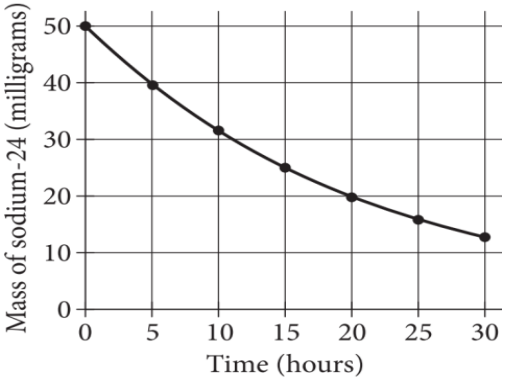
MATH NO CALCULATOR

1.



The graph models the radioactive decay of the sodium-24 in a sample over time. According to the graph, at 5 hours, which of the following is closest to the mass, in milligrams, of the sodium-24 in this sample?

A. 25
B. 31
C. 40
D. 50

2.

$$|x + 3| = 6$$

What is the positive solution to the given equation?

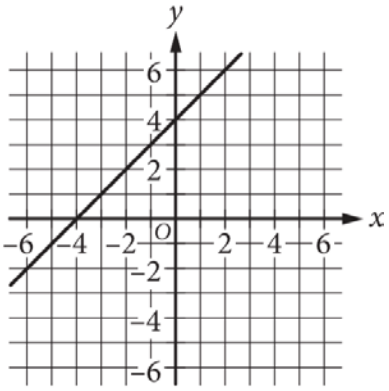
A. 2
B. 3
C. 9
D. 18

3.

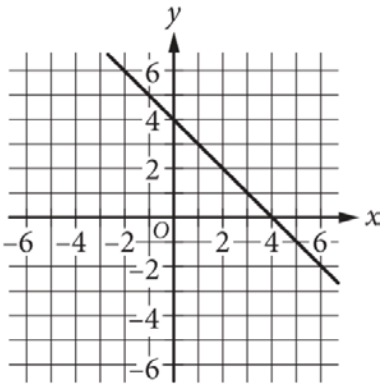
$$y = 4 - x$$

What is the graph of the given equation?

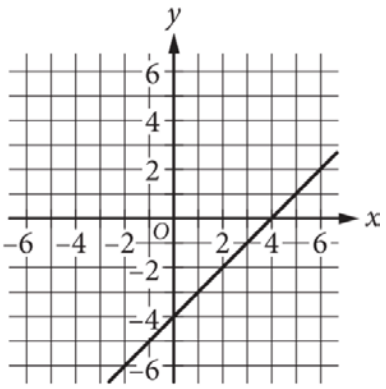
A.



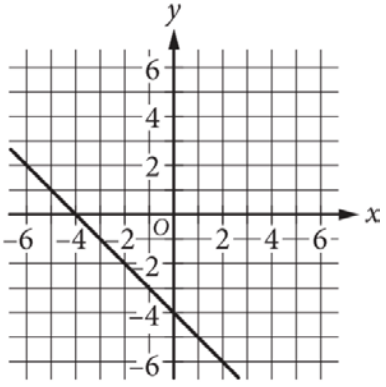
B.



C.



D.



4.

$$y = 7 - 4x$$
$$15x - 4y = 3$$

What is the solution (x, y) to the given system of equations?

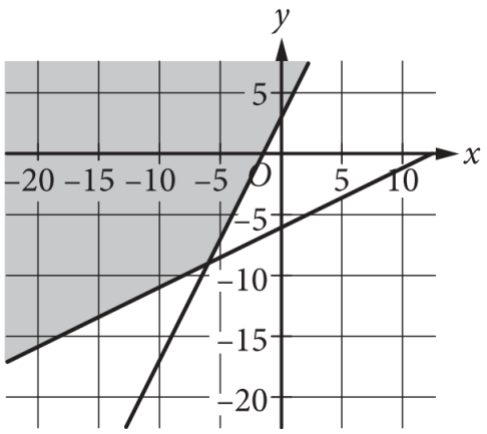
A. (-31, 131)
B. (-1, 11)
C. (1, 3)
D. (1, 11)

5.

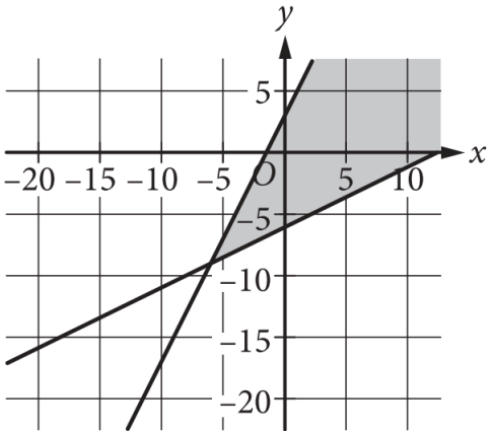
$$y \leq 2x + 3$$
$$y \geq 0.5x - 6$$

In which graph does the shaded region represent all solutions to the given system of inequalities?

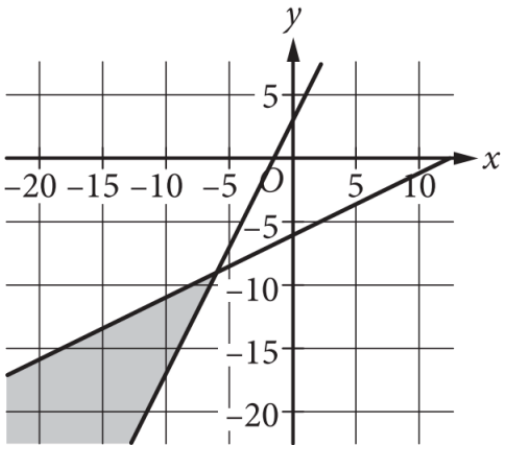
A.



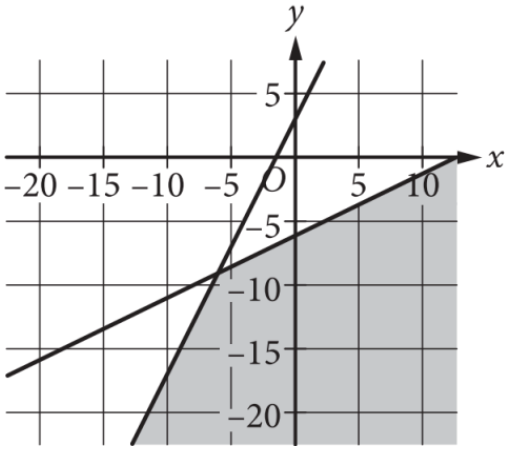
B.



C.



D.



6. $f(t) = 0.17t + 2.54$

The given function f models the annual worldwide production of avocados, in millions of metric tons, t years after 2000. According to the function, by how many millions of metric tons did the annual worldwide production of avocados increase from 2010 to 2011?

A. 0.17
B. 2.54
C. 2.71
D. 4.24

7. Which equation has no solution?

A. $4(x + 1) = x + 4$
B. $4(x + 1) = x + 1$
C. $4(x + 1) = 4x + 4$
D. $4(x + 1) = 4x$

8. The function f is defined by $f(x) = (x - 1)(x + 1)(x + 2)$. Which of the following is NOT an x-intercept of the graph $y = f(x)$ in the xy-plane?

A. (-2, 0)
B. (-1, 0)
C. (1, 0)
D. (2, 0)

9. Which expression is equivalent to $16^{\left(\frac{1}{2}x\right)}$?

A. 4^x
B. 8^x
C. $8x$
D. $16\sqrt{x}$

10. Trapezoid ABCD is similar to trapezoid PQRS. The length of each side of trapezoid PQRS is 3 times the length of its corresponding side of trapezoid ABCD. The area of trapezoid ABCD is 6 square centimeters. What is the area, in square centimeters, of trapezoid PQRS?

A. 9
B. 18
C. 54
D. 216

11. The function f is defined by $f(x) = (x + 1)^2 - 9$. In the xy-plane, the graph of which of the following equations has no x-intercepts?

A. $y = f(x - 2)$
B. $y = f(x + 2)$
C. $y = f(x) - 11$
D. $y = f(x) + 11$

12. $x^2 - 10x + y^2 - 6y = 30$

In the xy-plane, the graph of the given equation is a circle. What is the area of this circle?

A. 8π
B. 15π
C. 46π
D. 64π

13. $\frac{x^2+x}{x+5}$

The given expression can be rewritten as $A + \frac{20}{x+5}$, where A is a polynomial. Which of the following represents A?

A. $x - 4$
B. $x + 4$
C. $x^2 + x$
D. $x^2 + x - 20$

14. $\frac{1}{C} = \frac{1}{d} + \frac{1}{e} + \frac{1}{f}$

An electric circuit contains three capacitors in a particular arrangement. The given equation relates the equivalent capacitance C of the arrangement to d, e, and f, the capacitances of the individual capacitors. Which equation correctly gives C in terms of d, e, and f ?

A. $C = d + e + f$
B. $C = \frac{def}{d+e+f}$
C. $C = \frac{d+e+f}{def}$
D. $C = \frac{def}{de+df+ef}$

15. The cost of renting a bicycle is $8 for the first hour plus $4 for each additional hour. Which of the following functions gives the cost $C(h)$, in dollars, of renting the bicycle for h hours, where h is a positive integer?

A. $C(h) = 8h - 4$
B. $C(h) = 8h + 12$
C. $C(h) = 4h + 8$
D. $C(h) = 4h + 4$

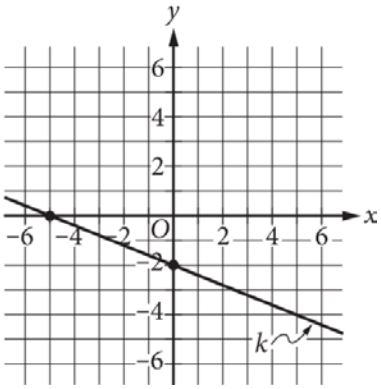
16. $5r = 3(r + 1)$

What value of r is the solution to the given equation?

17. $(3x)^2 - 4(3x) - 12 = 0$

What is the positive solution to the given equation?

18.



Line k is shown in the xy-plane. Line j (not shown) is perpendicular to line k. What is the slope of line j?

19. In the xy-plane, the graph of $y = (-14)\left(\frac{1}{2}\right)^x + k$, where k is a constant, has a y-intercept of (0,2). What is the value of k?

20. The perimeter of a square inscribed in a circle is 30 inches. The radius of the circle is $x\sqrt{2}$ inches. What is the value of x?

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Question	Correct Answer	Your Answer	Difficulty	Subscores/Cross-Test Scores
1	C	✓	■□□	Analysis in Science Passport to Advanced Math
2	B	✓	■□□	Passport to Advanced Math
3	B	✓	■□□	Heart of Algebra
4	C	✓	■■□	Heart of Algebra
5	B	✓	■■□	Heart of Algebra
6	A	✓	■■□	Heart of Algebra
7	D	✓	■■□	Heart of Algebra
8	D	✓	■■□	Passport to Advanced Math
9	A	✓	■■□	Passport to Advanced Math
10	C	✓	■■■	N/A
11	D	✓	■■■	Passport to Advanced Math
12	D	✓	■■■	N/A
13	A	✓	■■■	Passport to Advanced Math
14	D	✓	■■■	Analysis in Science Passport to Advanced Math
15	D	C	■■■	Heart of Algebra
16	3/2,1.5	✓	■■□	Heart of Algebra
17	2	✓	■■□	Passport to Advanced Math
18	5/2,2.5	✓	■■□	Heart of Algebra
19	16	✓	■■■	Passport to Advanced Math
20	3.75,15/4	✓	■■■	N/A