PrepAccelerator's ACT Crash Course

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1: Tense

It was twenty below zero that afternoon, and the sky shone with a pale gray light.

Which of the following alternatives to the underlined portion would NOT be acceptable?

A. was glowing
B. glowed
C. shined
D. shoned

2: Subject-Verb Agreement

One of his frescoes depict a progression through time and can be read as time lines from left to right.

A. NO CHANGE
B. Many
C. Each
D. Any one

3: Commas

The engineer, William Barclay Parsons accepted responsibility for overseeing this project.

F. NO CHANGE
G. engineer—William Barclay Parsons
H. engineer William Barclay Parsons,
J. engineer William Barclay Parsons

4: General Punctuation

Joan enjoyed jogging and painting cityscapes. I loved hiking trips and writing.

Which of the following alternatives to the underlined portion would NOT be acceptable?

F. cityscapes, while I
G. cityscapes; I
H. cityscapes. I, on the other hand,
J. cityscapes I

5: General Punctuation

On the right side, after they have moved through history. The same workers stand tall, radiating strength and confidence.

F. NO CHANGE
G. history; the
H. history, the
J. history—the

6: Transitional Expressions

Brightly lit stations welcomed the public, many of whom were skeptical of traveling underground. It didn't take long for New Yorkers to adapt, however.

A. NO CHANGE
B. therefore.
C. for instance.
D. that is.

Passage II

SOCIAL SCIENCE: This passage is adapted from the article "Green Music in the Rain Forest" by Suzanne Charlé, which appeared in the Fall 2002 *Ford Foundation Report*.

OELA is an acronym based on Portuguese words rather than the English words used in this article. A *luthier* is a maker of stringed musical instruments.

The Amazonian Workshop School for Fabrication of Stringed Instruments (OELA) is a small part of a larger effort to create a sustainable harvest of the great Amazon forest and to give employment to the region's burgeoning population.

"Few people know that the Amazon is one of the most rapidly urbanizing regions of the world," observes José Gabriel López, a Ford Foundation program officer in Brazil. The city of Manaus, for example, has grown in the past decade from 850,000 to 1.5 million. "This rural-urban migration and the resultant urban shantytowns stand as living symbols of failed or nonexistent rural development policies," López says. "In many places, small-scale rural producers have been abandoned—devoid of health and education services, credit, technical assistance and opportunity. What Rubens Gomes, founder of the workshop school, and his colleagues have created in Manaus is hope."

Gomes knows how to build hope. The school, he notes proudly, is the first to make stringed instruments in the Amazon. And it is the first in all of the Americas to construct instruments exclusively of lumber harvested in an environmentally and socially sustainable manner certified by the Forest Stewardship Council.

"Officially, there are 30 million cubic meters of wood cut in the Amazon annually," Gomes says. "Twenty million of this is wasted—sawdust, scraps, unwanted wood left to rot. And those are the official numbers. The motive of this school is to transform what is lost into things of value. Many people could do this—but there are no schools teaching carpentry in the Amazon."

OELA is meant to help fill the void. To graduate, each student must make a stringed instrument. All the guitars are made from certified wood. Gomes explains that traditionally, Brazilian rosewood and ebony were used in the construction of guitars. But because of intense harvesting, these trees are close to extinction. "I've been working for years, trying to find Amazon woods that are unknown on the market, that are in plentiful supply and that can be used in instrument making," Gomes says. He experimented with dozens before he found types that have the right strength and sound. (Like other master luthiers, he can tell by touching the wood whether it will reverberate well.) Once he identified the woods as possible substitutes, he sent them to a laboratory to be tested for the right grain and density. Today, Brosimum rubescens is substituted for rosewood, Aniba canellila for ebony, and Protium species for Brazilian mahogany and cedar. These and some 25 other undervalued tropical hardwoods have found their way into the luthiers' workshop, taking the pressure off the better-known woods.

For the past year, master luthier Raúl Lage from the Fernando Ortiz Instrument-Making School of the Cuban Music Institute has been working with the students. There are hurdles, he cautions, a number of them technical. The high humidity in Manaus means that the wood will crack in drier climates unless properly treated. Glue frequently doesn't hold. These problems are slowly being resolved.

There is also a major obstacle outside the workshop: The resistance of buyers to new woods. Thus far, most of the instruments have been sold to environmentalists, some of whom "adopt" a student by paying his or her tuition; the student's "project guitar" is then given to the donor as a gift.

There is also the possibility of contract work from outside the Amazon. Gomes's hopes were raised recently when the president of a well-known guitar company based in Nashville, Tennessee, ordered 15 guitars to be auctioned off for the Rainforest Alliance.

Lage cautions that it will be a long time before any of the students can command a master luthier's fee. "There is a saying," Lage says. "Anyone can make one good guitar; it takes a master to make one every time."

José Lucio do Nascimento Rabelo, director of the technical school, says, "By learning this skill, students come to look at the forest in a new way; there are ways other than logging for plywood and firewood to earn a living, to better the life of the people." One of the woods being used as a replacement for the precious rosewood, he notes, is typically used to make charcoal.

Such an appreciation for the forest, says Rabelo, could have a huge effect on the survival of the rain forest; some 80 percent of the students come from other parts of the state of Amazonas, and virtually all of them return to their home towns. "Some," he adds, "go on to become politicians who will have a direct influence on the future of the forest."

11. Which of the following assumptions would be most critical for a reader to accept in order to agree fully with the author's claims in the passage?

- **A.** Shantytowns in the Amazon need to be relocated if the forest is to be saved.
- **B.** Learning to make consistently good guitars requires access to the best materials available.
- **C.** Small-scale rural producers in the Amazon can help preserve the forest by being innovative.
- **D.** Consumers outside of the Amazon can do little to help prevent deforestation.

12. In the context of the passage, the statement "All the guitars are made from certified wood" (lines 34–35) most nearly suggests that Gomes's workshop:

F. uses environmentally sustainable woods in its guitars.
G. isn't doing enough to stop unnecessary deforestation in the Amazon.
H. has little chance of pleasing both musicians and environmentalists.
J. uses only traditional woods in making its guitars.

13. It can most reasonably be inferred from the passage that regarding OELA, the author feels:

A. skeptical of the workshop's aims.
B. dismayed by the workshop's low productivity.
C. supportive of the workshop's goals.
D. confident that the workshop could be duplicated in other places.

14. The main purpose of the second paragraph (lines 6–18) is to:

F. draw attention to the Amazon's tremendous population growth.
G. explain the necessity for ventures such as Gomes's.
H. explain the presence of the Ford Foundation in the Amazon.
J. justify raising taxes to increase social services in the Amazon.

15. The main function of the fifth paragraph (lines 33–53) is to:

A. demonstrate the woodworking skills required to be a master luthier.
B. explore the limitations of science as compared to intuition.
C. outline the scientific reasons why one type of wood cannot be replaced by another.
D. show that experiments led to the discovery of good substitutes for rare woods.

16. The passage notes all of the following as problems that the fledgling Amazon guitar industry has experienced EXCEPT that:

F. glue on the guitars sometimes doesn't hold.
G. the wood used may crack in drier climates.
H. woods usable for guitars have become extinct.
J. buyers resist guitars made with nontraditional woods.

17. The passage indicates that, as a group, the OELA students may impact the survival of the rain forests because most of them:

A. care deeply enough about music to spend their lives making musical instruments.
B. will return to their homes and spread their environmental knowledge.
C. are willing to endure personal hardships in order to use their new skills.
D. will have political careers after they return home.

18. In the passage, Gomes indicates that of the wood cut in the Amazon rain forest each year, approximately how much wood is wasted?

F. One-fourth
G. One-third
H. One-half
J. Two-thirds

19. The passage states that all of the following are woods traditionally used for making stringed instruments EXCEPT:

A. Aniba canellila.
B. rosewood.
C. Brazilian mahogany.
D. ebony.

20. According to the passage, when an OELA student is "adopted," he or she receives:

F. tuition.
G. room and board.
H. food and clothing.
J. a musical instrument.

Passage III

Cloud cover is the percent of Earth's surface covered by clouds. Cloud cover may increase because of an increase in the *cosmic ray flux* (number of high-energy particles from space reaching Earth per m^2 per hour). Table 1 shows how Earth's cover of *low clouds* (0 km to 3.2 km altitude) varies with the cosmic ray flux. Figures 1–3 show the *relative cosmic ray flux*, RCRF (the percent below the flux measured on October 1, 1965), and the monthly average cover of *high clouds* (6.0 km to 16.0 km altitude), *middle clouds* (3.2 km to 6.0 km altitude), and low clouds, respectively, from January 1980 to January 1995.

Table 1

Cosmic ray flux (particles/m^2/hr)	Cover of low clouds (%)
340,000	27.8
360,000	28.1
380,000	28.4
400,000	28.7
420,000	29.0

Table 1 adapted from E. Palle Bagó and C. J. Butler, "The Influence of Cosmic Rays on Terrestrial Clouds and Global Warming." ©2000 by Institute of Physics Publications, Ltd.

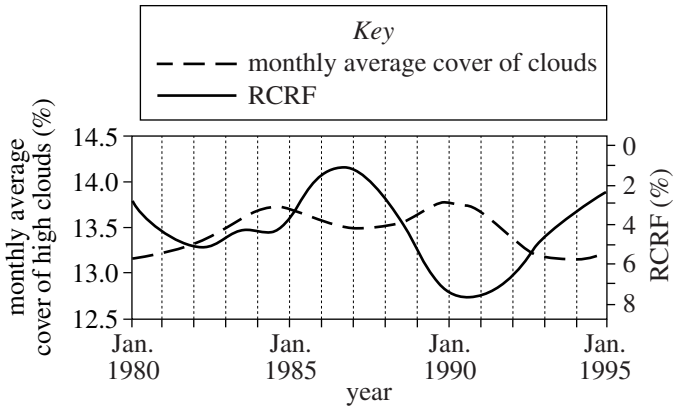


Figure 1

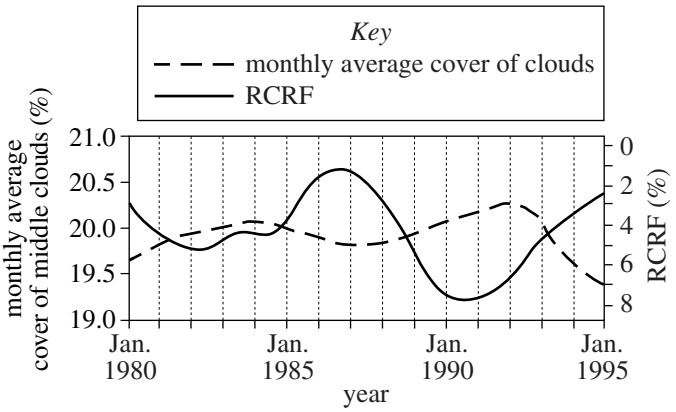


Figure 2

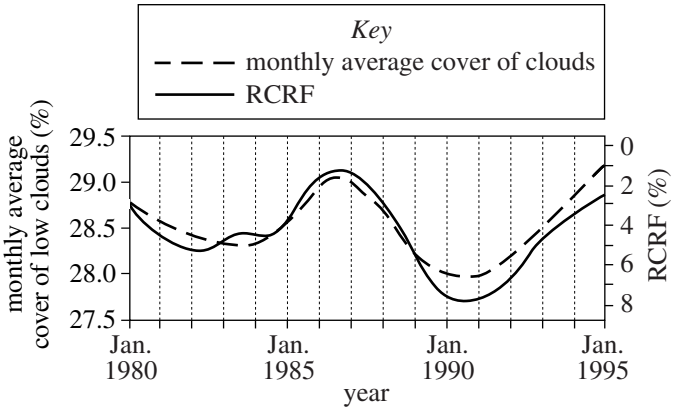


Figure 3

Figures adapted from Nigel Marsh and Henrik Svensmark, "Low Cloud Properties Influenced by Cosmic Rays." ©2000 by The American Physical Society.

13. The percent of Earth's surface covered by high clouds in January 1987 was closest to which of the following?

A. 13.0%
B. 13.5%
C. 14.0%
D. 14.5%

14. Based on Table 1, a cosmic ray flux of 440,000 particles/m^2/hr would correspond to a cover of low clouds that is closest to which of the following?

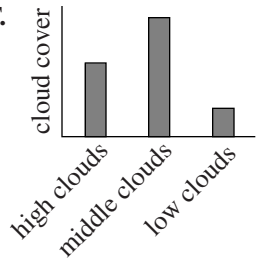
F. 28.7%
G. 29.0%
H. 29.3%
J. 29.6%

15. Is the statement "The monthly average cover of low clouds is more directly correlated with cosmic ray flux than is the monthly average cover of high clouds" consistent with Figures 1 and 3 ?

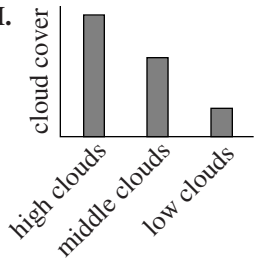
A. Yes, because the plot for the monthly average cover of low clouds more closely parallels the plot for RCRF.
B. Yes, because the plot for the monthly average cover of high clouds more closely parallels the plot for RCRF.
C. No, because the plot for the monthly average cover of low clouds more closely parallels the plot for RCRF.
D. No, because the plot for the monthly average cover of high clouds more closely parallels the plot for RCRF.

16. Which of the following figures best represents the monthly average cover of high, middle, and low clouds in January 1992 ?

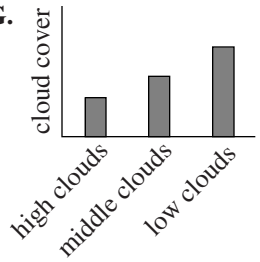
F.



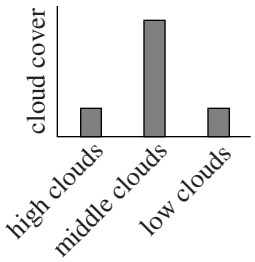
H.



G.



J.



17. High clouds are composed primarily of ice crystals, whereas low clouds are composed primarily of water droplets. This difference is most likely because the average air temperature at altitudes from:

A. 0 km to 3.2 km is at or below 0°C, whereas the average air temperature at altitudes from 3.2 km to 6.0 km is above 0°C.
B. 0 km to 3.2 km is at or below 0°C, whereas the average air temperature at altitudes from 6.0 km to 16.0 km is above 0°C.
C. 0 km to 3.2 km is above 0°C, whereas the average air temperature at altitudes from 3.2 km to 6.0 km is at or below 0°C.
D. 0 km to 3.2 km is above 0°C, whereas the average air temperature at altitudes from 6.0 km to 16.0 km is at or below 0°C.

1: Mean/Median/Mode (45 sec)

Dina has 5 biology tests this semester and has scored 91, 87, 82, and 94 on the first 4 tests. How much should she score on the 5th test so that her semester average score will be 90?

A. 88.5
B. 90
C. 91.5
D. 93
E. 96

2: Exponents (45 sec)

For all positive values of p and q, which of the following expressions is equivalent to

$$p\sqrt{p^7} \cdot q^3\sqrt[4]{q^{-5}} \ ?$$

A. $p^{\frac{5}{2}}q^{\frac{9}{4}}$ **B.** $p^{\frac{9}{2}}q^{\frac{5}{4}}$ **C.** $p^{\frac{7}{2}}q^{\frac{9}{4}}$ **D.** $p^{\frac{7}{2}}q^{\frac{7}{4}}$ **E.** $p^{\frac{9}{2}}q^{\frac{7}{4}}$

3: Inequalities (45 sec)

Which of the following is the solution statement for the inequality shown below?

$$-5 < 1 - 3x < 10$$

F. $-5 < x < 10$
G. $-3 < x$
H. $-3 < x < 2$
J. $-2 < x < 3$
K. $x < -3$ or $x > 2$

4: Complex Numbers (30 sec)

For $i^2 = -1$, $(4 + i)^2 = ?$

F. 15
G. 17
H. $15 + 4i$
J. $15 + 8i$
K. $16 + 4i$

5: Logarithms (60 sec)

What is the real value of x in the equation $\log_2 24 - \log_2 3 = \log_5 x$?

F. 3
G. 21
H. 72
J. 125
K. 243

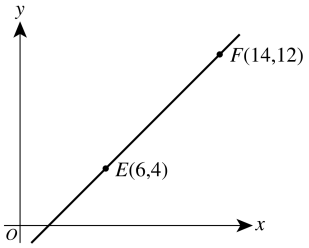
6: Slope (30 sec)

What is the slope of a line in the standard (x, y) coordinate plane that goes through the point $(2, 3)$ and has a y-intercept of 4?

A. -4 **B.** -2 **C.** $-\frac{1}{2}$ **D.** $-\frac{1}{4}$ **E.** 1

7: Points (60 sec)

The points $E(6, 4)$ and $F(14, 12)$ lie in the standard (x, y) coordinate plane. Point D lies on $\overline{EF}$ between E and F such that the length of $\overline{EF}$ is 4 times the length of $\overline{DE}$. What are the coordinates of D?



F. $(7, 5)$ **G.** $(8, 6)$ **H.** $(8, 8)$
J. $(10, 8)$ **K.** $(12, 10)$

8: Cylinders (60 sec)

A can of soda pop has the shape of a right circular cylinder with an inside height of 8 inches and an inside diameter of 3 inches. When you pour the soda pop from the full can into a cylindrical glass with an inside diameter of 4 inches, about how many inches high is the soda pop in the glass?

(Note: The volume of a right circular cylinder is $\pi r^2 h$.)

A. $2\frac{2}{3}$ **B.** $4\frac{1}{2}$ **C.** 6 **D.** $4\sqrt{3}$ **E.** 24

PrepAccelerator's ACT® and SAT®-PSAT® Math Cheat Sheet

Algebra

exponents

$x^a x^b = x^{a+b}$ $\quad \frac{x^p}{x^q} = x^{p-q}$ $\quad (x^m)^n = x^{mn}$

$x^0 = 1$ $\quad x^1 = x$ $\quad x^{-m} = \frac{1}{x^m}$ $\quad x^{\frac{m}{n}} = \sqrt[n]{x^m}$

FOIL (First, Outer, Inner, Last)

$(a+b)(c+d) = ac + ad + bc + bd$

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quadratic formula

$ax^2 + bx + c = 0$ has the roots

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

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logarithms (ACT only)

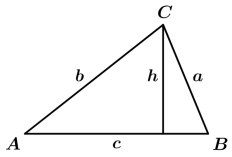
$\log_a x = u \Rightarrow x = a^u$ $\quad \log_a 1 = 0$ $\quad \log_a a = 1$

product rule $\quad \log_a xy = \log_a x + \log_a y$

quotient rule $\quad \log_a \left(\frac{x}{y}\right) = \log_a x - \log_a y$

power rule $\quad \log_a x^p = p \log_a x$

Plane Geometry

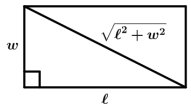


triangle

perimeter = $a + b + c$

area = $\frac{\text{base} \times \text{height}}{2} = \frac{ch}{2}$

area = $\frac{1}{2}ac \sin B$

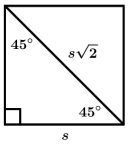


rectangle

perimeter = $2(\ell + w)$

area = ℓw

diagonal = $\sqrt{\ell^2 + w^2}$

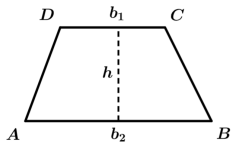


square

perimeter = $4s$

area = s^2

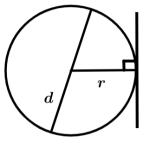
diagonal = $s\sqrt{2}$



trapezoid

area = base average × height

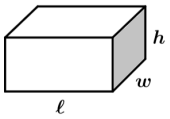
$= \left(\frac{b_1 + b_2}{2}\right)h$



circle

circumference = $2\pi r = \pi d$

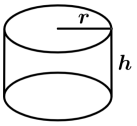
area = πr^2



rectangular prism or solid

area = $2(\ell w + \ell h + wh)$

volume = ℓwh



right circular cylinder

lateral area = $2\pi rh$

surface area = $2\pi rh + 2\pi r^2$

volume = $\pi r^2 h$

Coordinate Geometry

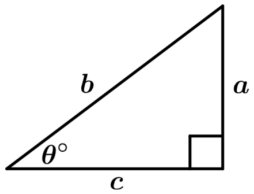
straight line

- slope = $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{rise}}{\text{run}}$
- distance = $\sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$
- equation: $y = mx + b$

circle with center (h, k) and radius r has equation

$(x - h)^2 + (y - k)^2 = r^2$

Trigonometry

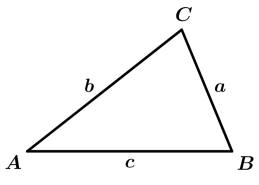


soh-cah-toa

$\sin\theta = \frac{\text{opp}}{\text{hyp}} = \frac{a}{b}$

$\cos\theta = \frac{\text{adj}}{\text{hyp}} = \frac{c}{b}$

$\tan\theta = \frac{\text{opp}}{\text{adj}} = \frac{a}{c}$



sine law (ACT only)

$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

cosine law (ACT only)

$c^2 = a^2 + b^2 - 2ab\cos C$

Pythagoras | correction