ACT Strategies

1. When $x \neq 0$ and $y \neq 0$, which expression is equivalent to: $-\frac{56x^2y^3}{7x^{-1}y}$

A. $-49x^3y^2$

B. $-63x^3y^2$

C. $-8x^5y^4$

D. $-8x^4y^3$

E. $-8x^3y^2$

2. When Katie went to sleep, the temperature was $36°F$. When Katie woke up, the temperature was $-8°F$. Letting $+$ mean a rise in temperature and – mean a drop in temperature, what was the change in temp from when Katie went to sleep and when she woke up?

F. $-44°F$

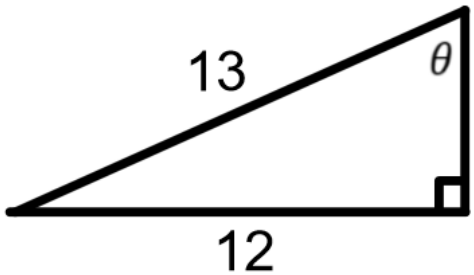
G. $-28°F$

H. $+4°F$

J. $+28°F$

K. $+44°F$

3. A right triangle is shown. What is the value of $\cos(\theta)$?



F. $\frac{5}{13}$ G. $\frac{5}{12}$ H. $\frac{12}{13}$ J. $\frac{13}{12}$ K. $\frac{13}{5}$

4. An 8×8 square grid shown below is divided into 64 equal squares, each with a side length of 1 cm. What fractional part of the 8×8 square grid is shaded?

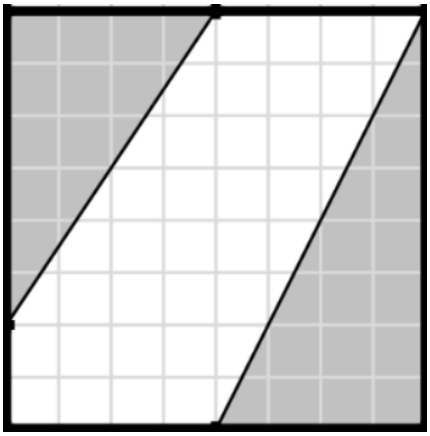
A. $\frac{3}{4}$

B. $\frac{2}{3}$

C. $\frac{7}{16}$

D. $\frac{5}{8}$

E. $\frac{9}{16}$



5. In the figure below, a board 7 feet 6 inches long is cut into 2 equal parts. What is the length, to the nearest inch, of each part?

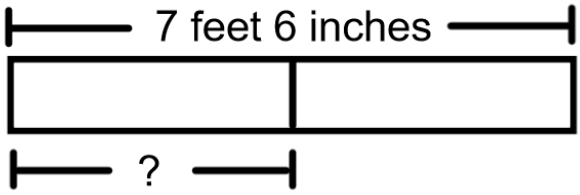
F. 3 feet 5 inches

G. 3 feet 8 inches

H. 3 feet 9 inches

J. 4 feet 3 inches

K. 4 feet 9 inches



6. For real numbers a, b, and c such that $a > b > c$ and $b < 0$, which of the statements must always be true?

I. $|a| > |b|$

II. $|b| < |c|$

III. $|b| > |a|$

A. I only

B. II only

C. III only

D. I and III only

E. I, II, and III

7. For $x = -3$, what is the value of $2x^2 - 9x$?

A. -63

B. -45

C. -9

D. 9

E. 45

8. What is the least common denominator of these fractions:

$$\frac{4}{15}, \frac{1}{24}, \text{ and } \frac{3}{51} \text{ ?}$$

A. 360

B. 765

C. 2,040

D. 6,120

E. 18,360

9. A movie theater surveyed 5,000 teens and young adults.

Age Groups	Number
13-14	2,750
15-16	1,225
17-18	625
Young adults	400

Moviegoer Category	Number
Very Often	830
Often	1,650
Sometimes	2,320
Rarely	200

Movie tickets are $9.50 for all regular showings and $7.00 for matinees. Suppose all the teens and young adults surveyed happened to attend 1 movie each in one particular month. The total amount spent on movie tickets by those surveyed in that month was $38,500. How many teens and young adults attended matinees that month?

F. 500

G. 1,400

H. 2,500

J. 3,600

K. 4,500

10. What is the value of $\left(25^{(1/2)} + 16^{(1/4)}\right)^2$?

A. 6 B. 29 C. 49 D. 81 E. 1681

11. All the values in the equation below are exact. What value of c makes the equation true?

$$(3.25 \times 10^{-c+2})(5 \times 10^6) = 1625$$

F. -7

G. -6

H. 6

J. 7

K. 8

12. In the standard (x,y) coordinate plane, the graph of $y = 35 - 20(x + 10)^2$ is a parabola. What are the coordinates of the vertex of the parabola?

A. $(10, 15)$

B. $(-10, 15)$

C. $(10, 35)$

D. $(-10, 35)$

E. $(-10, -20)$

13. The total amount of a substance present in a laboratory experiment is given by the formula: $A = A_0\left(3^{(h/7)}\right)$ where A is the total amount of the substance h hours after an initial amount (A_0) of the substance began accumulating. Which expression gives the number of hours it will take an initial amount of 20 grams of this substance to accumulate to 100 grams?

F. 7

G. 35

H. $log_3(70)$

J. $7log_3(5)$

K. $7log_{20}(100)$

14. If the positive integers x and y are relatively prime (their greatest common factor is 1) and

$$\frac{1}{5}\cdot\frac{1}{2}+\frac{1}{2}\div\frac{1}{5}=\frac{x}{y}$$

Then $x+y=?$

A. 5

B. 8

C. 13

D. 18

E. 65

15. A hyperbola has vertices $(-2,3)$ and $(-2,1)$ and that passes through the origin is shown below in the standard (x,y) coordinate plane. The hyperbola has which of the following equations?

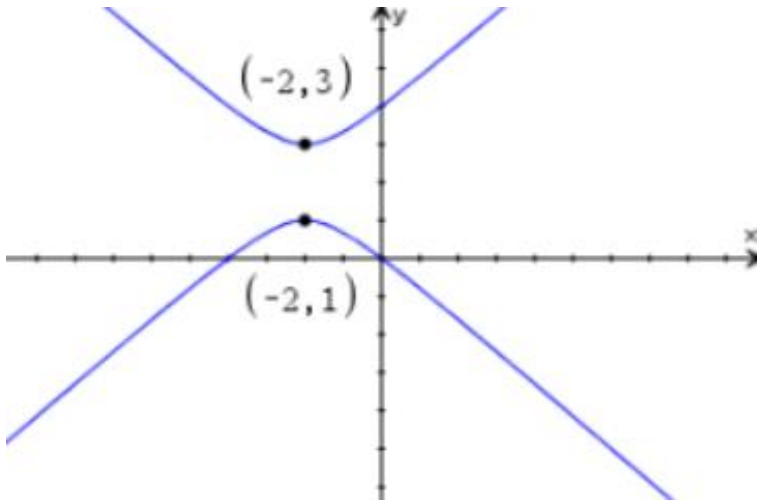
A. $\frac{(y-2)^2}{1}-\frac{4(x+2)^2}{3}=1$

B. $\frac{(y-2)^2}{1}-\frac{3(x+2)^2}{4}=1$

C. $\frac{(y+2)^2}{1}-\frac{4(x-2)^2}{3}=1$

D. $\frac{(y-2)^2}{1}+\frac{4(x+2)^2}{3}=1$

E. $\frac{(y-2)^2}{1}+\frac{3(x+2)^2}{4}=1$



16. The digit in the ones place of 3^{78} is 9. What digit is in the ones place of 3^{68} ?

A. 0

B. 1

C. 3

D. 7

E. 9

17. Remember, $i^2 = -1$. What complex number x is a solution to the equation $x(3 + 2i) = 1$?

F. $\frac{3}{13} + \frac{2}{13}i$

G. 1

C. $\frac{3}{13} - \frac{2}{13}i$

D. $-\frac{2i}{3}$

E. $\frac{1}{3} + 2i$

18. What value of x satisfies the equation $\frac{2x^2-6x}{x-3} = 2$?

F. 4

G. 3

H. 2

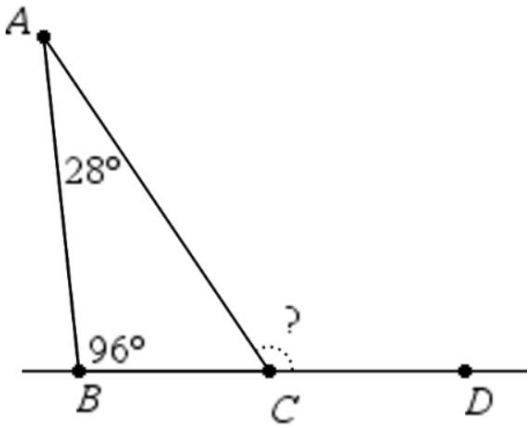
J. 1

K. -1

19. For all values of x greater than 2, which of the following expressions is equivalent to $\frac{x^2-x-6}{x^2-4}$?

A. $\frac{-x-6}{-4}$ B. $\frac{x-3}{x-2}$ C. $\frac{x-3}{x+2}$ D. $\frac{x+3}{x-2}$ E. $\frac{x+6}{x+2}$

20. In the figure, $\angle CAB$ measures $28°$, $\angle ABC$ measures $96°$and points B, C and D are collinear. What is the measure of $\angle ACD$?



F. $56°$

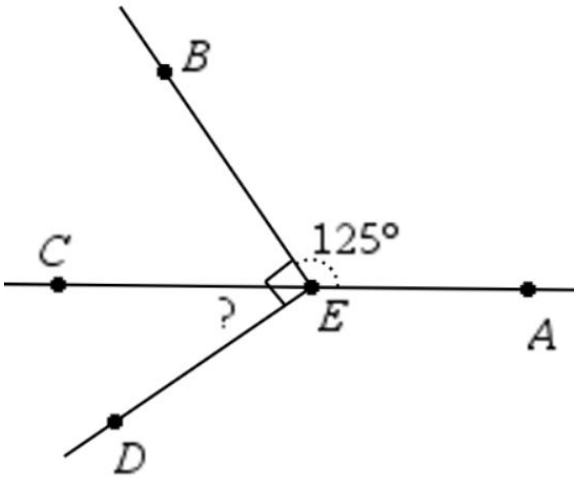
G. $114°$

H. $116°$

J. $124°$

K. $156°$

21. In the figure, E is on $\overline{CA}$, and the measures of $\angle BED$ and $\angle AEB$ are $90°$ and $145°$ respectively. What is the measure of $\angle CED$?



F. $25°$

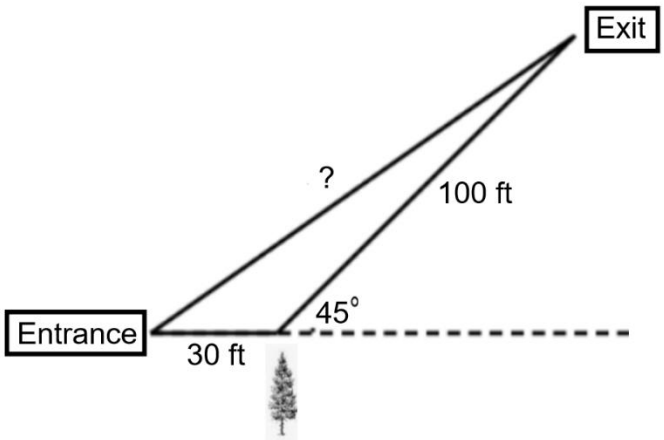
G. $35°$

H. $45°$

J. $55°$

K. $65°$

22. Angela walked her dog 30 feet due east from the entrance to a tree and then walked 100 feet in a straight line $45°$ north of east to the exit. What is the distance, in *feet*, between the entrance and the exit?



A. $\frac{130}{\cos(45)}$

B. $100 + \frac{30}{\cos(45)}$

C. $\frac{30}{\sin(135)} + 100$

D. $\sqrt{100^2 + 30^2 - 2(100)(30) \cdot \cos(45°)}$

E. $\sqrt{100^2 + 30^2 - 2(100)(30) \cdot \cos(135°)}$

23. A 500-square-mile national park has a number of protected large animals.

Large Animal	Number
Elephant	600
Rhinoceros	100
Lion	200
Leopard	300
Zebra	400
Giraffe	800
TOTAL	2,400

In this park, the average daily number of water consumed by each Leopard, Zebra, and Giraffe is 5, 8 and 10 respectively. Which matrix product gives the average total number of gallons of water consumed per day by all the Leopards, Zebras, and Giraffes in the park?

A. $\begin{bmatrix} 300 & 800 & 400 \end{bmatrix} \cdot \begin{bmatrix} 5 \\ 8 \\ 10 \end{bmatrix}$

B. $\begin{bmatrix} 300 & 400 & 800 \end{bmatrix} \cdot \begin{bmatrix} 5 \\ 8 \\ 10 \end{bmatrix}$

C. $\begin{bmatrix} 5 \\ 8 \\ 10 \end{bmatrix} \cdot \begin{bmatrix} 300 & 400 & 800 \end{bmatrix}$

D. $\begin{bmatrix} 5 \\ 8 \\ 10 \end{bmatrix} \cdot \begin{bmatrix} 300 & 800 & 400 \end{bmatrix}$

E. $\begin{bmatrix} 5 \\ 8 \\ 10 \end{bmatrix} \cdot \begin{bmatrix} 300 \\ 400 \\ 800 \end{bmatrix}$

24. A rectangular porch is 24 feet long and 15 feet wide. What is the area, in square *yards*, of the porch?

A. 30 B. 40 C. 120 D. 240 E. 360

25. Mason and Terry are best friends. They always sit at the circular lunch table with the same group of 7 people. If each person sits in a random spot around the table, what is the probability that Mason and Terry will NOT sit next to each other?

A. $\frac{1}{6}$

B. $\frac{1}{3}$

C. $\frac{1}{2}$

D. $\frac{2}{3}$

E. $\frac{5}{6}$