind foot on the same side as the horse moves?**
A: Scalping
S: Newhor(240)
- 5) Q: How many fewer chromosome pairs does the donkey have compared to a horse?**
A: 1 pair
S: Griffiths(16)
- 6) Q: What is the name of the social behavior when a horse curls its upper lip and holds its head in the air?**
A: Flehmen response
S: Griffiths(62)

- 7) **Q: What is the solid mass that forms from the follicle after ovulation? This yellow body secretes a hormone to maintain pregnancy.**
A: Corpus luteum
S: HS2001(22)
- 8) **Q: What trace mineral is deficient if a horse is anemic?**
A: Iron
S: Griffiths(139)
- 9) **Q: A deficiency of this micro-mineral causes an affliction known as white muscle disease.**
A: Selenium
S: Griffiths(141)
- 10) **Q: The most common external parasites are flies, lice, mites, ticks, and ringworm. Of those, which two are communicable to man?**
A: Ringworm and mites
S: HS2001(52)
- 11) **Q: Gasterophilus nasalis is commonly known as what?**
A: Throat or chin bot fly
S: HS2001(56)
- 12) **Q: The granules of pigment that control color in the horse are called melanin. Name the two forms of melanin.**
A: Eumelanin and pheomelanin
S: Griffiths(93)
- 13) **Q: What two vitamins cannot be manufactured in the horse's body**
A: Vitamin A and E
S: HS2001(34)

- 14) Q: What is the funnel-like membrane that surrounds the ovary?**
A: Infundibulum
S: HS2001(23)

TOSS UP WITH A BONUS ATTACHED

- 15) Q: The small intestine absorbs what type of vitamins?**
A: Fat soluble
S: Griffiths(111)

BONUS QUESTION

- 16) Q: Horses belong to the order perissodactyla. What are the three qualities that members of this order must possess?**
A: 1) have an odd number of toes 2) be a non-ruminant 3) be hooved
S: Griffiths(15)
- 17) Q: What NC State 4-H Horse Show division provides an educational and therapeutic opportunity for 4-H members with physical or mental disabilities to demonstrate their horsemanship skills?**
A: Adaptive division
S: 4-HR&R(95)
- 18) Q: Define the term "bascule."**
A: Desirable arc in a horse body as it goes over a jump
S: Newhor(24)
- 19) Q: The soft swelling of joints or tendons, usually in the fetlock, are known as what?**
A: Windpuffs
S: 4-HJM(11)

TOSS UP WITH A BONUS ATTACHED

20) Q: What is the term for a gene that cannot mask the genetic makeup of the other gene in the allele pair?

A: Recessive gene

S: Griffiths(90)

BONUS QUESTION

21) Q: The term "overo" includes three coat patterns. Name them.

A: 1) Frame 2) sabino 3) splashed white

S: Griffiths(0)

22) Q: What term refers to an involuntary trembling or quivering of a muscle?

A: Tremor

S: Newhor(184)

23) Q: What two types of vaccines are available to treat tetanus?

A: Antitoxin and toxoid

S: Griffiths(172)

24) Q: Name the tube through which both semen and urine pass in the penis.

A: Urethra

S: HS2001(24)

TOSS UP WITH A BONUS ATTACHED

25) Q: What is the more common name for ascorbic acid?

A: Vitamin C

S: Griffiths(130)

BONUS QUESTION

26) Q: Name, in order, the five major forms of the horse as it evolved to the modern day horse.

A: 1) Prehorse 2) eohippus 3) mesohippus 4) merychippus 5) pliohippus

S: Griffiths(9)

- 27) Q: What NC 4-H Horse Program contest encourages youth to teach others how to do something related to horses by the correct use of visuals and equipment?**
A: Team or individual presentation
S: 4-HR&R(148)
- 28) Q: List two factors that might influence the nutrient value of grass and hay.**
A: Soil fertility, soil type, and climate
S: HS2001(29)
- 29) Q: The coffin bone, cannon bone, and tibia are all parts of what structure in the horse?**
A: Hind leg
S: Griffiths(203)
- 30) Q: Name one place where the horse was first domesticated 6,000 years ago.**
A: Ukraine, Western Europe, or Central Asia
S: Griffiths(13)
- 31) Q: What is the position or location of a gene on a chromosome known as?**
A: Locus or loci
S: Griffiths(90)
- 32) Q: What are the three components of the nervous system?**
A: Brain, spinal cord, and nerves
S: Griffiths(212)

END OF ROUND 7

**2017 NC State Horse Bowl Contest
Junior Division Round 8**

- 1) Q: Name the part of the large intestine extending from the cecum to the rectum.**

A: Colon

S: Newhor(62)

- 2) Q: Which mineral is found in 60% of the hemoglobin in the red blood cells & 20% of the myoglobin in muscle tissue?**

A: Iron

S: Griffiths(139)

- 3) Q: Chromosomes pairs split during the reproductive process & half of the genetic information of each parent is passed on to the next generation in the form of gametes. What is this type of cell division called?**

A: Meiosis

S: Griffiths(88)

- 4) Q: Name one (1) of the mandatory obstacles in Western Trail at the NC State 4-H Horse Show.**

A: Gate (open, pass through and close), Ride over logs or rails, Back through an obstacle

S: NC4HR&R(71)

- 5) Q: Name the condition where there are an insufficient number of red blood cells & can be caused by a deficiency of folic acid?**

A: Anemia

S: Griffiths(129)

- 6) **Q: A lessening of the intensity of the basic color hair is known as what?**
A: Dilution
S: Newhor(81)
- 7) **Q: Liquids can take as little as 15 to 30 minutes & dry matter may take as long as 12 hours to pass through this digestive organ that makes up about 8% of the total digestive tract. Name this organ.**
A: Stomach
S: Griffiths(110)
- 8) **Q: How many pairs of chromosomes does a horse have?**
A: 32
S: Griffiths(20)
- 9) **Q: When body systems are calling all the available blood to the center of the body & away from the extremities in an effort to maintain function of the vital organs, the horse may be going into shock & have a slowed CRT. What is CRT?**
A: Capillary Refill Time
S: Griffiths(163)
- 10) **Q: The bar is the part of the saddle tree that runs along the horse's spine. Name two parts of the horse's body that are also called bars.**
A: Teeth (interdental space) and hoof
S: Newhor(22)
- 11) **Q: Lungworm infection in horses is often related to exposure to what animal?**
A: Donkeys
S: Griffiths(189)
- 12) **Q: Why is washing a horse a poor substitute for regular grooming?**
A: It removes the protective oil of the hair and skin
S: H&H2001(38)

13) Q: Carbohydrates are primarily made of carbon atoms. Name one of the other atoms they may contain.

A: Hydrogen or oxygen

S: Griffiths(145)

14) Q: Which animal is a reservoir for protozoa carrying Equine Protozoal Myeloencephalitis?

A: Opossum

S: Griffiths(174)

TOSS UP WITH A BONUS ATTACHED

15) Q: What is the anatomical term for the long pastern bone?

A: First phalanx

S: Newhor(171)

BONUS QUESTION

16) Q: Name the three microbes that aid in fermentation in the cecum.

A: Bacteria, protozoa and fungi.

S: Griffiths(112)

17) Q: Shoes protect the hoof against excessive wear and may be used to help cure disease or defective hooves and to provide relief from the pain of injured parts. Name 2 conditions where shoes may be used to correct a medical condition.

A: Contracted heels, thrush, hoof-wall cracks, bruised soles, tendonitis

S: H&H2001(0)

18) Q: What markings, also called "pawprints," are small, dark spots found in the white areas of pintos?

A: Inkspots

S: Griffiths(39)

19) Q: In reproduction, artificial lighting is used to prolong estrus in the winter and hasten estrus in the early spring. For what other purpose might a horseman use artificial lighting?

A: To promote shedding and maintain show coats.

S: Newhor(16)

TOSS UP WITH A BONUS ATTACHED

20) Q: In the Saddleseat division of the NC State 4-H Horse Show, day coats are allowed in all classes with the exception of which class?

A: Equitation

S: NC4HR&R(37)

BONUS QUESTION

21) Q: The Internatational Buckskin Horse Association is a registry for horses of what 3 coat colors other than buckskin?

A: Dun, Red Dun, Grullo

S: Newhor(153)

22) Q: Pepsin is an enzyme that works in the stomach to digest protein. What is the job of gastric lipase?

A: digest fats

S: HS2001(29)

23) Q: When discussing vaccines with a fellow horse owner, they mention vaccinating their horse for Lyme disease each spring. What is wrong with this statement?

A: There is no vaccine for horses for this disease.

S: Griffiths(170)

24) Q: The horse has monocular vision, which means it can see separate objects with each eye at the same time. Why is this increased side vision useful?

A: It helps protect the horse from presators, so it can see danger coming from either side without turning its head.

S: HS2001(5)

TOSS UP WITH A BONUS ATTACHED

25) Q: What is the plant pigment that is the precursor of vitamin A?

A: Carotene

S: HS2001(33)

BONUS QUESTION

26) Q: Auscultation is listening for sounds within the body. Name 3 organs that for which auscultation would be used to determine their condition.

A: Lungs, heart, pleura, intestines

S: Newhor(18)

27) Q: In relation to direction on the horse's body, ventral is the opposite of what?

A: Dorsal

S: Griffiths(200)

28) Q: The fat soluble vitamins are A, D, E and K. Why are A and E essential in the diet?

A: They cannot be manufactured in the horse's body.

S: HS2001(29)

29) Q: Chromosomes are long, thread-like structures made of protein. They exist in pairs in all body cells except for which two types?

A: Sperm and Egg

S: HS2001(18)

30) Q: Describe the difference in ancestry of the hot blooded & cold blooded horses.

A: Hot blooded have Arabian ancestors (includes most modern light horse breeds) & Cold blooded have draft horse ancestors

S: Griffiths(24)

- 31) Q: Horses may refuse to eat or poor quality drink food or water because it doesn't smell good to them. Why is this important to their survival?**
- A:** A horse's digestive and respiratory systems are very sensitive and eating or drinking poor quality, moldy or tainted food or water could cause colic, heaves, poisoning or death
- S:** Griffiths(62)
- 32) Q: What is it called when a horse has a outward arched profile of the nose area?**
- A:** Roman nose
- S:** HS2001(13)

END OF ROUND 8

2017 NC State Horse Bowl Contest Junior Division Round 9

- 1) Q: What proof of horse health must be submitted for every horse entered in the NC State 4-H Horse Show?**

A: Negative Coggins Test (within 12 months of the show)

S: 4-H R&R(19)

- 2) Q: The fork of a Western saddle fits over what part of the horse?**

A: Withers

S: H&H2001(27)

- 3) Q: If a horse has renal failure, what organ is not working correctly?**

A: Kidneys

S: Newhor(232)

- 4) Q: Why does the stallion genetically control the sex of the foal?**

A: Sperm can contain either an X or a Y chromosome, while ova can only contain X chromosomes

S: HS2001(22)

- 5) Q: A vitamin D deficiency can only occur from what?**

A: Inadequate sunlight

S: Newhor(284)

- 6) Q: According to the NC 4-H Horse Program Rules and Regulations Manual, what are the three ways ponies are classified, in regards to fence heights, for pony working hunter classes?**

A: Small, medium and large

S: 4-H R&R(50)

- 7) **Q: What is the parasite of horses commonly known as bloodworms?**
A: Strongyles
S: Griffiths(188)
- 8) **Q: The hairs on the outside of the nostrils and lips that help distinguish between good and bad feed are known as what?**
A: Tactile Hairs
S: Newhor(262)
- 9) **Q: Name the disease from the following description: Destruction of muscle tissue, causing muscle-cell necrosis; blood may be seen in the urine; usually occurs in draft breeds.**
A: Rhabdomyolysis (also accept tying-up, Monday-morning disease, azoturia)
S: Griffiths(100)
- 10) **Q: How would you know if a vein was lacerated?**
A: Dark blood would continuously flow.
S: AYHCYL(109)
- 11) **Q: This gene regulates the color distribution of eumelanin and pheomelanin to the skin and hair.**
A: Extension Gene
S: Griffiths(94)
- 12) **Q: This is condition found in newborn foals and is usually seen 2-5 days after birth. It is an incompatibility of the mare's and foal's blood group causing destruction of red blood cells in the newborn foal**
A: Neonatal Isoerythrolysis
S: Griffiths(102)
- 13) **Q: What is the most important thing to consider when building a barn for a horse that has heaves?**
A: Ventilation (need plenty)
S: HS2002(49)

14) Q: What is the term for the substance the horse's immune system will produce in response to the presence of an antigen?

A: Antibody

S: Newhor(12)

TOSS UP WITH A BONUS ATTACHED

15) Q: When talking about chromosomes, what does the term "haploid" mean?

A: Half

S: Griffiths(88)

BONUS QUESTION

16) Q: Name 4 ways excess water leaves a horse's body

A: Urine, feces, sweat and from lungs as water vapor.

S: Griffiths(116)

17) Q: What is the purpose of using a biting rig on a horse? A biting rig is the combination of a bridle, harness pad and crupper?

A: To teach the horse to flex at the poll

S: H&H2001(27)

18) Q: Gasterophilus hemorridalis is commonly known as what?

A: Nose Bot Fly

S: HS2001(56)

19) Q: What is a condition resulting from the presence of organisms in the body that causes health issues or disease?

A: Infection

S: Griffiths(167)

TOSS UP WITH A BONUS ATTACHED

20) Q: Name 2 parts of the horse's head that a bit will put pressure on when you pull back on the reins.

A: Corners of mouth, bars, tongue, roof of mouth, curb groove, nose & poll

S: H&H2001(29)

BONUS QUESTION

21) Q: Name three of the Single-Foot gaits and the breeds that perform them.

A: Running walk/plantation gait; Tennessee Walking Horse, Slow gait/stepping pace/amble; American Saddlebred, Rack; American Saddlebred, Fox Trot; Missouri Fox Trotter

S: Griffiths(81)

22) Q: A gene characteristic that produces only one kind of gamete is called?

A: Homozygous dominant

S: Newhor(141)

23) Q: A horse weight tape can be used to estimate the weight of a horse by measuring where on the horse?

A: Around the heart girth

S: HS2001(43)

24) Q: Drugs that cause contraction of infected areas, such as tannic acid, alum and zinc oxide or sulphage are called what?

A: Astringents

S: HS2001(45)

TOSS UP WITH A BONUS ATTACHED

25) Q: Small teeth located in the interdental space just in front of the premolars are called what?

A: Wolf teeth

S: Newhor(295)

BONUS QUESTION

- 26) Q: Name three characteristics of animals in the Class "Mammalia".**
A: Warm blooded animals that have hair and give milk
S: Griffiths(15)
- 27) Q: What part of the brain controls the basic body functions such as temperature, respiration & heart rate?**
A: The brain stem or medulla oblongata
S: Newhor(37)
- 28) Q: Rectal Palpation is a procedure used to diagnose what condition(s).**
A: Pregnancy, Colic, Abdominal Disease
S: Newhor(230)
- 29) Q: Foals are born without a bacterial population in their large intestine. How do they obtain it?**
A: By eating their dam's feces
S: HS2001(31)
- 30) Q: What is the name of the glands that are located along the urethra of the male horse that produce fluids that nourish and preserve the sperm?**
A: Accessory glands
S: HS2001(22)
- 31) Q: The period of rapid follicle growth in the estrous cycle just prior to heat or estrus is known as what?**
A: Proestrus
S: Newhor(220)
- 32) Q: Some amino acids can be synthesized into different amino acids when the body needs them. The amino acids that can NOT be synthesized in sufficient amounts are known as what?**
A: Essential Amino Acids
S: Griffiths(118)

END OF ROUND 9

**2017 NC State Horse Bowl Contest
Junior Division Extra Toss Up Questions**

- 1) Q: What term describes when you work a horse in a circle on 20-30 foot line? The handler stands in the center of a circle and the horse travels around the circumference.**
A: Longe/Lunge
Source: Newhor(171)
- 2) Q: There are 3 major riding styles or seats. Name two (2) of these different riding styles.**
A: Western, hunt seat and saddle seat
Source: BH(48)
- 3) Q: How many testicles does a stallion have?**
A: Two (2)
Source: HS2001(17)
- 4) Q: What is the most important gait of draft horses?**
A: The walk.
Source: H&H2001(17)
- 5) Q: What is the best control for flies?**
A: Removal of waste and decaying vegetable material.
Source: Griffiths(52)
- 6) Q: About how many miles per hour can a horse go at a canter?**
A: about 12 mph
Source: Griffiths(74)

- 7) **Q: What term describes a heavy, coarse tail?**
A: Broom tail
Source: H&H2001(7)
- 8) **Q: Tan or brown hairs on the muzzle or flank indicates what coat color?**
A: Seal brown
Source: BH(15)
- 9) **Q: Where did the term "horse" originate?**
A: From the Anglo-Saxon word "hors" meaning swiftness
Source: HS2001(5)
- 10) **Q: What is another name for the cecum?**
A: Blind gut or fermentation vat
Source: HS2001(31)
- 11) **Q: How old will a horse be when it has a full mouth?**
A: Five
Source: HS2001(15)
- 12) **Q: What part of a horses eye is defined as a slit in the eye to allow light in?**
A: Pupil
Source: Griffiths(56)
- 13) **Q: What is a war bridle?**
A: An emergency bridle made of rope
Source: H&H2001(29)

- 14) **Q: What is another name for the horse's chestnuts**
A: Nighteyes
Source: H&H2001(8)
- 15) **Q: What do geneticists use to determine expected outcomes and the percentages of offspring for simple inheritance traits?**
A: Punnett Square
Source: Griffiths(92)
- 16) **Q: What is the best way to check capillary-refill time or CRT?**
A: By pressing your finger against their gum and hold for a few seconds
Source: Griffiths(163)
- 17) **Q: Which part of the horse has no bone structure for support, making it the weakest part of the topline?**
A: Loin
Source: HS2001(10)
- 18) **Q: What is a tapadera?**
A: stirrup cover
Source: H&H2001(29)
- 19) **Q: Horses belong to what scientific family?**
A: Equidae
Source: Griffiths(19)
- 20) **Q: Which of the overo coat patterns generally has dark feet and legs?**
A: Frame
Source: Griffiths(49)

- 21) **Q: What term describes a bluish tinge to the coloration?**
A: Smokey
Source: H&H2001(6)
- 22) **Q: What are the 2 types of lice?**
A: biting and sucking
Source: HS2001(53)
- 23) **Q: What breed's association used genetic selection to eliminate Aniridia from their breed by not allowing affected animals to be used as breeding stock?**
A: Belgians
Source: Griffiths(100)
- 24) **Q: Historically, what was the name of the first one-toed horse?**
A: Pliohippus
Source: Griffiths(11)
- 25) **Q: What is the term for the coil-like structure of the amino acids and proteins in DNA?**
A: Double helix
Source: Griffiths(87)
- 26) **Q: How much will the horses stomach hold, in gallons?**
A: 2 to 4 gallons
Source: Griffiths(110)
- 27) **Q: How many diploid chromosomes does a horse have?**
A: 64
Source: Griffiths(20)
- 28) **Q: Mitosis can be defined as what?**

A: The process when body cells split in half

Source: Griffiths(88)

29) Q: Where on the horse can the deltoid muscle be found?

A: Shoulder

Source: Griffiths(204)

30) Q: How many gallons of saliva does a horse produce each day?

A: 8 to 10 gallons

Source: HS2001(28)

**2017 NC State Horse Bowl Contest
Junior Division Extra Bonus Questions**

- 1) Q: What are four (4) areas on the horse you should look at when determining body condition score?**
A: Behind the shoulder, ribs, along the neck, along the withers, crease down the loin, at the tail head
Source: AYHCYL(119-2)
- 2) Q: The equine digestive tract is composed of 5 major parts, what are they?**
A: Mouth, esophagus, stomach, small intestine, large intestine
Source: Griffiths(108)
- 3) Q: There are three (3) main functions of the hoof. What are they?**
A: Shock absorption, locomotion and circulation
Source: H&H2001(48)
- 4) Q: What are the 3 parts of a sperm cell?**
A: Head, middle section and tail
Source: HS2001(25)
- 5) Q: Throughout history, what were four (4) major uses of the horse?**
A: Food, transportation, work, war, and recreation
Source: Griffiths(1)