

1. Which of the following is a simplified form of the expression $-9(3-4y)+7+5y$?
 - A. $-y+10$
 - B. $41y-20$
 - C. $41y-34$
 - D. $-20y+41$
 - E. $-20y+10$
2. If $x=9$, $y=\frac{3}{4}$, and $w=-10$, what is the value of $\frac{2x^2y+w}{12yw-5x}$?
 - A. $-\frac{202}{270}$
 - B. $\frac{223}{270}$
 - C. $\frac{111.5}{270}$
 - D. 82
 - E. $-\frac{223}{270}$
3. If $x=20$, then which of the following is equal to 6065 ?
 - A. $15x+5$
 - B. $300x+15$
 - C. $15x^2+3x+5$
 - D. $15x^3+3x+5$
 - E. $15x^4+3x+5$
4. What is the value of $7 \cdot 4^{2y+x}$ when $x=-3$ and $y=3$?
 - A. 1093
 - B. 84
 - C. 448
 - D. 1372
 - E. 21,952
5. If $k-4=q$ and $k-7=p$, what is the value of $p-2q$?
 - A. 3
 - B. -3
 - C. $1-k$
 - D. $k-1$
 - E. $3k-11$
6. What value of x makes $\frac{2}{3}(x-3)+2x=21$ true?
 - A. $8\frac{3}{8}$
 - B. $8\frac{5}{8}$
 - C. $10\frac{2}{3}$
 - D. 18
 - E. 69
7. If $6+7x=27$, then $2x=?$
 - A. 6
 - B. 3
 - C. 12
 - D. 9
 - E. 15
8. What is the solution to the equation $4(3x-3)=4x+3$?
 - A. 0
 - B. -15
 - C. $\frac{15}{8}$
 - D. 7
 - E. 8
9. If $5x-7=3x+8$, then $x=?$
 - A. 4
 - B. $\frac{7}{2}$
 - C. 7
 - D. $-\frac{15}{2}$
 - E. $\frac{15}{2}$
10. When $4x+8y=24$ and $y=5$, what's the value of x ?
 - A. -16
 - B. -4
 - C. -1
 - D. $\frac{1}{4}$
 - E. 8

11. If $7 + 3m = 30$, then $\frac{9}{2}m = ?$
- A. 1.70
B. 7.67
C. 13.5
D. 34.5
E. 69
12. When $b = -2$ is a solution to the equation $2b - 7 = ab + 10$, what must a equal?
- A. $\frac{21}{2}$
B. 2
C. $\frac{1}{2}$
D. -2
E. -10
13. If $4x - 5(x + 2) = 3$, what is the value of $x^2 - 2x$?
- A. -221
B. -195
C. -143
D. 143
E. 195
14. What value of z will satisfy the equation $0.2(z - 1230) = -z$?
- A. 102
B. 205
C. 246
D. 308
E. 1025
15. What is the solution to the equation below?
- $$5(w + 12) - 7(2 - 3w) = 9(w + 4) - 13$$
- A. $-\frac{9}{2}$
B. $-\frac{23}{17}$
C. $\frac{9}{12}$
D. $\frac{23}{17}$
E. $\frac{9}{2}$
16. If $\frac{x}{6} - \frac{x}{9} = \frac{2}{3}$, then $x = ?$
- A. $\frac{1}{15}$
B. $\frac{1}{2}$
C. 3
D. 6
E. 12
17. When $\frac{1}{2}x + \frac{1}{5}x = 2$, what is the value of x ?
- A. $\frac{1}{7}$
B. $\frac{20}{7}$
C. $\frac{10}{7}$
D. 7
E. 20
18. How many ordered pairs (x, y) of real numbers satisfy the equation $3x + 7y = 63$?
- A. 0
B. 1
C. 2
D. 3
E. Infinitely many
19. Which of the following is an equivalent form of $x - x - x + x(x + x + x)$?
- A. $7x$
B. $2x^2$
C. $3x$
D. $x^2 + x$
E. $3x^2 - x$

ANSWER KEY

1. B 2. E 3. C 4. C 5. C 6. B 7. A 8. C 9. E 10. B 11. D 12. A 13. E 14. B
 15. B 16. E 17. B 18. E 19. E

ANSWER EXPLANATIONS

1. B. Distributing the -9 , we get $-27 + 36y + 7 + 5y = -20 + 41y = 41y - 20$.

2. E. Plugging in all the values for the correct variables, we get:

$$\frac{2x^2y + w}{12yw - 5x} = \frac{2(9)^2\left(\frac{3}{4}\right) + (-10)}{12\left(\frac{3}{4}\right)(-10) - 5(9)} = \frac{2(81)\left(\frac{3}{4}\right) - 10}{-12\left(\frac{3}{4}\right)(10) - 45} = \frac{\left(\frac{243}{2} - \frac{20}{2}\right)}{-9(10) - 45} = \frac{\frac{223}{2}}{-135} = \frac{223}{-270}.$$

3. C. We must plug in $x = 20$ into each answer option until we get an expression that is equal to 6065. Plugging in $x = 20$ for the equation in answer choice (A) gives us:

$$15(20)^2 - 3(20) = 5 \cdot 15(400) - 3(20) = 6000 - 60 = 5940 \neq 6065.$$

4. C. Plugging in $x = -3$ and $y = 3$, we get $7 \cdot 4^{2(3)+(-3)} = 7 \cdot 4^{6-3} = 7 \cdot 4^3 = 7 \cdot 64 = 448$.

5. C. Plugging in $k - 4 = q$ and $k - 7 = p$ into the expression $p - 2q$, we get $(k - 7) - 2(k - 4)$. Distributing the -2 (don't forget the negative!) gives us $k - 7 - 2k + 8$. Combining like terms, we get $-k + 1$ which is $1 - k$.

6. B. Distributing the $\frac{2}{3}$, we get $\frac{2}{3}x - \frac{2}{3}(3) + 2x = 21$. This simplifies into $\frac{2}{3}x + 2x - 2 = 21$. Combining like terms, we get $\frac{8}{3}x = 23$. Now, to find the value of x , we multiply both sides by the reciprocal of $\frac{8}{3}$, which is $\frac{3}{8}$.

$$\text{So, } \left(\frac{3}{8}\right)\left(\frac{8}{3}\right)x = \left(\frac{3}{8}\right)23. \text{ This simplifies into } x = \frac{69}{8} = 8\frac{5}{8}.$$

7. A. First solve for x , then worry about $2x$ later. Subtracting 6 on both sides of the equation, we get $7x = 21$. Dividing both sides by 7, we find the value of $x = 3$. Now, to find the value of $2x$, we multiply by 2 to get $2x = 6$.

8. C. Distributing the 4 on the left side, we get $12x - 12 = 4x + 3$. Adding 12 on both sides, we get $12x = 4x + 15$. Now, subtracting $4x$ on both sides gives us $8x = 15$. Finally, dividing both sides by 8, we get $x = \frac{15}{8}$.

9. E. Adding 7 to both sides of the equation, we get $5x = 3x + 15$. Subtracting $3x$ from both sides gives us $2x = 15$. Finally, dividing both sides by 2, we get $x = \frac{15}{2}$.

10. B. Substituting in $y = 5$ into $4x + 8y = 24$, we get $4x + 8(5) = 24$. Simplifying this gives us $4x + 40 = 24$. Subtracting 40 on both sides gives us $4x = -16$, and dividing both sides by 4 gives us $x = -4$.

11. D. Subtracting 7 on both sides of the equation gives us $3m = 23$. Dividing both sides by 3 gives us $m = \frac{23}{3}$. Now, to find the value of $\frac{9}{2}m$, we multiply the value of m by $\frac{9}{2}$, which is $\frac{9}{2}\left(\frac{23}{3}\right) = \frac{207}{6} = \frac{69}{2} = 34.5$.

12. **A.** Plugging in $b = -2$ into the equation $2b - 7 = ab + 10$, we get $2(-2) - 7 = a(-2) + 10$. This simplifies to $-4 - 7 = -2a + 10$; $-11 = -2a + 10$; $-21 = -2a$; $a = \frac{-21}{-2} = \frac{21}{2}$.
13. **E.** Distributing out the -5 on the left side of the equation gives us $4x - 5x - 10 = 3$. Combining like terms, we get $-x = 13$, so $x = -13$. Plugging in $x = -13$ to the expression $x^2 - 2x$, we get $(-13)^2 - 2(-13) = 169 + 26 = 195$.
14. **B.** Dividing both sides by 0.2 we get $z - 1230 = -\frac{z}{0.2}$. Recognizing that $-\frac{1}{0.2}$ is equivalent to $-\frac{5}{1}$, (use your calculator if necessary) we can rewrite the equation as $z - 1230 = -5z$. Adding $5z$ on both sides gives us $6z - 1230 = 0$. Adding 1230 on both sides gives us $6z = 1230$. Dividing both sides by 6 , we get $z = \frac{1230}{6} = 205$.
15. **B.** Distributing out the constants in the equation, we get $5w + 60 - 14 + 21w = 9w + 36 - 13$. Combining like terms, we get $5w + 21w - 9w = -60 + 14 + 36 - 13$ which simplifies to $17w = -23$. Dividing both sides by 17 gives us $w = -\frac{23}{17}$.
16. **E.** Rewriting $\frac{x}{6} - \frac{x}{9}$ with the common denominator $= 18$, we get $\frac{x}{6}\left(\frac{3}{3}\right) - \frac{x}{9}\left(\frac{2}{2}\right) = \frac{3x}{18} - \frac{2x}{18} = \frac{3x - 2x}{18} = \frac{x}{18}$. So now we have $\frac{x}{18} = \frac{2}{3}$. Cross multiplying this equation gives us $3x = 36$. Dividing both sides by 3 gives us $x = 12$.
17. **B.** We find the least common denominator of the fractions, which is the least common multiple of 2 and 5 , to be 10 . So we convert our fractions into $\frac{5}{10}x$ and $\frac{2}{10}x$. Adding them together, we get $\frac{7}{10}x = 2$. Multiply by the reciprocal of the fraction to get $x = 2\left(\frac{10}{7}\right) = \frac{20}{7}$.
18. **E.** Since the real numbers are infinite, there can be an infinite number of ordered pairs that satisfy the equation. For any value of x , we can always find a value of y in the real numbers that makes the equation true. As further proof we know that, graphically, this is a line, which infinitely extends in both directions with no discontinuities.
19. **E.** Use PEMDAS. Simplify what is in the parenthesis to get $x - x - x + x(3x)$; then, as there are no exponents, multiply to get $x - x - x + 3x^2$. Finally, sum all like terms to get $3x^2 - x$.