# Intermediate Algebra ACT Questions

## Middle School Standards (not explicitly reviewed in IA)

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. If 40% of a given number is 8, then what is 15% of the given number?</td>
<td>A. 1.2, B. 1.8, C. 3.0, D. 5.0, E. 6.5</td>
</tr>
<tr>
<td>2. Vehicle A averages 14 miles per gallon of gasoline, and Vehicle B averages 36 miles per gallon of gasoline. At these rates, how many more gallons of gasoline does Vehicle A need than Vehicle B to make a 1,008-mile trip?</td>
<td>A. 25, B. 28, C. 44, D. 50, E. 72</td>
</tr>
<tr>
<td>3. A consultant charges $45 for each hour she works on a consultation, plus a flat $30 consulting fee. How many hours of work are included in a $210 bill for a consultation?</td>
<td>F. 2\frac{2}{5}, G. 4, H. 4\frac{2}{3}, J. 5\frac{1}{2}, K. 7</td>
</tr>
<tr>
<td>4. If 7 + 3x = 22, then 2x = ?</td>
<td>F. 5, G. 10, H. 12, J. 14, K. 58/3</td>
</tr>
<tr>
<td>5. (</td>
<td>7 - 3</td>
</tr>
<tr>
<td>6. What is the least common denominator for adding the fractions (\frac{4}{12}, \frac{1}{12}, \text{ and } \frac{7}{8})?</td>
<td>A. 40, B. 120, C. 180, D. 480, E. 1,440</td>
</tr>
<tr>
<td>7. (</td>
<td>7(-3) + 2(4)</td>
</tr>
<tr>
<td>8. In what order should (\frac{5}{3}, \frac{7}{4}, \frac{6}{5}, \text{ and } \frac{9}{8}) be listed to be arranged by increasing size?</td>
<td>A. (\frac{9}{8} &lt; \frac{6}{5} &lt; \frac{5}{3} &lt; \frac{7}{4}), B. (\frac{9}{8} &lt; \frac{6}{5} &lt; \frac{7}{4} &lt; \frac{5}{3}), C. (\frac{7}{4} &lt; \frac{5}{3} &lt; \frac{9}{6} &lt; \frac{6}{5}), D. (\frac{6}{5} &lt; \frac{9}{8} &lt; \frac{5}{3} &lt; \frac{7}{4}), E. (\frac{5}{3} &lt; \frac{6}{5} &lt; \frac{7}{4} &lt; \frac{9}{8})</td>
</tr>
</tbody>
</table>
9. If \( \frac{A}{30} + \frac{B}{105} = \frac{7A + 2B}{x} \) and \( A, B, \) and \( x \) are integers greater than 1, then what must \( x \) equal?

A. 9
B. 135
C. 210
D. 630
E. 3,150

10. What rational number is halfway between \( \frac{1}{5} \) and \( \frac{1}{3} \)?

F. \( \frac{1}{2} \)
G. \( \frac{1}{4} \)
H. \( \frac{2}{15} \)
J. \( \frac{4}{15} \)
K. \( \frac{8}{15} \)

11. Which of the following is an equivalent simplified expression for \( 2(4x + 7) - 3(2x - 4) \)?

F. \( x + 2 \)
G. \( 2x + 2 \)
H. \( 2x + 26 \)
J. \( 3x + 10 \)
K. \( 3x + 11 \)

12. What is the least common multiple of 70, 60, and 50?

F. 60
G. 180
H. 210
J. 2,100
K. 210,000

13. The circle graph below shows the distribution of registered voters, by age, for a community. Registered voters are randomly selected from this distribution to be called for jury duty. What are the odds (in the age range: not in the age range) that the first person called for jury duty is in the age range of 25–35 years?

Distribution of Registered Voters by Age

- 18–24: 11%
- 25–35: 42%
- 36–44: 25%
- 45–55: 8%
- 56 and up: 14%

A. 1:3
B. 7:8
C. 7:43
D. 21:29
E. 42:25

14. In a basketball passing drill, 5 basketball players stand evenly spaced around a circle. The player with the ball (the passer) passes it to another player (the receiver). The receiver cannot be the player to the passer’s immediate right or left and cannot be the player who last passed the ball. A designated player begins the drill as the first passer. This player will be the receiver for the first time on which pass of the ball?

A. 4th
B. 5th
C. 6th
D. 10th
E. 24th

15. Jerome, Kevin, and Seth shared a submarine sandwich. Jerome ate \( \frac{1}{2} \) of the sandwich, Kevin ate \( \frac{1}{4} \) of the sandwich, and Seth ate the rest. What is the ratio of Jerome’s share to Kevin’s share to Seth’s share?

A. 2:3:6
B. 2:6:3
C. 3:1:2
D. 3:2:1
E. 6:3:2
Unit 1: Statistics

16. Marlon is bowling in a tournament and has the highest average after 5 games, with scores of 210, 225, 254, 231, and 280. In order to maintain this exact average, what must be Marlon’s score for his 6th game?
   F. 200
   G. 210
   H. 231
   J. 240
   K. 245

17. To increase the mean of 4 numbers by 2, by how much would the sum of the 4 numbers have to increase?
   F. 2
   G. 4
   H. 6
   J. 8
   K. 16

18. The table below shows the total number of goals scored in each of 43 soccer matches in a regional tournament. What is the average number of goals scored per match, to the nearest 0.1 goal?

<table>
<thead>
<tr>
<th>Total number of goals in a match</th>
<th>Number of matches with this total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

A. 1.0
B. 2.8
C. 3.0
D. 6.1
E. 17.1

19. Tom has taken 5 of the 8 equally weighted tests in his U.S. History class this semester, and he has an average score of exactly 88.0 points. How many points does he need to earn on the 6th test to bring his average score up to exactly 90.0 points?
   A. 90
   B. 88
   C. 82
   D. 80
   E. 79

20. What is the median of the following 7 scores?
   42, 67, 33, 79, 33, 89, 21
   A. 42
   B. 52
   C. 54.5
   D. 56
   E. 79

21. To determine a student’s overall test score for the semester, Ms. Lopez throws out the lowest test score and takes the average of the remaining test scores. Victor earned the following test scores in Ms. Lopez’s class this semester: 62, 78, 83, 84, and 93. What overall test score did Victor earn in Ms. Lopez’s class this semester?
   A. 67.6
   B. 80.0
   C. 83.0
   D. 83.5
   E. 84.5
Unit 2: Advanced Solving

22. Charles defined a new operation, $\#$, on pairs of ordered pairs of integers as follows: $(a,b) \# (c,d) = \frac{ac + bd}{ab - cd}$. What is the value of $(2,1) \# (3,4)$?
   A. -2  B. -1  C. 2  D. 5  E. 10

23. John Jones has decided to go into the business of producing and selling boats. In order to begin this venture, he must invest $10 million in a boat production plant. The cost to produce each boat will be $7,000, and the selling price will be $20,000. Accounting for the cost of the production plant, which of the following expressions represents the profit, in dollars, that John will realize when $x$ boats are produced and sold?
   A. $13,000x - 10,000,000$
   B. $27,000x - 10,000,000$
   C. $9,973,000x$
   D. $20,000x$
   E. $13,000x$

24. What is the slope of any line parallel to the line $8x + 9y = 3$ in the standard $(x,y)$ coordinate plane?
   F. -8  G. $\frac{8}{9}$  H. $\frac{8}{3}$  J. 3  K. 8

25. As a class experiment, a cart was rolled at a constant rate along a straight line. Shawn recorded the chart below the cart’s distance (x), in feet, from a reference point at the start of the experiment and for each of 5 times (t), in seconds.

<table>
<thead>
<tr>
<th>t</th>
<th>x</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>26</td>
</tr>
<tr>
<td>5</td>
<td>30</td>
</tr>
</tbody>
</table>

Which of the following equations represents this data?
   A. $x = t + 10$
   B. $x = 4t + 6$
   C. $x = 4t + 10$
   D. $x = 10t + 4$
   E. $x = 14t$

26. Which of the following is the graph of the equation $2x + y = 4$ in the standard $(x,y)$ coordinate plane?

27. For some real number $A$, the graph of the line $y = (A + 1)x + 8$ in the standard $(x,y)$ coordinate plane passes through $(2,6)$. What is the slope of this line?
   A. -4  B. -3  C. -1  D. 3  E. 7
28. When graphed in the standard \((x,y)\) coordinate plane, the lines \(x = -3\) and \(y = x - 3\) intersect at what point?
   A. \((0, 0)\)
   B. \((0, -3)\)
   C. \((-3, 0)\)
   D. \((-3, -3)\)
   E. \((-3, -6)\)

29. For all real numbers \(b\) and \(c\) such that the product of \(c\) and \(3\) is \(b\), which of the following expressions represents the sum of \(c\) and \(3\) in terms of \(b\)?
   A. \(b + 3\)
   B. \(3b + 3\)
   C. \(3(b + 3)\)
   D. \(\frac{b+3}{3}\)
   E. \(\frac{b}{3} + 3\)

30. If \(9(x - 9) = -11\), then \(x = ?\)
   A. \(-\frac{92}{9}\)
   B. \(-\frac{20}{9}\)
   C. \(-\frac{11}{9}\)
   D. \(-\frac{2}{9}\)
   E. \(\frac{70}{9}\)

31. For what value of \(a\) would the following system of equations have an infinite number of solutions?
   \[
   2x - y = 8 \\
   6x - 3y = 4a
   \]
   A. 2
   B. 6
   C. 8
   D. 24
   E. 32

32. The weekly fee for staying at the Pleasant Lake Campground is $20 per vehicle and $10 per person. Last year, weekly fees were paid for \(v\) vehicles and \(p\) persons. Which of the following expressions gives the total amount, in dollars, collected for weekly fees last year?
   A. \(20v + 10p\)
   B. \(20p + 10v\)
   C. \(10(v + p)\)
   D. \(30(v + p)\)
   E. \(10(v + p) + 20p\)

33. Joelle earns her regular pay of $7.50 per hour for up to 40 hours of work in a week. For each hour over 40 hours of work in a week, Joelle is paid \(1\frac{1}{2}\) times her regular pay. How much does Joelle earn for a week in which she works 42 hours?
   A. $126.00
   B. $315.00
   C. $322.50
   D. $378.00
   E. $472.50

34. The 6 consecutive integers below add up to 447.
   \[
   x - 2 \\
   x - 1 \\
   x \\
   x + 1 \\
   x + 2 \\
   x + 3
   \]
   What is the value of \(x\)?
   F. 72
   G. 73
   H. 74
   J. 75
   K. 76

35. A copy machine makes 60 copies per minute. A second copy machine makes 80 copies per minute. The second machine starts making copies 2 minutes after the first machine starts. Both machines stop making copies 8 minutes after the first machine started. Together, the 2 machines made how many copies?
   A. 480
   B. 600
   C. 680
   D. 720
   E. 960
36. The total cost of renting a car is $30.00 for each day the car is rented plus $28.75 for each mile the car is driven. What is the total cost of renting the car for 5 days and driving 350 miles?
(Note: No sales tax is involved.)
A. $104.75
B. $159.98
C. $249.75
D. $300.00
E. $1,147.50

37. The point (2, 5) is shown in the standard $(x, y)$ coordinate plane below. Which of the following is another point on the line through the point (2, 5) with a slope of $-\frac{2}{3}$?

A. A(1, 3)
B. B(0, 8)
C. C(4, 2)
D. D(5, 3)
E. E(5, 7)

38. $(a + 2b + 3c) - (4a + 6b - 5c)$ is equivalent to:
A. $-4a - 8b - 2c$
B. $-4a - 4b + 8c$
C. $-3a + 8b - 2c$
D. $-3a - 4b - 2c$
E. $-3a - 4b + 8c$

39. Discount tickets to a basketball tournament sell for $4.00 each. Enrico spent $60.00 on discount tickets, $37.50 less than if he had bought the tickets at the regular price. What was the regular ticket price?
F. $2.50
G. $6.40
H. $6.50
J. $7.50
K. $11.00

40. What are the quadrants of the standard $(x, y)$ coordinate plane below that contain points on the graph of the equation $4x - 2y = 8$?

A. I and III only
B. I, II, and III only
C. I, II, and IV only
D. II, III, and IV only
E. II, III, and IV only

41. The sum of the real numbers $x$ and $y$ is 11. Their difference is 5. What is the value of $xy$?
F. 3
G. 5
H. 8
J. 24
K. 55

42. Ms. Lewis plans to drive 900 miles to her vacation destination, driving an average of 50 miles per hour. How many miles per hour faster must she average, while driving, to reduce her total driving time by 3 hours?
A. 5
B. 8
C. 10
D. 15
E. 18

43. Two enterprising college students decide to start a business. They will make up and deliver helium balloon bouquets for special occasions. It will cost them $39.99 to buy a machine to fill the balloons with helium. They estimate that it will cost them $2.00 to buy the balloons, helium, and ribbons needed to make each balloon bouquet. Which of the following expressions could be used to model the total cost for producing $b$ balloon bouquets?
A. $2.00b + 39.99$
B. $37.99b$
C. $39.99b + 2.00$
D. $41.99b$
E. $79.98b$
44. What is the slope of the line through (−5, 2) and (6, 7) in the standard (x, y) coordinate plane?
   
   F. 9  
   G. 5  
   H. −5  
   J. 5/11  
   K. −5/11

45. As part of a lesson on motion, students observed a cart rolling at a constant rate along a straight line. As shown in the chart below, they recorded the distance, y feet, of the cart from a reference point at 1-second intervals from t = 0 seconds to t = 5 seconds.

<table>
<thead>
<tr>
<th>t</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>14</td>
<td>19</td>
<td>24</td>
<td>29</td>
<td>34</td>
<td>39</td>
</tr>
</tbody>
</table>

Which of the following equations represents this data?
   
   F. y = t + 14  
   G. y = 5t + 9  
   H. y = 5t + 14  
   J. y = 14t + 5  
   K. y = 19t

46. Lines p and n lie in the standard (x, y) coordinate plane. An equation for line p is y = 0.12x + 3.000. The slope of line n is 0.1 greater than the slope of line p. What is the slope of line n?
   
   F. 0.012  
   G. 0.02  
   H. 0.22  
   J. 1.2  
   K. 300

47. When \( \frac{1}{3}k + \frac{1}{4}k = 1 \), what is the value of k?
   
   A. \( \frac{1}{7} \)  
   B. \( \frac{12}{7} \)  
   C. \( \frac{7}{2} \)  
   D. 6  
   E. 12

48. Uptown Cable, a cable TV provider, charges each customer $120 for installation, plus $25 per month for cable programming. Uptown’s competitor, Downtown Cable, charges each customer $50 for installation, plus $35 per month for cable programming. A customer who signs up with Uptown will pay the same total amount for cable TV as a customer who signs up with Downtown if each pays for installation and cable programming for how many months?
   
   F. 3  
   G. 6  
   H. 10  
   J. 18  
   K. 30

49. On the first day of school, Mr. Vilani gave his third-grade students 5 new words to spell. On each day of school after that, he gave the students 3 new words to spell. In the first 20 days of school, how many new words had he given the students to spell?
   
   A. 28  
   B. 62  
   C. 65  
   D. 68  
   E. 152

50. The table below shows the price of different quantities of standard-sized lemons at Joe’s Fruit Stand. What is the least amount of money needed to purchase exactly 20 standard-sized lemons if the bags must be sold intact and there is no tax charged for lemons?

<table>
<thead>
<tr>
<th>Number of lemons:</th>
<th>1</th>
<th>bag of 6</th>
<th>bag of 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total price:</td>
<td>$0.30</td>
<td>$1.20</td>
<td>$2.10</td>
</tr>
</tbody>
</table>

   A. $3.60  
   B. $3.90  
   C. $4.20  
   D. $4.50  
   E. $6.00
51. 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 \(x > 2\)

52. The inequality \(6(x + 2) > 7(x - 5)\) is equivalent to which of the following inequalities?

A. \(x < -23\)
B. \(x < 7\)
C. \(x < 17\)
D. \(x < 37\)
E. \(x < 47\)

53. Marcia makes and sells handcrafted picture frames in 2 sizes: small and large. It takes her 2 hours to make a small frame and 3 hours to make a large frame. The shaded triangular region shown below is the graph of a system of inequalities representing weekly constraints Marcia has in making the frames. For making and selling \(s\) small frames and \(l\) large frames, Marcia makes a profit of \(30s + 70l\) dollars. Marcia sells all the frames she makes.

The weekly constraint represented by the horizontal line segment containing \((9,2)\) means that each week Marcia makes a minimum of:

F. 2 large frames.
G. 9 large frames.
H. 2 small frames.
J. 9 small frames.
K. 11 small frames.

54. For every hour that Marcia spends making frames in the second week of December each year, she donates \$3 from that week’s profit to a local charity. This year, Marcia made 4 large frames and 2 small frames in that week. Which of the following is closest to the percent of that week’s profit Marcia donated to the charity?

A. 6%
B. 12%
C. 14%
D. 16%
E. 19%

55. What is the maximum profit Marcia can earn from the picture frames she makes in 1 week?

F. \$410
G. \$460
H. \$540
J. \$560
K. \$690

56. Tickets for the Senior Talent Show at George Washington Carver High School are \$3 for adults and \$2 for students. To cover expenses, a total of \$600 must be collected from ticket sales for the show. One of the following graphs in the standard \((x,y)\) coordinate plane, where \(x\) is the number of adult tickets sold and \(y\) is the number of student tickets sold, represents all the possible combinations of ticket sales that cover at least \$600 in expenses. Which graph is it?

F. \[\text{graph A}\]
G. \[\text{graph B}\]
H. \[\text{graph C}\]
J. \[\text{graph D}\]
K. \[\text{graph E}\]
57. The slope of the line with equation \( y = ax + b \) is greater than the slope of the line with equation \( y = cx + b \). Which of the following statements must be true about the relationship between \( a \) and \( c \)?

- F. \( a \leq c \)
- G. \( a < c \)
- H. \( a = c \)
- J. \( a > c \)
- K. \( a \geq c + 1 \)

58. The number line graph below is the graph of which of the following inequalities?

- A. \(-1 \leq x \) and \( 3 \leq x \)
- B. \(-1 \leq x \) and \( 3 \geq x \)
- C. \(-1 \leq x \) or \( 3 \leq x \)
- D. \(-1 \geq x \) or \( 3 \leq x \)
- E. \(-1 \geq x \) or \( 3 \geq x \)

59. The inequality \( 3(x + 2) > 4(x - 3) \) is equivalent to which of the following inequalities?

- F. \( x < -6 \)
- G. \( x < 5 \)
- H. \( x < 9 \)
- J. \( x < 14 \)
- K. \( x < 18 \)

---

### Unit 4: Exponential Models

60. The product \((2x^3y)(3x^5y^8)\) is equivalent to:

- F. \( 5x^9y^9 \)
- G. \( 6x^9y^8 \)
- H. \( 6x^9y^9 \)
- J. \( 5x^20y^8 \)
- K. \( 6x^20y^8 \)

61. The expression \((3x - 4y^2)(3x + 4y^2)\) is equivalent to:

- A. \( 9x^2 - 16y^4 \)
- B. \( 9x^2 - 8y^4 \)
- C. \( 9x^2 + 16y^4 \)
- D. \( 6x^2 - 16y^4 \)
- E. \( 6x^2 - 8y^4 \)

62. Which of the following is equivalent to \((4x^2)^3\)?

- F. \( 64x^8 \)
- G. \( 64x^6 \)
- H. \( 12x^6 \)
- J. \( 12x^5 \)
- K. \( 4x^6 \)

63. If there are \( 8 \times 10^{12} \) hydrogen molecules in a volume of \( 4 \times 10^4 \) cubic centimeters, what is the average number of hydrogen molecules per cubic centimeter?

- F. \( 5 \times 10^{-9} \)
- G. \( 2 \times 10^3 \)
- H. \( 2 \times 10^8 \)
- J. \( 32 \times 10^{16} \)
- K. \( 32 \times 10^{48} \)

64. If \( 3^x = 54 \), then which of the following must be true?

- A. \( 1 < x < 2 \)
- B. \( 2 < x < 3 \)
- C. \( 3 < x < 4 \)
- D. \( 4 < x < 5 \)
- E. \( 5 < x \)

65. What is the value of the expression \((x - y)^2\) when \( x = 5 \) and \( y = -1 \)?

- F. \( 4 \)
- G. \( 6 \)
- H. \( 16 \)
- J. \( 24 \)
- K. \( 36 \)
66.
A group of cells grows in number as described by the equation $y = 16(2)^t$, where $t$ represents the number of days and $y$ represents the number of cells. According to this formula, how many cells will be in the group at the end of the first 5 days?
A. 80  
B. 160  
C. 400  
D. 512  
E. 1,280

67.
A function $f(x)$ is defined as $f(x) = -8x^2$. What is $f(-3)$?
F. $-72$  
G. $72$  
H. $192$  
J. $-576$  
K. $576$

68.
If $r = 9$, $b = 5$, and $g = -6$, what does $(r + b - g)(b + g)$ equal?
F. $-20$  
G. $-8$  
H. $8$  
J. $19$  
K. $20$

69.
$-3 \mid -6 + 8 \mid = ?$
F. $-42$  
G. $-6$  
H. $1$  
J. $6$  
K. $42$

70.
For the function $h(x) = 4x^2 - 5x$, what is the value of $h(-3)$?
A. $-93$  
B. $-9$  
C. $21$  
D. $51$  
E. $159$

71..
Two hoses are used to fill the pool. Twice as many gallons of water per minute flow through one of the hoses as through the other. Both hoses had been on for 12 hours and had filled the pool to the 4-foot mark when the hose with the faster flow stopped working. The hose with the slower flow then finished filling the pool to the 5-foot mark. Which of the following graphs shows the relationship between the time spent filling the pool and the height of the water in the pool?
Unit 6: Transformations

70.

The solution set of which of the following equations is the set of real numbers that are 5 units from -3?

F. $|x + 3| = 5$
G. $|x - 3| = 5$
H. $|x + 5| = 3$
J. $|x - 5| = 3$
K. $|x + 5| = 3$

Unit 7: Quadratics

71.

The graph of the equation $h = -at^2 + bt + c$, which describes how the height, $h$, of a hit baseball changes over time, $t$, is shown below.

If you alter only this equation’s $c$ term, which gives the height at time $t = 0$, the alteration has an effect on which of the following?

I. The $h$-intercept
II. The maximum value of $h$
III. The $t$-intercept

F. I only
G. II only
H. III only
J. I and III only
K. I, II, and III

STOP! DO IT!
### Unit 8: Probability

#### 75.
In a bag of 400 jelly beans, 25% of the jelly beans are red in color. If you randomly pick a jelly bean from the bag, what is the probability that the jelly bean picked is NOT one of the red jelly beans?

- **F.** \(\frac{1}{2}\)
- **G.** \(\frac{1}{4}\)
- **H.** \(\frac{3}{4}\)
- **J.** \(\frac{15}{16}\)
- **K.** \(\frac{1}{16}\)

#### 76.
A bag contains 12 red marbles, 5 yellow marbles, and 15 green marbles. How many additional red marbles must be added to the 32 marbles already in the bag so that the probability of randomly drawing a red marble is \(\frac{2}{5}\)?

- **F.** 13
- **G.** 18
- **H.** 28
- **J.** 32
- **K.** 40

#### 77.
A bag contains 6 red marbles, 5 yellow marbles, and 7 green marbles. How many additional red marbles must be added to the 18 marbles already in the bag so that the probability of randomly drawing a red marble is \(\frac{2}{5}\)?

- **F.** 12
- **G.** 16
- **H.** 18
- **J.** 24
- **K.** 36

#### 78.
Only tenth-, eleventh-, and twelfth-grade students attend Washington High School. The ratio of tenth graders to the school’s total student population is 86:255, and the ratio of eleventh graders to the school’s total student population is 18:51. If 1 student is chosen at random from the entire school, which grade is that student most likely to be in?

- **A.** Tenth
- **B.** Eleventh
- **C.** Twelfth
- **D.** All grades are equally likely.
- **E.** Cannot be determined from the given information

#### 79.
In the school cafeteria, students choose their lunch from 3 sandwiches, 3 soups, 4 salads, and 2 drinks. How many different lunches are possible for a student who chooses exactly 1 sandwich, 1 soup, 1 salad, and 1 drink?

- **F.** 2
- **G.** 4
- **H.** 12
- **J.** 36
- **K.** 72

For all \(x\), \((3x + 7)^2 = ?\)

- **A.** \(6x + 14\)
- **B.** \(6x^2 + 14\)
- **C.** \(9x^2 + 49\)
- **D.** \(9x^2 + 21x + 49\)
- **E.** \(9x^2 + 42x + 49\)