No Calculator

4

$$4x^2 - 9 = (px + t)(px - t)$$

In the equation above, p and t are constants. Which of the following could be the value of p ?

A) 2
B) 3
C) 4
D) 9

7

A bricklayer uses the formula $n = 7\ell h$ to estimate the number of bricks, n, needed to build a wall that is ℓ feet long and h feet high. Which of the following correctly expresses ℓ in terms of n and h ?

A) $\ell = \frac{7}{nh}$
B) $\ell = \frac{h}{7n}$
C) $\ell = \frac{n}{7h}$
D) $\ell = \frac{n}{7+h}$

8

x	$w(x)$	$t(x)$
1	−1	−3
2	3	−1
3	4	1
4	3	3
5	−1	5

The table above shows some values of the functions w and t. For which value of x is $w(x) + t(x) = x$?

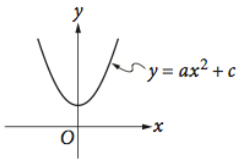
A) 1
B) 2
C) 3
D) 4

9

If $\sqrt{x} + \sqrt{9} = \sqrt{64}$, what is the value of x ?

A) $\sqrt{5}$
B) 5
C) 25
D) 55

11



The vertex of the parabola in the xy-plane above is $(0, c)$. Which of the following is true about the parabola with the equation $y = -a(x - b)^2 + c$?

A) The vertex is (b, c) and the graph opens upward.
B) The vertex is (b, c) and the graph opens downward.
C) The vertex is $(-b, c)$ and the graph opens upward.
D) The vertex is $(-b, c)$ and the graph opens downward.

12

Which of the following is equivalent to $\frac{4x^2 + 6x}{4x + 2}$?

A) x
B) $x + 4$
C) $x - \frac{2}{4x + 2}$
D) $x + 1 - \frac{2}{4x + 2}$

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$$2x^2 - 4x = t$$

In the equation above, t is a constant. If the equation has no real solutions, which of the following could be the value of t ?

A) −3
B) −1
C) 1
D) 3

15

Which of the following is equivalent to $\left(a + \frac{b}{2}\right)^2$?

A) $a^2 + \frac{b^2}{2}$
B) $a^2 + \frac{b^2}{4}$
C) $a^2 + \frac{ab}{2} + \frac{b^2}{2}$
D) $a^2 + ab + \frac{b^2}{4}$

16

If $a^{\frac{b}{4}} = 16$ for positive integers a and b, what is one possible value of b ?

1

Which expression is equivalent to $(2x^2 - 4) - (-3x^2 + 2x - 7)$?

A) $5x^2 - 2x + 3$

B) $5x^2 + 2x - 3$

C) $-x^2 - 2x - 11$

D) $-x^2 + 2x - 11$

5

$$6x - 9y > 12$$

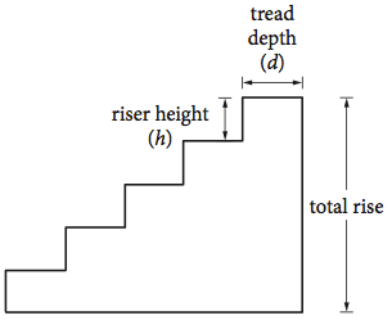
Which of the following inequalities is equivalent to the inequality above?

A) $x - y > 2$

B) $2x - 3y > 4$

C) $3x - 2y > 4$

D) $3y - 2x > 2$



Note: Figure not drawn to scale.

When designing a stairway, an architect can use the riser-tread formula $2h + d = 25$, where h is the riser height, in inches, and d is the tread depth, in inches. For any given stairway, the riser heights are the same and the tread depths are the same for all steps in that stairway.

The number of steps in a stairway is the number of its risers. For example, there are 5 steps in the stairway in the figure above. The total rise of a stairway is the sum of the riser heights as shown in the figure.

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Which of the following expresses the riser height in terms of the tread depth?

A) $h = \frac{1}{2}(25 + d)$

B) $h = \frac{1}{2}(25 - d)$

C) $h = -\frac{1}{2}(25 + d)$

D) $h = -\frac{1}{2}(25 - d)$

20

What is the sum of the solutions to $(x - 6)(x + 0.7) = 0$?

A) -6.7

B) -5.3

C) 5.3

D) 6.7

29

A motor powers a model car so that after starting from rest, the car travels s inches in t seconds, where $s = 16t\sqrt{t}$. Which of the following gives the average speed of the car, in inches per second, over the first t seconds after it starts?

A) $4\sqrt{t}$

B) $16\sqrt{t}$

C) $\frac{16}{\sqrt{t}}$

D) $16t$

31

A group of friends decided to divide the $800 cost of a trip equally among themselves. When two of the friends decided not to go on the trip, those remaining still divided the $800 cost equally, but each friend's share of the cost increased by $20. How many friends were in the group originally?

34

In the xy-plane, the graph of $y = 3x^2 - 14x$ intersects the graph of $y = x$ at the points $(0, 0)$ and (a, a). What is the value of a ?