

## Chapter 6 Cumulative Review

1. Simplify  $6(a + 3b) - 4(2b - 5a)$ . (Lesson 1-4)

1. \_\_\_\_\_

2. To study students' exercise habits, you choose 30 students at random from a list of those students involved in athletics at your school. Is this a good sample? Explain. (Lesson 1-6)

2. \_\_\_\_\_

3. Order  $-2$ ,  $3$ ,  $-7$ ,  $5$ , and  $0$  from greatest to least. (Lesson 2-1)

3. \_\_\_\_\_

4. Evaluate  $3xz - y + 2yz$  if  $x = -1$ ,  $y = 3$ , and  $z = -2$ . (Lesson 2-5)

4. \_\_\_\_\_

5. Find  $-\frac{7}{8} + \frac{1}{2} - (-\frac{3}{4})$ . (Lesson 3-2)

5. \_\_\_\_\_

6. Find the median of the data. (Lesson 3-3)  
 $26, 42, 35, 24, 60, 8$ 

6. \_\_\_\_\_

7. At a wedding you may choose either a garden or Caesar salad, a steak, chicken, or fish entrée, broccoli or asparagus, and chocolate cake or apple pie for dessert. How many dinners are possible? (Lesson 4-2)

7. \_\_\_\_\_

8. Fifteen less than six times a number  $b$  is equal to seven more than four times  $b$ . Find  $b$ . (Lesson 4-6)

8. \_\_\_\_\_

**For Questions 9-11, solve each equation or proportion.**

9.  $|-k - 2| + 2 = 3$  (Lesson 3-7)

9. \_\_\_\_\_

10.  $-\frac{3}{5}m = -45$  (Lesson 4-4)

10. \_\_\_\_\_

11.  $\frac{b + 10}{6} = \frac{b - 6}{2}$  (Lesson 5-1)

11. \_\_\_\_\_

12. 49 is 35% of what number? (Lesson 5-3)

12. \_\_\_\_\_

13. If you pick one letter from the word MATHEMATICS, what is the probability that it will be either M or a vowel? (Lesson 5-6)

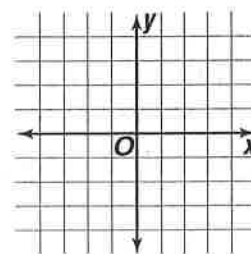
13. \_\_\_\_\_

14. Find the range of  $x - 3y = 10$  if the domain is  $\{-5, -2, 7, 13\}$ . (Lesson 6-2)

14. \_\_\_\_\_

15. Graph  $2x - 3y = 1$ . (Lesson 6-3)

15. \_\_\_\_\_

16. If  $y$  varies directly as  $x$ , and  $y = 54$  when  $x = 12$ , find  $y$  when  $x = 20$ . (Lesson 6-5)

16. \_\_\_\_\_



# What causes the seasons?

## Lesson Review

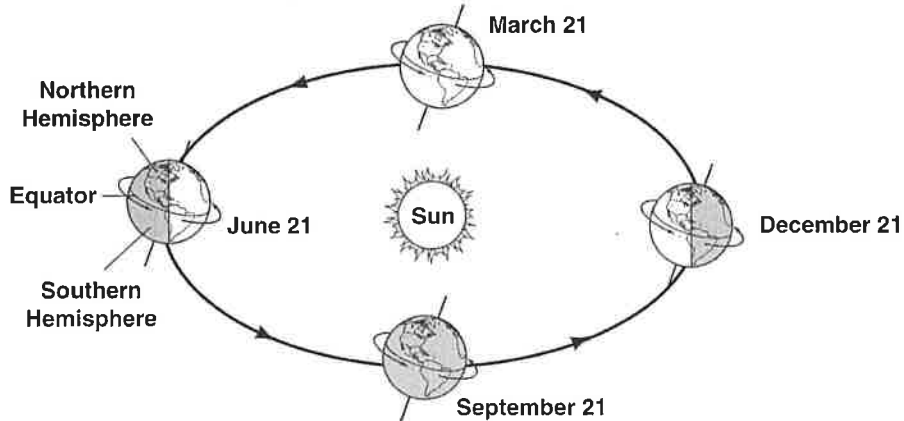
Write *true* if the statement is true. If the statement is false, change the underlined term to make the statement true.

- \_\_\_\_\_ 1. When the North Pole is tilted toward the Sun, the Northern Hemisphere has fewer daylight hours.
- \_\_\_\_\_ 2. During winter, the combination of fewer daylight hours and less direct rays of the Sun causes lower temperatures.
- \_\_\_\_\_ 3. When the Northern Hemisphere is tilted toward the Sun, it has summer.
- \_\_\_\_\_ 4. The seasons are caused in part by the tilt of Earth's axis.
- \_\_\_\_\_ 5. During summer, the Sun's rays are less direct.
- \_\_\_\_\_ 6. Direct rays produce more heat than indirect rays.
- \_\_\_\_\_ 7. The seasons in the Northern Hemisphere and the Southern Hemisphere are the same.

## Skill Challenge

**Skills:** interpreting, applying concepts

Use the diagram to answer the following.



1. Does Earth revolve around the Sun in a clockwise or counterclockwise direction as viewed from above? \_\_\_\_\_
2. a. What season begins in the Northern Hemisphere on December 21? \_\_\_\_\_  
 b. What season begins in the Southern Hemisphere on December 21? \_\_\_\_\_
3. a. What season begins in the Northern Hemisphere on March 21? \_\_\_\_\_  
 b. What season begins in the Southern Hemisphere on March 21? \_\_\_\_\_
4. Does the Northern Hemisphere receive direct or indirect rays from the Sun on June 21? \_\_\_\_\_
5. Does the Northern Hemisphere have more daylight hours on December 21 or June 21? \_\_\_\_\_





Label all countries and bodies of water



**Questions 19-28 are based on the following passage and supplementary material.**

This passage is adapted from Bettina Boxall, "Yellowstone Wolves Boost Berry Diet for Grizzlies, Study Says." ©2013 by Los Angeles Times.

In another example of how the return of a top predator can have far-reaching ecological effects, researchers have found that the reintroduction of the  
 Line gray wolf to Yellowstone National Park has boosted  
 5 an important food source for the threatened grizzly bear. A study published in the *Journal of Animal Ecology* is essentially a tale of who eats what.

When wolves were reintroduced to the park in 1995 after a 70-year absence, they preyed on elk  
 10 herds that browsed trees and shrubs. The elk population, which had exploded without the wolves, dropped. The over-browsed plants began to rebound, including berry-producing shrubs that provide nutritious summer meals for grizzlies when they are  
 15 fattening up for hibernation.

"The grizzly bear uses some of the same plants that the prey of the wolf uses," said William Ripple, an Oregon State University professor of forest ecosystems and lead author of the study. "The  
 20 reintroduction of one top predator is potentially affecting another top predator through this food web."

Ripple and his fellow researchers at OSU and Washington State University compared the  
 25 frequency of fruit found in grizzly bear scat (animal fecal droppings) to elk numbers before and after wolf introduction. Over a 19-year period, they found that the average proportion of fruit in grizzly scat rose significantly after wolves returned to Yellowstone  
 30 and the elk population fell. The scientists examined and rejected other possible explanations for the smaller, pre-wolf proportion of fruit in grizzly diets—such as climate influences or the operation of open-pit garbage dumps that served as bear mess  
 35 halls before the last one was closed in 1970.

Previous research by Ripple and colleagues has demonstrated other ways in which the gray wolf's return has had a cascading effect in the Greater Yellowstone Ecosystem, the wildest in the lower  
 40 48 states. Ripple's work was the first to show that aspens declined after wolves were eliminated from the park in the 1920s. When wolves returned and drove down the elk numbers, scientists saw a resurgence of aspen, cottonwood, and willows in  
 45 some parts of the park that has led to an increase in beavers.

"We're in the early stages of this ecosystem recovery. This is what we call passive restoration," Ripple said. "We put the wolf back in and then we let  
 50 nature take its course." In the case of the grizzly, the paper's authors said increasing berry production could help make up for the loss of another bear food threatened by climate change, whitebark pine nuts. The Yellowstone region's whitebark pines have  
 55 been dying en masse, the victim of beetle kills promoted by milder winters. Wildlife biologists worry the diminishing nut crop could hurt grizzly survival.

Ripple cautioned that it will take time for  
 60 berry-producing shrubs to regrow. "It may not be a panacea or a big silver bullet as a food item for the grizzlies."

The wolf-bear connection in Yellowstone offers a broader lesson, Ripple said. "We should be looking  
 65 much farther and much more holistically at large mammal or predator management," he suggested. "There could be far reaching effects that we have not considered in the past. And they can be very important."

Annual Counts of Northern Yellowstone Elk and Wolves  
and the Ratio of Wolves per 1,000 Elk, 1986–2004

Year	Winter elk count	Wolf numbers	Wolf/elk ratio
1986	16,286	0	0
1987	17,007	0	0
1988	18,913	0	0
1989	*10,265	0	0
1990	14,829	0	0
1991	*9,465	0	0
1992	12,859	0	0
1993	17,585	0	0
1994	19,045	0	0
1995	16,791	0	0
1996	—**	21	—**
1997	—**	24	—**
1998	11,736	32	2.73
1999	11,742	48	4.09
2000	14,539	44	3.03
2001	13,400	72	5.37
2002	11,969	77	6.43
2003	9,215	84	9.12
2004	8,335	106	12.72

\*Poor counting conditions; count is likely a substantial underestimate.

\*\*Elk count not available in 1996 and 1997.

Adapted from Patrick J. White and R. A. Garrott, "Northern Yellowstone Elk after Wolf Restoration." ©2005 by John Wiley & Sons, Inc.

19

The main purpose of the passage is to

- A) discuss an ecological phenomenon.
- B) analyze a scientific experiment.
- C) resolve an environmental debate.
- D) draw attention to a historic discovery.

20

According to the passage, what was a direct result of the drop in the elk population at Yellowstone National Park?

- A) An investigation of the grizzly bear population
- B) A decrease in the number of aspen trees
- C) An increase in fruit-bearing plants
- D) A surge in the wolf population

21

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 6-7 ("A study . . . what")
- B) Lines 12-15 ("The over-browsed . . . hibernation")
- C) Lines 42-46 ("When . . . beavers")
- D) Lines 49-50 ("We put . . . course")

22

According to the passage, one potential challenge to the survival of the grizzly bear population in Yellowstone National Park is a shortage of

- A) elk.
- B) beetles.
- C) cottonwood trees.
- D) whitebark pine trees.



23

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 27-30 (“Over . . . fell”)
- B) Lines 50-53 (“In the . . . nuts”)
- C) Lines 59-60 (“Ripple . . . regrow”)
- D) Lines 60-62 (“It may . . . grizzlies”)

24

As used in line 10, “browsed” most nearly means

- A) inspected.
- B) skimmed.
- C) destroyed.
- D) grazed.

25

Which choice most closely captures the meaning of the figurative “big silver bullet” referred to in line 61?

- A) Unexpected outcome
- B) Tempting choice
- C) Definitive solution
- D) Dangerous event

26

The main purpose of the final paragraph of the passage is to

- A) advise the reader of some potential limitations of Ripple’s conclusions about the nutritional needs of the grizzly bear.
- B) extend the implications of the relationship between wolves and grizzlies in a particular environment to other animals and contexts.
- C) describe a certain experiment that Ripple will be undertaking in the future to corroborate his findings.
- D) suggest the potential ramifications of reintroducing another species into an already fragile ecosystem.

27

According to the table, the wolf/elk ratio experienced a decrease between which of the following years?

- A) 1998 and 1999
- B) 1999 and 2000
- C) 2000 and 2001
- D) 2003 and 2004

28

Which claim from the passage is most directly supported by the data given in the table?

- A) Elk numbers in Yellowstone National Park showed an overall decline as a result of the introduction of wolves.
- B) Elk numbers in Yellowstone National Park declined every year following the introduction of wolves.
- C) Elk numbers in Yellowstone National Park in any given year decreased as the ratio of wolves to elk that year increased.
- D) Elk numbers in Yellowstone National Park stabilized after an initial decline as wolf population numbers stabilized.

**Questions 29-38 are based on the following passages.**

Passage 1 is adapted from Henry David Thoreau, "Resistance to Civil Government." Originally published in 1849. Passage 2 is adapted from Martin Luther King, Jr., "Letter from Birmingham Jail." ©1986 by the Estate of Martin Luther King, Jr. Thoreau wrote at a time when slavery was legal in the United States. In 1963, King was arrested while protesting racial segregation in Birmingham, Alabama; he wrote this letter while in jail.

**Passage 1**

Must the citizen ever for a moment, or in the least degree, resign his conscience to the legislator? Why has every man a conscience, then? I think that we  
 Line should be men first, and subjects afterward. It is not  
 5 desirable to cultivate a respect for the law, so much as for the right. The only obligation which I have a right to assume is to do at any time what I think right. It is truly enough said that a corporation has no  
 10 conscience; but a corporation of conscientious men is a corporation *with* a conscience. Law never made men a whit more just; and, by means of their respect for it, even the well-disposed are daily made the agents of injustice. . . .

The mass of men serve the state . . . not as men  
 15 mainly, but as machines, with their bodies. They are the standing army, and the militia, jailers, constables, . . . etc. In most cases there is no free exercise whatever of the judgment or of the moral sense; but they put themselves on a level with wood and earth  
 20 and stones; and wooden men can perhaps be manufactured that will serve the purpose as well. Such command no more respect than men of straw or a lump of dirt. They have the same sort of worth only as horses and dogs. Yet such as these even  
 25 are commonly esteemed good citizens. Others, as most legislators, politicians, lawyers, ministers, and office-holders, serve the state chiefly with their heads; and, as they rarely make any moral distinctions, they are as likely to serve the devil, without *intending* it, as  
 30 God. A very few, as heroes, patriots, martyrs, reformers in the great sense, and *men*, serve the state with their consciences also, and so necessarily resist it for the most part; and they are commonly treated as enemies by it. . . .

35 How does it become a man to behave toward this American government to-day? I answer, that he cannot without disgrace be associated with it. I

cannot for an instant recognize that political organization as *my* government which is the *slave's*  
 40 government also.

**Passage 2**

You express a great deal of anxiety over our willingness to break laws. This is certainly a legitimate concern. Since we so diligently urge people to obey the Supreme Court's decision of 1954  
 45 outlawing segregation in the public schools, at first glance it may seem rather paradoxical for us consciously to break laws. One may well ask: "How can you advocate breaking some laws and obeying others?" The answer lies in the fact that there are  
 50 two types of laws: just and unjust. I would be the first to advocate obeying just laws. One has not only a legal but a moral responsibility to obey just laws. Conversely, one has a moral responsibility to disobey unjust laws. I would agree with St. Augustine that "an  
 55 unjust law is no law at all."

Now, what is the difference between the two? How does one determine whether a law is just or unjust? A just law is a man-made code that squares with the moral law or the law of God. An unjust law  
 60 is a code that is out of harmony with the moral law. To put it in the terms of St. Thomas Aquinas: An unjust law is a human law that is not rooted in eternal law and natural law. Any law that uplifts human personality is just. Any law that degrades  
 65 human personality is unjust. All segregation statutes are unjust because segregation distorts the soul and damages the personality. It gives the segregator a false sense of superiority and the segregated a false sense of inferiority. . . . Thus it is that I can urge  
 70 men to obey the 1954 decision of the Supreme Court, for it is morally right; and I can urge them to disobey segregation ordinances, for they are morally wrong. . . .

In no sense do I advocate evading or defying the  
 75 law, as would the rabid segregationist [by refusing to comply with the Supreme Court ruling]. That would lead to anarchy. One who breaks an unjust law must do so openly, lovingly, and with a willingness to accept the penalty. I submit that an individual who  
 80 breaks a law that conscience tells him is unjust, and who willingly accepts the penalty of imprisonment in order to arouse the conscience of the community over its injustice, is in reality expressing the highest respect for law.

29

As used in line 22, “command” most nearly means

- A) order.
- B) dominate.
- C) overlook.
- D) deserve.

30

Thoreau makes which point about people who follow their consciences?

- A) They often band together with other entities to form corporations.
- B) They tend to have mutually antagonistic relationships with their governments.
- C) They generally believe that the exercise of the moral sense is what makes them human.
- D) They hold their legislators to a different moral standard than that to which they hold themselves.

31

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 1-2 (“Must . . . legislator”)
- B) Lines 7-10 (“It is . . . conscience”)
- C) Lines 17-21 (“In most . . . well”)
- D) Lines 30-34 (“A very . . . by it”)

32

According to King, an unjust statute should not be

- A) regarded as having moral authority.
- B) broken in a manner intended to attract attention.
- C) viewed as detrimental to the human spirit.
- D) used to enforce obedience to moral law.

33

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 49-50 (“The answer . . . unjust”)
- B) Lines 51-52 (“One . . . laws”)
- C) Lines 53-55 (“one . . . all”)
- D) Lines 64-65 (“Any . . . unjust”)

34

As used in line 57, “determine” most nearly means

- A) establish.
- B) regulate.
- C) direct.
- D) limit.

35

The primary purpose of each passage is to

- A) make an argument about the relationship between the individual and the law.
- B) advance a view on how laws could be made more just.
- C) question a claim that the morality of actions depends on their consequences.
- D) discuss a change in the nature of the state and its power over the individual.

36

Both authors would most likely agree with which statement about people who obey their government's statutes?

- A) They fail to follow the guidance of their consciences.
- B) They are incapable of exercising moral judgment.
- C) They may not be acting in accordance with justice.
- D) They value personal morality over the public good.

37

In the passages, a significant difference in how the two authors discuss morality is that Thoreau indicates that

- A) very few people follow their consciences, while King indicates that most people consistently adhere to moral laws.
- B) people should do what they judge to be right, while King indicates that people should follow a universal moral code.
- C) the morality of an action derives from its legal status, while King indicates that morality and human law are distinct.
- D) even morally good laws should be disobeyed, while King indicates that people should follow just laws.

38

Assuming that he agrees with the assertions in the final paragraph of Passage 1, King would most likely recommend which course of action to Thoreau?

- A) Thoreau should obey laws upholding slavery while they are in force but should work to repeal them.
- B) Thoreau should view laws upholding slavery as immoral but should not break them since doing so would lead to anarchy.
- C) Thoreau should break laws upholding slavery and in doing so should neither hide his actions nor try to avoid punishment.
- D) Thoreau should openly criticize laws upholding slavery but should follow them since committing a crime would degrade his personality.

**Questions 39-47 are based on the following passage.**

This passage is adapted from Ed Yong, "Gut Bacteria Allows Insect Pest to Foil Farmers." ©2013 by National Geographic Society.

Here is a lesson that we're going to be taught again and again in the coming years: Most animals are not just animals. They're also collections of  
 Line microbes. If you really want to understand animals,  
 5 you'll also have to understand the world of microbes inside them. In other words, zoology is ecology.

Consider the western corn rootworm—a beetle that's a serious pest of corn in the United States. The adults have strong preferences for laying eggs in corn  
 10 fields, so that their underground larvae hatch into a feast of corn roots. This life cycle depends on a continuous year-on-year supply of corn. Farmers can use this dependency against the rootworm, by planting soybean and corn in alternate years.  
 15 These rotations mean that rootworms lay eggs into corn fields but their larvae hatch among soybean, and die.

But the rootworms have adapted to this strategy by reducing their strong instincts for laying eggs in  
 20 corn. These rotation-resistant females might lay among soybean fields, so their larvae hatch into a crop of corn.

There are almost certainly genetic differences that separate the rotation-resistant rootworms from their  
 25 normal peers, but what are they? Researchers at the University of Illinois have been studying the problem since 2000 and, despite generating a vast mountain of data, have failed to find the genes in question.

"The western corn rootworm has been an enigma for  
 30 a long time," says Manfredo Seufferheld. "This insect has the ability to adapt to practically all control methods deployed against it, including crop rotation. After many years of research about the mechanisms of rotation resistance, results were mostly  
 35 inconclusive."

So, Seufferheld looked elsewhere. Rather than focusing on the rootworm's own genes, he studied the genes of the bacteria in its gut . . . and found some answers. The rotation-resistant varieties have  
 40 very different gut bacteria from the normal ones. And when the team killed these microbes with antibiotics, they severely reduced the beetle's ability to cope with rotation.

"The bad guy in the story—the western corn  
 45 rootworm—was actually part of a multi-species conspiracy," says Joe Spencer, who was part of the study.

The team, including graduate student Chia-Ching Chu, found that a third of the rootworms' gut  
 50 bacteria comprise species that are unique to either the resistant or normal varieties. These two factions also differ in the relative numbers of the bacteria that they share.

These different microbes give the resistant beetles  
 55 an edge when eating soybeans. The rootworms digest the protein in their meals using enzymes called cysteine proteases, and soybeans defend themselves with substances that can block these enzymes. But Chu found that the more the beetles' bacteria  
 60 differed from the normal set, the higher the levels of cysteine proteases in their guts. By avoiding indigestion, these beetles were better at surviving among soybeans, and more likely to lay their eggs there.

65 The team proved that the bacteria were responsible by killing them with antibiotics. Sure enough, this drastically lowered the cysteine protease activity in the guts of the rotation-resistant beetles and wrecked their ability to thrive among soybeans.

39

Over the course of the passage, the main focus shifts from a

- A) statement about the challenge posed by a particular insect to an indication of why that challenge was easy to overcome.
- B) summary of a once-unexplained natural phenomenon to a biography of the scientists who researched that phenomenon.
- C) description of a problem affecting agriculture to an explanation of how scientists identified the cause of that problem.
- D) discussion about a scientific field to an anecdote showing how research is done in that field.

40

The statement “zoology is ecology” (line 6) mainly serves to

- A) propose that two areas of scientific knowledge be merged.
- B) point out that knowledge obtained in one field of research will lead to expertise in another.
- C) assert a point about biological science that is supported by the example in the passage.
- D) suggest that one field of scientific research has completely supplanted another.

41

According to the passage, one similarity between rotation-resistant rootworms and normal rootworms is that they both

- A) reduce crop productivity by extracting nutrients from the soil.
- B) produce larvae that feed on the plant roots of crops.
- C) adapt to crop rotation by maintaining high levels of enzymes in their guts.
- D) contain the same quantity and composition of bacteria in their guts.

42

Which choice most clearly provides information indicating how some rootworms have overcome farmers’ efforts to eradicate them?

- A) Lines 15-17 (“These . . . die”)
- B) Lines 18-20 (“But . . . corn”)
- C) Lines 25-28 (“Researchers . . . question”)
- D) Lines 41-43 (“And . . . rotation”)

43

The central claim in the fourth paragraph (lines 23-35) is that

- A) extensive study of the rootworm’s genes was insufficient to determine why some rootworms are rotation resistant.
- B) the rootworm’s ability to adapt to pest control methods is unique among insects.
- C) the genetic profile of rootworms is significantly more complex than researchers initially believed.
- D) our current understanding of genetics is inadequate to allow researchers to understand why some rootworms are rotation resistant.

44

As used in line 24, “separate” most nearly means

- A) distinguish.
- B) discharge.
- C) extract.
- D) scatter.

45

According to the passage, the gut bacteria of rotation-resistant rootworms

- A) help the rootworms survive in soybean crops.
- B) are responsible for lowering the amount of cysteine protease in the rootworms’ guts.
- C) make the rootworms less vulnerable to being killed by antibiotics.
- D) are transferred to the larvae that hatch from the rootworms’ eggs.

46

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 29-30 (“The western . . . Seufferheld”)
- B) Lines 39-40 (“The rotation-resistant . . . ones”)
- C) Lines 44-47 (“The bad . . . study”)
- D) Lines 54-55 (“These . . . soybeans”)

47

The main idea of the last paragraph is that

- A) cysteine proteases are harmful to rootworms when present in large quantities in the body.
- B) eggs laid by rotation-resistant rootworms will hatch into crops of soybeans.
- C) bacteria unique to rotation-resistant rootworms allow them to digest soybeans.
- D) rotation-resistant rootworms do not digest soybeans using cysteine proteases.

**STOP**

**If you finish before time is called, you may check your work on this section only.  
Do not turn to any other section.**

