**STAAR Test Review**

The new STAAR exams for high school students in Texas have got a lot of students worried, and rightly so. If you’re currently enrolled in a Texas high school, you have no doubt already heard some rumors (and some horror stories) about these new tests. You’ve been told that there are a dozen tests you have to pass. You’ve heard that each test can take hours to finish. People are saying that your test scores will have an impact on your final grade in your high school courses. You’ve heard from many people, students and educators, that the tests are more difficult to pass than the old TAKS tests. Well, you heard right. Everything above is true, and then some. You will have to pass a dozen tests in order to earn a high school diploma, and each test can take several hours to complete, and your score will account for fifteen percent of your final grade in the course, and the tests are much harder than the old TAKS exams. Well, there’s certainly reason to be concerned, but there is no reason to be scared. Because we can help you pass the tests and get your high school diploma. Before we explore that, let’s look at some important background information about the STAAR tests.

Years ago, parents and legislators across America became concerned that many students were being promoted and allowed to graduate without actually learning very much. In response, states began requiring students to pass a variety of tests, in order to demonstrate that they had acquired a certain amount of knowledge, before they could receive a high school diploma. In Texas, there have been several different versions of these tests. The early version was known as Texas Educational Assessment of Minimum Skills, or TEAMS. Then it turned into Texas Assessment of Academic Skills, or TAAS. That was replaced by Texas Assessment of Knowledge and Skills, or TAKS. Now TAKS is being phased out and replaced with STAAR, which stands for State of Texas Assessments of Academic Readiness. Several changes have been made. For one thing, there are now a dozen different tests high school students are required to take. In English, the tests are English I, English II, and English III. In science, the tests are Biology, Chemistry, and Physics. The math tests are Algebra I, Geometry, and Algebra II. The science test subjects are World Geography, World History, and American History. All three tests in each subject must be passed to receive a passing score in that subject, and the final score will count toward a student’s grade.

Another thing to keep in mind is the reason Texas decided to get rid of TAKS and come up with a new system. They did so because people were complaining that the TAKS tests were too easy, and weren’t getting the job done. In other words, the new system of tests is going to be a lot harder to pass than the old system, making it that much hard to earn a high school diploma. This is certainly cause for concern. Fortunately, though, you don’t need to be scared of the exams. Because on this website you’ll find the help you need in order to pass the exams and get your diploma. You’ll learn about each one of the twelve different exams, what each one is about, when it’s given, the material you’ll need to know to pass it, the number of questions on the test and the format, etc. Best of all, we’ll give you a lot of free test questions you can take to get an idea of where you stand. When you know your weak areas, you can concentrate on those in the days and weeks before taking the test, giving you plenty of time to study so you wind up passing the test.

We can’t stress enough how important it is to spend adequate time on test prep for the STAAR exams. Did you know that a high school diploma can mean the difference between living well, and a life of poverty? It’s true. These days, it’s nearly impossible to land a decent, good paying job without a diploma. If you doubt this, just go to any job listing website, or the job section in your local classified ads, and see what’s available for a person without a high school diploma. Good luck, because you’re going to need it. You’ll find it’s slim pickings, indeed. In fact, in most cases, there won’t be a single job opening listed that doesn’t require an applicant to have a high school diploma. Of course, to get the really good jobs, you’ll need a degree from a college or a trade school, which is pretty much impossible to get without a high school diploma. Sure, you can theoretically go back and get a GED one day, but if you don’t pass the STAAR exams there’s no reason to believe you’ll pass the GED. So it’s important not to underestimate these tests. They won’t be easy to pass, but by using our free guides and free test questions, you’ll get the information and practice you need to relax and face the tests with confidence.

**STAAR Practice Test Questions**

# Reading Comprehension Practice Questions

Jean Piaget (1896-1980) was a Swiss developmental psychologist and philosopher. Originally trained as a botanist, he developed one of the most important theories of cognitive development in the field of developmental psychology. He was born in the French-speaking part of Switzerland. The son of a university professor, Jean was an intellectually precocious child who was interested in the natural world and the subject of biology. Piaget was growing up during a time when Sigmund Freud’s theory and practice of psychoanalysis was developing and becoming popular, which also influenced his interests.  
After graduating from his university studies, Piaget moved to Paris and taught at a school directed by Alfred Binet, who developed standardized intelligence tests still used today. As he helped to score Binet’s tests, Piaget noticed patterns of consistent errors made by younger children but not by older children and adults. He formed a hypothesis that young children thought differently than adults. This was the germ of what would eventually become his theory of progressive, distinct stages of cognitive development that people go through universally as they grow.

Piaget went from France back to Switzerland in 1921, where he directed the Rousseau Institute in Geneva. When he and his wife had three children of their own, he studied their behavior and learning from their births and through their childhoods. He used the techniques of direct observation and the case study, a method of developing an in-depth, multidimensional profile of each individual child. Piaget described children as “little scientists” who learned through exploring, interacting with, and acting upon their environments.  
Piaget proposed in his theory that in learning, just as in biology, humans adapt to their environments through processes of assimilation and accommodation. He proposed that babies form mental constructs to represent their world, which he called schemata. An infant assimilates new information by fitting it into an existing schema. When it will not fit, the child accommodates to it by modifying an existing schema or forming a new one. Because of his emphasis on children’s roles in actively constructing their own knowledge of reality, Piaget has been called a great pioneer of constructivism, the theory that people build knowledge based on interactions between their thoughts and experiences.

**1. According to this passage, Piaget’s first scientific discipline was:**

A. Botany.  
B. Developmental psychology.  
C. Philosophy.  
D. Cognitive development.  
E. None of these.

**2. Piaget’s proposal of human adaptation to the environment was an application of a principle of:**

A. Freudian psychoanalysis.  
B. The biology he studied.  
C. Binet’s intelligence test.  
D. Direct child observation.  
E. None of these.

**3.What is correct about Piaget’s experience with Alfred Binet’s intelligence tests, according to the passage?**  
A. Piaget helped Alfred Binet by developing the intelligence tests.  
B. Piaget found the tests were inappropriate for younger children.  
C. Piaget felt younger children thought differently than adults did.  
D. Piaget identified error patterns that invalidated the test results.  
E. None of these

**4. Piaget’s theory involved which of these?**

A. A gradual and continuous progression of cognitive development  
B. Completely different progression from one individual to the next  
C. The premise that younger children make errors but adults do not  
D. Universal progressive stages of development all humans undergo  
E. None of these

**5. The theory that humans build knowledge from interactions between their thoughts and experiences is called:**  
A. Biology.  
B. Constructivism.  
C. Cognitive development.  
D. Developmental psychology.  
E. None of these.

**6. According to this passage, \_\_\_\_\_\_\_\_\_are in Piaget’s preoperational stage of cognitive development.**

A. Toddlers  
B. Infants  
C. Teens  
D. Adults  
E. Unknown

**7. If a child believes that his disobedience caused a thunderstorm, this is most specifically an example of what Piaget termed:**

A. Animism.  
B. Magical thinking.  
C. Egocentrism.  
D. Conservation.  
E. None of these.

**8. Which of these is correct about the stage of concrete operations, according to this passage?**

A. Children can think abstractly during this stage.  
B. Children still think egocentrically in this stage.  
C. Children can think logically during this stage.  
D. Children cannot perform mental operations.  
E. None of these is available from the passage.

**9. In a classic Piagetian experiment, a researcher pours liquid into a tall, narrow beaker, and transfers it to a short, wide beaker in front of a student, asking the student which beaker holds more liquid. The student says the amount of liquid is the same regardless of which beaker holds it. Of Piaget’s stages, which is the earliest one in which this student is likely to be?**  
A. Sensorimotor  
B. Preoperational  
C. Concrete operations  
D. Formal operations  
E. This is not available

**10. According to the passage, which is true regarding Lawrence Kohlberg’s theory?**

A. It is a cognitive theory that opposes Piaget’s theory.  
B. It is a theory which is unrelated to Piaget’s theory.  
C. It focuses primarily upon cognitive development.  
D. It expands on Piaget’s moral development theory.  
E. It cannot be known which is true from the passage.

**Answers – Reading Comprehension**

1. A: The second sentence states that Piaget was originally trained as a botanist. While the first sentence identifies him as a developmental psychologist and philosopher (B), and the second sentence states that his theory of cognitive development (D) is one of the most important in the field of developmental psychology, these fields are not identified as his first discipline.

2. B: The first sentence of the fourth paragraph in the passage states that Piaget proposed in his theory that “just as in biology, humans adapt to their environments…” Freudian psychoanalysis (A) is named earlier in the passage as an influence on Piaget’s interests, but not as including a principle he applied to environmental adaptation. Binet’s intelligence test (C) is identified as an instrument Piaget helped Binet to score, and as a source for his hypothesis that children think differently than adults, but not as a source for his proposal of adaptation through assimilation and accommodation. Direct child observation (D) is identified as a method Piaget used to study children, not as containing a principle he applied regarding adaptation.

3. C: The passage states that Piaget helped Binet to score his intelligence tests, but not that he helped by actually developing the tests (A). The passage says that Piaget identified error patterns in younger children’s test results, but not that these patterns made the tests inappropriate for younger children (B) or that they invalidated the results (D). Rather, these patterns he noticed helped him to form his hypothesis that children thought differently than adults (C).

4. D: Piaget’s theory involved progressive stages of development which all humans universally undergo, as the passage states. His theory did not involve gradual and continuous progression (A), because he formulated distinct stages of cognitive development. Gradual and continuous development would preclude separate stages. The statement that this progression through stages was universal means that it was not completely different for each individual (B). The passage never says Piaget’s theory had a premise that younger children make errors but adults do not (C). It only says Piaget noticed consistent patterns of certain errors by younger children but not by adults on Binet’s tests and he concluded from these that younger children think differently than adults.

5. B: The theory that humans build knowledge from interactions between their ideas and their experiences is known as constructivism. This information is given in the last sentence of the passage. Biology (A) is not the name of this theory; it is the scientific field of Piaget’s early interest, which influenced his own theory. It was from biology that he applied the idea that in learning, humans also adapt mentally to their environments through assimilation and accommodation. Cognitive development (C) is the area on which Piaget’s own theory is focused. Developmental psychology (D) is the disciplinary field wherein Piaget’s and other theories of cognitive development are categorized.

6. A: The second paragraph of the passage identifies the preoperational stage as being approximately from ages 2-7 years. This age range would include toddlers. Infants (A) are identified in the first paragraph of the passage as being in the sensorimotor stage of cognitive development. Teens (C) and adults (D) are identified in the last (fourth) paragraph as being in Piaget’s stage of formal operations. This information is given, so it is not unknown (E).

7. B: Magical thinking is defined in the second paragraph as believing one’s thoughts or actions cause unrelated external events. In the same paragraph, animism (A) is defined as attributing human characteristics and behaviors to inanimate objects. Egocentrism (C) is defined in the same paragraph as thinking the world revolves around oneself, and the inability to assume others’ viewpoints. While animism and magical thinking are characteristics of the egocentrism Piaget found typical of the preoperational stage, the example is most specifically of magical thinking, so egocentrism is not the most specific answer choice. Conservation (D) is defined in the second and third paragraphs as the ability to retain mentally the properties of objects despite changes in their appearance, shape, or arrangement. Conservation with concrete materials is identified as developing in the concrete operations stage, while the first three answer choices are characteristics of the preoperational stage.

8. C: The third paragraph of the passage indicates that children can first think logically during the stage of concrete operations. However, this logic only applies to concrete objects; the passage also states that they cannot yet think abstractly during this stage (A). This paragraph also says that children no longer think egocentrically in this stage (B). The passage indicates that the concrete operations stage is the period when children can first perform mental operations (D). All of this information is available from the passage (E).

9. C: The passage identifies the stage of concrete operations as the first one wherein a person achieves conservation, as long as it involves concrete materials. Students in this stage can understand that the volume of liquid remains the same regardless of the shape of its container, as in the example. The passage states they cannot perform wholly mental operations until the stage of formal operations (D), but the experiment described uses concrete materials, so the earliest stage when a student could answer correctly is concrete operations (C). The sensorimotor stage (A) is identified as that of infants and the preoperational (B) of children around 2-7 years; both are described as stages wherein logical thought has not yet developed. This information is available (E) from the passage for application to the experiment described in the question.

10. D: The end of the passage states that Kohlberg’s theory of moral reasoning expands on the foundations Piaget provided in his theory of moral development. Kohlberg’s theory is also a cognitive theory, but it is based on Piaget’s theory and does not oppose it (A). Being based on Piaget’s work, Kohlberg’s theory is not unrelated to it (B). Kohlberg’s theory is identified in the passage as a theory of moral reasoning; this is its primary focus, not cognitive development (C) overall. It is not true that this answer cannot be known from the passage (E).

# Free Algebra 1 Practice Test Questions

**1. This year, a salesman sells a total of $60,000 worth of steak knives by going door-to-door. This represents a 20% increase from the year before. What was the value of his sales last year?**

A. $45,000  
B. $48,000  
C. $50,000  
D. $52,500  
E. $56,000

**2. Solve the equation for x.**

A. –3  
B. 2  
C. 3  
D.  
E. 9

**3. Solve the equation for y.  
3(2y + 4) = 8y**

A. –8  
B. –6  
C. –2  
D. 2  
E. 6

**4. Solve the equation for x.  
|x + 5| = 3**

A. -8  
B. -3  
C. -2  
D. -8 and -3  
E. -8 and -2

**5. If 3x + 8x + 4x = 6x + 63, then what is 5x + 23?**

A. 28  
B. 35  
C. 38  
D. 58  
E. 62

**6. What is the reciprocal of -3?**

A. –3  
B.  
C.  
D. 3  
E. undefined  
 **7. If the positive square root of x is between 3 and 11, then what inequality represents all possible values of x?**

A. 3 < x < 11  
B. 9 < x < 11  
C. 9 < x < 121  
D. x < 3 or x < 11  
E. x < 9 or x < 121

**8. Carol is three times older than Andrew. Brad is two years older than Andrew. In six years, the sum of Andrew’s and Brad’s ages will be the same as Carol’s age. How old is Carol?**

A. 24 years old  
B. 27 years old  
C. 30 years old  
D. 36 years old  
E. 42 years old

**9. A cab ride costs $3.25 for the first half-mile and $0.70 for each mile after the first half-mile. How far can someone travel for $12?**

A. 9 miles  
B. 13 miles  
C. 14 miles  
D. 26 miles  
E. 27 miles

**10. Solve the equation for x.  
13 – 2(2x + 1) = 1**

A. alg1q10a  
B. alg1q10b  
C. alg1q10c  
D. alg1q10d  
E. alg1q10e

**Answer Key**

1. C. Let x represent the total value of last year’s sales, Set up an equation and solve it for x. Since the salesman’s sales increased by 20% since last year’s, his current sales 120% of x, or 1.2x. So,  
1.2x = 60,000

Solve the equation for x by dividing both sides by 1.2.

x = 50,000

Therefore, the salesman sold $50,000 worth of steak knives last year.

2. E. This equation is a proportion, so it can be solved by cross-multiplication. Form a new equation by multiplying the numerator of each fraction by the denominator of the fraction on the other side. Then, simplify the result and solve for x.

7x = 3(2x + 3)  
7x = 6x + 9  
x = 9

3. E. To begin, simplify the right side of the equation by distributing the 3.

3(2y + 4) = 8y  
6y + 12 = 8y

Then, solve the equation by isolating the variable and dividing both sides by the coefficient.

12 = 2y  
y = 6

4. E. This equation involves an absolute value function. The absolute value of a number is its distance from zero on a number line. Since distances are never negative, the absolute value of a number is always positive (or equal to zero). In order to make the equation true, the expression inside the absolute value, x + 5, can equal either -3 or 3 since the absolute value of both values is 3. Write two equations and solve each.

x + 5 = -3

x = -8

x + 5 = 3

x = -2

5. D. To begin, solve the given equation for x.

3x + 8x + 4x = 6x + 63  
15x = 6x + 63  
9x = 63  
x = 7  
Next, substitute 7 for x in the expression 5x + 23 and simplify the result.

5(7) + 23 = 35 + 23 = 58

6. B. The product of a number and its reciprocal, or multiplicative inverse, is 1. For a fraction, the reciprocal can be found by inverting (or switching) the numerator and denominator. Since –3 can be written as alg1a6b,  
its reciprocal is  
alg1a6b2.

7. C. Since the square root of x is between 3 and 11, we know that the inequality 3  
alg1a7c  
11 is true. To find the value of x, square each part of the inequality. The result is the inequality 9 < x < 121.

8. A. Write each piece of information as an equation using the variables A, B, and C for the current ages of Andrew, Brad, and Carol, respectively.

C = 3A  
B = A + 2  
(A + 6) + (B + 6) = C + 6

This is a system of equations. Since the first two equations are already solved for C and B, substitute the expressions on the right side into the third equation. Then, solve for A.

(A + 6) + (B + 6) = C + 6  
(A + 6) + [(A + 2) + 6) = (3A) + 6  
2A + 14 = 3A + 6  
A = 8

Therefore, Andrew is 8 years old. To find Carol’s age, multiply Andrew’s age by three. Thus, Carol is currently 24 years old.

9. B. To begin, write an equation relating the cost C to the distance D. If one travels more than half a mile, the cost is $3.25 plus the $0.70 times the distance in miles, excluding the first half-mile. Because the first half-mile is excluded, ½, or 0.5 must be subtracted from the distance when multiplying by 0.70.

C = 3.25 + 0.70(D – 0.5)

To find how far someone can travel with $12, substitute 12 for C and solve for D.

12 = 3.25 + 0.70(D – 0.5)  
12 = 3.25 + 0.7D – 0.35  
9.1 = 0.7D  
D = 13

Therefore, someone can travel 13 miles on $12.

10. D. First, simplify the left side of the equation.

13 – 2(2x + 1) = 1  
13 – 4x – 2 = 1  
–4x + 11 = 1

Then, isolate the variable and solve for x.

–4x = –10  
alg1a10

# Free Algebra 2 Practice Test Questions

1. Solve the system of equations.  
y = –3x + 4  
x + 4y = –6

A. x = –2,y = –1  
B. x = –2,y = 10  
C. x = 2,y = –2  
D. x = 3,y = –5  
E. x = 4,y = –8

2. John can mow his lawn in 3 hours and his sister, Julie, can mow it in 2 hours. How long will it take them to mow their lawn if they work together?  
A. 1 hour 12 minutes  
B. 1 hour 15 minutes  
C. 1 hour 20 minutes  
D. 1 hour 30 minutes  
E. 1 hour 35 minutes

3. Solve the equation.  
alg2q3

A. –5  
B. –5 and 2  
C. 2  
D. 2 and 4  
E. 4

4. Factor the expression completely.  
6×3- 4×2 – 16x

A. 0  
B. 2x(3×2 – 2x – 8)  
C. 2x(3x + 4)(x – 2)  
D. 4x(2x + 1)(x – 4)  
E. 2x(2×2 + 7x – 4)

5. Solve the equation for x.

5×2 + 6x = 3

A. alg2q5a  
B. alg2q5b  
C. alg2q5c  
D. alg2q5d  
E. alg2q5e

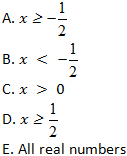
6. What should be added to both sides of the equation x2 – 12x = 5 in order to solve it by completing the square?  
A. –36  
B. –12x  
C. –6  
D. 12x  
E. 36

7. Find the vertical asymptotes of the function.  
alg2q7

A. x = –5 and x = –3  
B. x = –5, x = –3, and x = 6  
C. x = 3 and x = 5  
D. x = 3 and x = 6  
E. x = 6

8. Two cars are traveling north along a highway. The first drives at 40 mph, and the second, which leaves 3 hours later, travels at 60 mph. How long after the second car leaves will it take for the second car to catch the first?  
A. 1 hour 12 minutes  
B. 2 hours  
C. 5 hours  
D. 6 hours  
E. 6 hours 40 minutes

9. What is the domain of the function f(x) = 2x – 4?

  
10. Solve the equation for x.

alg2q10  
A. –3  
B.  
C. 2  
D. 3  
E. 5

**Answer Key**

1. C. Notice that the given system has two equations, and each equation has two variables, x and y. Therefore, the solution of the system of equations will have values for each variable. Since the first equation already has y isolated on the left side, it will be easier to use the substitution method than the elimination method to solve the system of equations. To begin, substitute the left side of the first equation, –3x+4, for y into the second equation, and then solve for x.

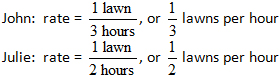
x + 4y = –6  
x + 4(–3x + 4) = –6  
x – 12x + 16 = –6  
–11x = –22  
x = 2

To find the value of y, substitute 2 for x in the first equation.

y = –3(2) + 4  
= –6 + 4  
= –2

Therefore, the solution of the given system of equations is x = 2,y = –2. Check this solution by substituting the values into the second equation and making sure the resulting equality is true.

2. A. Using, rate x time = amount, determine the rate at which John and Julie each mows the lawn if they work separately. To make the calculation easier, rewrite the formula as alg2a2a.

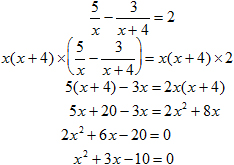


Next, if John and Julie work together, their total rate can be found by adding the individual rates together. In other words, their total rate working together is alg2a2c lawns per hour. Substitute this value into the original rate formula and solve for t, the variable that represents time spent mowing.

rate x time = amount



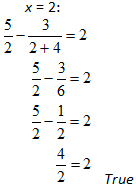
Therefore, it will take John and Julie hours, or 1 hour 12 minutes, to mow the lawn if they work together.

3. B. First, eliminate the denominators by multiplying both sides by x(x + 4). Then, simplify the result.  


The result is a quadratic equation. Solve it by factoring the left side and setting each factor equal to zero.

(x + 5)(x – 2) = 0  
x = –5, x = 2

Therefore, the possible solutions are x = –5 and x = 2. Unfortunately, there is a risk of finding an incorrect solution when solving rational equations in this manner. Consequently, the two possible solutions must be verified. To do this, substitute them into the given equations and make sure that the result is a true statement.



Therefore, the solutions are x = –5 and x = 2.

4. C. First, factor out any common factors from each of the three terms, 6×3, -4×2, and -16x. Notice that the greatest common factor (GCF) of the coefficients is 2, and each term is divisible by x. Therefore, factor out 2x.

6×3 – 4×2 – 16x = 2x(3×2 – 2x – 8)

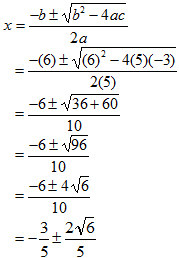
Finally, factor the trinomial, 3×2 – 2x – 8, into two binomials.

2x(3×2 – 2x – 8) = 2x(3x + 4)(x – 2)

5. C. To begin, rewrite the equation in the form ax2 + bx + c = 0 by subtracting 3 from both sides of the equation.

5×2 + 6x = 3

5×2 + 6x – 3 = 0  
Since the left side cannot be factored, use the quadratic formula to solve the equation, which is written in the form ax2 + bx + c = 0. For this equation, a = 5, b = 6, and c =–3.



6. E. To solve an equation by completing the square, manipulate it algebraically so that one side (in this case, the left side) is a perfect square trinomial and the other side (the right side) is a constant. Recall that a perfect square trinomial is a trinomial that can be factored as (ax + b)2or (ax – b)2. In the given equation, the left side only has two terms, an x2-term and an x-term; a constant term needed to make the expression a perfect square trinomial.

To calculate that constant, divide the coefficient of the x-term (which is –12) by 2 (giving –6) and square the result ( (-6)2 = 36). Adding 36 to both sides of the original equation will complete the square: notice that x2 – 12x + 36 is indeed a perfect square trinomial because it can be factored as (x – 6)2.

7. C. An asymptote is a line that the graph of a function approaches but never touches. For a rational function like the given one, the vertical asymptotes are vertical lines that occur at every x-value for which the denominator is zero. For the given function, set up and solve an equation to determine when x2 – 8x + 15 is zero.

x2 – 8x + 15 = 0  
(x – 3)(x – 5) = 0  
x = 3, x = 5

Therefore, the vertical asymptotes are the lines x = 3 and x = 5.

8. D. Use the rate formula, , to find the answer. Let t represent the number of hours the second car travels.

40(t + 3) = distance that first car travels  
60t = distance that second car travels

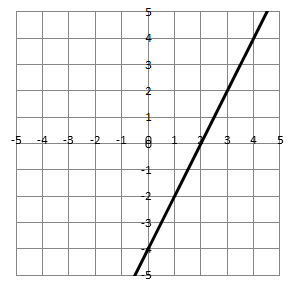
The second car will catch the first car when both have traveled the same distance. So, set the two formulas equal to each other and solve for t.

40(t + 3) = 60t  
40t + 120 = 60t  
120 = 20t  
t = 6

Therefore, the second car catches the first car six hours after it leaves.

9. E. The domain of a function is the set of all possible input values for the function. In this case, the input for f(x) is x. The easiest way to find the domain of f(x) is to figure out which x-values do not work (that is, give undefined output values) in the function. Then you can exclude those values from the domain.

Examine the given function. Notice that it does not contain a square-root sign, a logarithm, or a fraction with x in the denominator. Therefore, the function is defined for all real numbers. Notice from the graph below that the function can go to the left and right without end.



10. D. The logarithm of a number is the exponent to which the base must be raised to in order to get that number. For example, since 23 = 8 , it is also true that log2 8 = 3. Therefore, the equation can be rewritten as

alg2a10a

Simplify the equation and solve for x.

alg2a10b

Thus, the solution is x = 3. Check this solution by substituting 3 into the original equation and making sure that the result is a true statement.

# Geometry Practice Questions

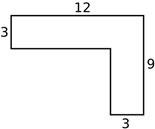
**1. In a 30-60-90 triangle, the length of the hypotenuse is 6. What is the length of the shortest side?**

1. 2
2. 3
3. https://www.studyguidezone.com/images/geo1qc.jpg
4. https://www.studyguidezone.com/images/geo1qd.jpg
5. https://www.studyguidezone.com/images/geo1qe.jpg

**2. What is the area of a circle with a diameter of 16?**

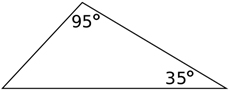
1. 8pi
2. 16pi
3. 64pi
4. 128pi
5. 256pi

**3. The figure below contains only horizontal and vertical lines. Calculate its perimeter.**



1. 27
2. 33
3. 36
4. 42
5. 48

**4. Find the measure of the missing angle in the triangle below.**



1. 35°
2. 40°
3. 45°
4. 50°
5. 55°

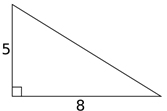
**5. The circumference of a circle is 30https://www.studyguidezone.com/images/pi.jpg. What is its area?**

1. 15pi
2. 225pi
3. 400pi
4. 900pi
5. 3000pi

**6. What is the sum of the measures of the interior angles of a hexagon?**

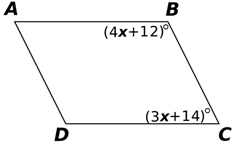
1. 540°
2. 720°
3. 810°
4. 1080°
5. 1440°

**7. Find the area of the triangle below.**



1. 20
2. 30
3. 35
4. 40
5. 80

**8. The figure below is a parallelogram with two angles given in terms of x. Determine the value of x.**

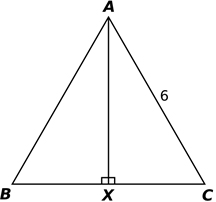


1. 9
2. 10
3. 20
4. 22
5. 24

**9. Which of the following could be the side lengths of a right triangle?**

1. 3, 13, and 14
2. 4, 5, and 6
3. 4, 9, and 10
4. 5, 10, and 15
5. 5, 12, and 13

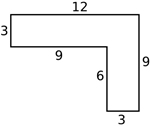
**10. The figure below is an equilateral triangle with sides of length 6. What is the area of the triangle?**



1. 12
2. 18
3. 36
4. https://www.studyguidezone.com/images/geo10qd.jpg
5. https://www.studyguidezone.com/images/geo10qe.jpg

## Answer Key

**1. B.** In a 30-60-90 triangle, the ratio of the lengths of the sides is 1: https://www.studyguidezone.com/images/pi3.jpg :2. In other words, the length of the longer leg is https://www.studyguidezone.com/images/pi3.jpg  times the length of the shorter leg, and the hypotenuse is twice the length of the shorter leg. Therefore, the smallest side is half the length of the hypotenuse, so its length is https://www.studyguidezone.com/images/geo1a.jpg.

**2. C.** The area of a circle is given by the formula A = https://www.studyguidezone.com/images/pir.jpg2, where r is the radius of the circle. The problem provides the diameter of the circle, which is twice the radius. So,  
https://www.studyguidezone.com/images/geo2a1.jpg  
Now substitute this value into the area formula and calculate the area.  
https://www.studyguidezone.com/images/geo2a2.jpg  
**3. D.** The perimeter of a figure is the length around it. To find the perimeter of a polygon, add the lengths of its sides. Start by filling in the missing lengths of the sides. For instance, the length of the shorter missing side is 6 because if you add it to the 3 on the left, the result should be the 9 on the right.  
  
Finally, add the side lengths together to find the perimeter.

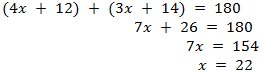
12 + 3 + 9 + 9 + 6 + 3 = 42

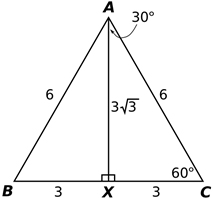
**4. D.** The sum of the angles of a triangle is 180°. Therefore, if we subtract the two given angles from 180°, the result will be the missing angle.

180 – 95 – 35 = 50

Therefore, the missing angle is 50°.

**5. B.** The circumference of a circle is given by the formula C = 2https://www.studyguidezone.com/images/pir.jpg, where r is the radius of the circle. Substitute the given circumference into this formula and solve for r.  
30https://www.studyguidezone.com/images/pi.jpg = 2https://www.studyguidezone.com/images/pir.jpg  
r = 15  
Therefore, the radius of the circle is 15. Use this to find the area of the circle. The area of a circle is given by the formula A= https://www.studyguidezone.com/images/pir.jpg2.  Substitute the length of the radius into this formula and calculate the area.  
A =https://www.studyguidezone.com/images/pi.jpg(15)2 = 225https://www.studyguidezone.com/images/pi.jpg  
**6. B.** The sum of the measures of the interior angles of a polygon with n sides is 180 **.**(n – 2) A hexagon has six sides. Therefore, substitute 6 for n into the formula and calculate.  
https://www.studyguidezone.com/images/geo6a.jpg  
Therefore, the sum of the measures is 720°.

**7. A.** The area of a triangle is given by the formula https://www.studyguidezone.com/images/geo7a.jpg, where b is the length of the base and h is the triangle’s height. In the figure, the base is 8 and the height is 5. Substitute these values into the formula and calculate the area.  
https://www.studyguidezone.com/images/geo7a2.jpg  
**8. D.** In a parallelogram, adjacent angles are complimentary; that is, they add to 180°. Use this to set up an equation, and then solve it for x.  
  
**9. E**. If a triangle is a right triangle, then the lengths of its sides satisfy the Pythagorean Theorem, a2 + b2 = c2 . To determine which choice is correct, test each set of values by substituting them into the Pythagorean Theorem. Start with the first set of numbers: 3, 13, and 14.  
  
Since the result is not a true equality, the first set of values does not represent the side lengths of a right triangle. Test the other four choices. The only values that satisfy the Pythagorean Theorem are 5, 12, and 13.  
  
**10. D.** Since the triangle is an equilateral triangle, its angles are 60°. In addition, the vertical line AX bisects the angle BAC, so it splits it into two congruent angles of 30° each. Therefore, the two smaller triangles are 30-60-90 triangles. Thus, the ratio of the lengths of the sides is 1:https://www.studyguidezone.com/images/pi3.jpg :2. Use this to fill in the information of the figure as follows.



The area of a triangle is given by the formula https://www.studyguidezone.com/images/geo7a.jpg, where b is the length of the base and h is the height. In the figure, the base is 3 + 3 = 6 and the height is 3https://www.studyguidezone.com/images/pi3.jpg. Substitute these values into the formula and calculate the area.  
https://www.studyguidezone.com/images/geo10a2.jpg

# Biology Practice Questions

**1. Which of the following sentences is true?**

A. All organisms begin life as a single cell.  
B. Organisms begin life as multi-cellular.  
C. Some organisms begin life as a single cell and others as multi-cellular.  
D. None of the above.

**2. Scientists suggest that \_\_\_\_\_\_\_\_ has occurred through a process called \_\_\_\_\_\_\_\_.**

A. evolution/differentiation  
B. evolution/natural selection  
C. natural selection/homeostasis  
D. homeostasis/reproduction

**3. What are the two types of measurement important in science?**

A. quantitative and numerical  
B. qualitative and descriptive  
C. numerical and scientific  
D. quantitative and qualitative

**4. A normal human sperm must contain:**

A. an X chromosome.  
B. a Y chromosome.  
C. 23 chromosomes.  
D. B and C.  
E. A, B, and C.

**5. All living organisms on Earth utilize:**

A. oxygen.  
B. light.  
C. sexual reproduction.  
D. neurotransmitters.  
E. a triplet genetic code.

**6. The major advantage of sexual reproduction over asexual forms is that:**

A. it requires two individuals.  
B. it promotes diversity.  
C. it produces more offspring.  
D. it can be undertaken at any time of year.  
E. it involves chromosomes.

**7. What is the second part of an organism’s scientific name?**

A. species  
B. phylum  
C. population  
D. kingdom

**8. What is the name of the process by which a bacterial cell splits into two new cells?**

A. mitosis  
B. meiosis  
C. replication  
D. fission

**9. Which of the following is not found within a bacterial cell?**

A. mitochondria  
B. DNA  
C. vesicles  
D. ribosomes

## Biology Answers

**1. A:** All organisms begin life as a single cell.  
**2. B:** Scientists suggest that evolution has occurred through a process called natural selection.  
**3. D:** The two types of measurement important in science are quantitative (when a numerical result is used) and qualitative (when descriptions or qualities are reported).  
**4. C:** A normal sperm must contain one of each of the human chromosome pairs. There are 23 chromosome pairs in all. Of these, 22 are autosomal chromosomes, which do not play a role in determining gender. The remaining pair consists of either two X chromosomes in the case of a female or of an X and a Y chromosome in the case of a male. Therefore, a normal sperm cell will contain 22 autosomal chromosomes and either an X or a Y chromosome, but not both.  
**5. E:** All living organisms on Earth utilize the same triplet genetic code in which a three-nucleotide sequence called a codon provides information corresponding to a particular amino acid to be added to a protein. In contrast, many organisms, especially certain types of bacteria, do not use oxygen. These organisms live in oxygen-poor environments and may produce energy through fermentation. Other organisms may live in dark environments, such as in caves or deep underground. Many organisms reproduce asexually by budding or self-fertilization, and only the most evolutionarily advanced organisms make use of neurotransmitters in their nervous systems.  
**6. B:** Sexual reproduction allows the genetic information from two parents to mix. Recombination events between the two parental copies of individual genes may occur, creating new genes. The production of new genes and of new gene combinations leads to an increase in diversity within the population, which is an advantage in terms of adapting to changes in the environment.  
**7. A:** The second part of an organism’s scientific name is its species. The system of naming species is called binomial nomenclature. The first name is the genus, and the second name is the species. In binomial nomenclature, species is the most specific designation. This system enables the same name to be used globally so that scientists can communicate with one another. Genus and species are just two of the categories in biological classification, otherwise known as taxonomy. The levels of classification, from most general to most specific, are kingdom, phylum, class, order, family, genus, and species. As shown, binomial nomenclature includes only the two most specific categories.  
**8. D:** Fission is the process of a bacterial cell splitting into two new cells. Fission is a form of asexual reproduction in which an organism divides into two components; each of these two parts will develop into a distinct organism. The two cells, known as daughter cells, are identical. Mitosis, on the other hand, is the part of eukaryotic cell division in which the cell nucleus divides. In meiosis, the homologous chromosomes in a diploid cell separate, reducing the number of chromosomes in each cell by half. In replication, a cell creates duplicate copies of DNA.  
**9. A:** Bacterial cells do not contain mitochondria. Bacteria are prokaryotes composed of single cells; their cell walls contain peptidoglycans, and the functions normally performed in the mitochondria are performed in the cell membrane of the bacterial cell. DNA is the nucleic acid that holds the genetic information of the organism. It is shaped as a double helix. DNA can reproduce itself and can synthesize RNA. A vesicle is a small cavity containing fluid. A ribosome is a tiny particle composed of RNA and protein in which polypeptides are constructed.

# Chemistry Practice Questions

**1. What is the name for the horizontal rows of the periodic table?**  
A. groups  
B. periods  
C. families  
D. sets

**2. Which of the following substances allows for the fastest diffusion?**  
A. gas  
B. solid  
C. liquid  
D. plasma

**3. What is the name for the number of protons in an atom?**  
A. atomic identity  
B. atomic mass  
C. atomic weight  
D. atomic number  
**4. Which of the following could be an empirical formula?**  
A. C4H8  
B. C2H6  
C. CH  
D. C3H6

Questions 5 and 6 are based on the following text:

Isotopes

The nucleus of an atom contains both protons and neutrons. Protons have a single positive electric charge, while neutrons have a charge of zero. The number of protons that a nucleus contains, called the atomic number and abbreviated as Z, determines the identity of an atom of matter. For example, hydrogen contains a single proton (Z = 1), whereas helium contains two (Z = 2).  
Atoms of a single element may differ in terms of the number of neutrons in their atomic nuclei, however. The total number of protons and neutrons in an atom is referred to as the atomic mass, or M. Helium typically has an atomic mass equal to 4, but there is another helium isotope for which M = 3. This form of helium has the same number of protons, but only one neutron.  
In an atomic fusion reaction, nuclei collide with one another with enough force to break them apart. The resulting nuclei may have a lower atomic mass than the reactants, with the difference released as energy. Electric charge, however, is always conserved.  
5. Two atoms of helium-3 (atomic mass = 3) collide in a fusion reaction to produce a single atom of helium-4 (atomic mass = 4). What might be another product of this reaction?  
A. a neutron  
B. a proton  
C. two electrons  
D. a proton and a neutron  
E. two protons  
6. Hydrogen atoms usually contain a single neutron. Deuterium and tritium are isotopes of hydrogen containing two and three neutrons, respectively. How many electrons orbit the tritium nucleus if the atom is electrically neutral?  
A. 0  
B. 1  
C. 2  
D. 3

Questions 7 and 8 are based on the following text:

Electrochemical Battery

An electrochemical battery is a device powered by oxidation and reduction reactions that are physically separated so that the electrons must travel through a wire from the reducing agent to the oxidizing agent. The reducing agent loses electrons and is oxidized in a reaction that takes place at an electrode called the anode. The electrons flow through a wire to a second electrode, the cathode, where an oxidizing agent gains electrons and is thus reduced. To maintain a net zero charge in each compartment, there is a limited flow of ions through a salt bridge.  
In a car battery, for example, the reducing agent is oxidized by the following reaction, which involves a lead (Pb) anode and sulfuric acid (H2SO4). Lead sulfate (PbSO4), protons (H+), and electrons (e-) are produced.

Pb + H2SO4 = PbSO4 +2 H+ + 2 e-

At the cathode, which is made of lead oxide (PbO2), the below reaction occurs. During this reaction, the electrons produced at the anode are used:

PbO2 + H2SO4 + 2 e- + 2 H+= PbSO4 + 2 H2O

7. Electrons are produced by a chemical reaction that takes place at the:  
A. anode.  
B. cathode.  
C. lead oxide electrode.  
D. oxidizer.  
E. salt bridge.

8. In an oxidation reaction:  
A. an oxidizing agent gains electrons.  
B. an oxidizing agent loses electrons.  
C. a reducing agent gains electrons.  
D. a reducing agent loses electrons.  
E. an oxidizing agent reduces an electrode.

9. What does aerobic mean?  
A. in the presence of oxygen  
B. calorie-burning  
C. heated  
D. anabolic

10. What is the name for substances that cannot be broken down into simpler types of matter?  
A. electrons  
B. molecules  
C. nuclei  
D. elements

11. When atoms of one element are combined with atoms of another element, the result is a(n) \_\_\_\_\_\_\_\_\_ of a compound.  
A. electron  
B. ion  
C. molecule  
D. enzyme

**Chemistry Answers**  
1. B: The horizontal rows of the periodic table are called periods. The vertical columns of the periodic table are known as groups or families. Developed by Dmitri Mendeleev to organize the known elements according to their similarities, all of the periodic table elements in a group have similar properties, and the relationships between the elements in each period moving from left to right are similar. New elements can be added to the periodic table without necessitating a redesign.  
2. A: Diffusion is fastest through gases, followed by liquid, then plasma, and lastly, solids. In chemistry, diffusion is defined as the movement of matter by the random motions of molecules. In a gas or a liquid, the molecules are in perpetual motion; for instance, in a quantity of seemingly immobile air, molecules of nitrogen and oxygen are constantly bouncing off each other. In solids, there is a miniscule degree of diffusion, which rises in proportion to the temperature of the substance.  
3. D: The number of protons in an atom is the atomic number. Protons are the fundamental positive unit of an atom and are located in the nucleus. In a neutral atom (an atom with neither positive nor negative charge), the number of protons in the nucleus is equal to the number of electrons orbiting the nucleus. In written form, the atomic number is the subscript in front of the element’s symbol, for example: 13Al. Atomic mass is the average mass of the various isotopes of a given element; atomic identity and atomic weight are not chemistry concepts.  
4. C: CH could be an empirical formula. An empirical formula is the smallest expression of a chemical formula. To be empirical, a formula must be incapable of being reduced. For this reason, answer choices A, B, and D are incorrect, as they could all be reduced to a simpler form. Note that empirical formulas are not the same as compounds, which do not have to be irreducible. Two compounds can have the same empirical formula but different molecular formulas. The molecular formula represents the actual number of atoms in the molecule.  
5. E: The charge must be conserved in the reaction. Since the reactants, the two helium atoms, each have two protons, they will have a total electric charge of +4. The reaction product, helium-4, also has two protons, and therefore has a total charge of +2. Two positive charges are lacking to balance the reaction. Of the choices given, only E, with two protons, has a charge of +2.  
6. B: Since tritium is an isotope of hydrogen, the nucleus contains a single proton, giving it a charge of +1. The extra neutrons do not contribute to the charge. Electrons have a charge of -1. In order to neutralize the single positive charge of the nuclear proton, a single orbiting electron is required.  
7. A: As described in the text, negatively charged electrons are produced by a reaction that reduces the positively charged lead anode. The reducing agent, in turn, is oxidized by this reaction. These electrons travel through the wire to the negatively charged cathode, where they react with the sulfuric acid oxidizer and reduce it, forming lead sulfate. In a car battery, the anode is normally indicated by a red mark.  
8. A: In an oxidation reaction, an oxidizing agent gains electrons from a reducing agent. By contributing electrons, the reducing agent reduces, or makes more negative, the charge on the oxidizer. In the car battery, reduction of the positively charged anode provides electrons, which then flow to the cathode, where an oxidation takes place. In an oxidation, an oxidizing agent increases (makes more positive) the charge on a reducer. In this way, the extra electrons in the negatively charged cathode are neutralized by the surrounding oxidizing agent.  
9. A: Aerobic means in the presence of oxygen.  
10. D: An element is a substance that cannot be broken into simpler types of matter.  
11. C: When atoms from two elements combine, the result is a molecule of a compound.