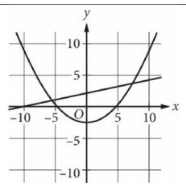
# SAT Math

## Nonlinear Equations and Systems 2

| Question # | ID |
|---|---|

**2.1** a5663025




A system of equations consists of a quadratic equation and a linear equation. The equations in this system are graphed in the *xy*-plane above. How many solutions does this system have?

A. 0

B. 1

C. 2

D. 3

**2.2** d0a7871e

$$y = x + 1$$
$$y = x^2 + x$$

If $(x,y)$ is a solution to the system of equations above, which of the following could be the value of $x$ ?

A. –1

B. 0

C. 2

D. 3

**2.3** 7f81d0c3

$$x^2 - x - 1 = 0$$

What values satisfy the equation above?

A. $x = 1$ and $x = 2$

B. $x = -\frac{1}{2}$ and $x = \frac{3}{2}$

C. $x = \frac{1+\sqrt{5}}{2}$ and $x = \frac{1-\sqrt{5}}{2}$

D. $x = \frac{-1+\sqrt{5}}{2}$ and $x = \frac{-1-\sqrt{5}}{2}$

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**2.4** 911383f2

$$(x-4)(x+2)(x-1)=0$$

What is the product of the solutions to the given equation?

A. $8$

B. $3$

C. $-3$

D. $-8$

**2.5** b80d10d7

$$\frac{2(x+1)}{x+5}=1-\frac{1}{x+5}$$

What is the solution to the equation above?

A. 0

B. 2

C. 3

D. 5

**2.6** fcdf87b7

$$y=x^2-4x+4$$
$$y=4-x$$

If the ordered pair $(x, y)$ satisfies the system of equations above, what is one possible value of $x$ ?

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**2.7** 652054da

An oceanographer uses the equation $s = \frac{3}{2}p$ to model the speed *s*, in knots, of an ocean wave, where *p* represents the period of the wave, in seconds. Which of the following represents the period of the wave in terms of the speed of the wave?

A. $p = \frac{2}{3}s$

B. $p = \frac{3}{2}s$

C. $p = \frac{2}{3} + s$

D. $p = \frac{3}{2} + s$

**2.8** 6e02cd78

In the *xy*-plane, what is the *y*-coordinate of the point of intersection of the graphs of $y = (x-1)^2$ and $y = 2x - 3$?

**2.9** 802549ac

$$(x+2)(x+3) = (x-2)(x-3) + 10$$

Which of the following is a solution to the given equation?

A. $1$

B. $0$

C. $-2$

D. $-5$

**2.10** a4f61d75

$$x^2 - ax + 12 = 0$$

In the equation above, *a* is a constant and $a > 0$. If the equation has two integer solutions, what is a possible value of *a*?

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**2.11** 630897df

The speed of sound in dry air, *v*, can be modeled by the formula $v = 331.3 + 0.606T$, where *T* is the temperature in degrees Celsius and *v* is measured in meters per second. Which of the following correctly expresses *T* in terms of *v* ?

A. $T = \frac{v + 0.606}{331.3}$

B. $T = \frac{v - 0.606}{331.3}$

C. $T = \frac{v + 331.3}{0.606}$

D. $T = \frac{v - 331.3}{0.606}$

**2.12** c77ef2fb

Blood volume, $V_B$, in a human can be determined using the equation $V_B = \frac{V_P}{1 - H}$, where $V_P$ is the plasma volume and *H* is the hematocrit (the fraction of blood volume that is red blood cells). Which of the following correctly expresses the hematocrit in terms of the blood volume and the plasma volume?

A. $H = 1 - \frac{V_P}{V_B}$

B. $H = \frac{V_B}{V_P}$

C. $H = 1 + \frac{V_B}{V_P}$

D. $H = V_B - V_P$

**2.13** 364a2d25

$$x + y = 17$$
$$xy = 72$$

If one solution to the system of equations above is $(x, y)$, what is one possible value of *x* ?

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| **2.14** | 0980fcdd | $x^2 = 6x + y$<br>$y = -6x + 36$<br><br>A solution to the given system of equations is $(x,y)$. Which of the following is a possible value of *xy* ?<br><br>A. 0<br><br>B. 6<br><br>C. 12<br><br>D. 36 |
| **2.15** | 87a3de81 | $x^2 + x - 12 = 0$<br><br>If *a* is a solution of the equation above and $a > 0$ , what is the value of *a* ? |
| **2.16** | 2683b5db | $T = 0.01(P - 40{,}000)$<br><br>In a city, the property tax *T*, in dollars, is calculated using the formula above, where *P* is the value of the property, in dollars. Which of the following expresses the value of the property in terms of the property tax?<br><br>A. $P = 100T - 400$<br><br>B. $P = 100T + 400$<br><br>C. $P = 100T - 40{,}000$<br><br>D. $P = 100T + 40{,}000$ |

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**2.17** 2f958af9

$$v^2 = \frac{LT}{m}$$

The formula above expresses the square of the speed $v$ of a wave moving along a string in terms of tension $T$, mass $m$, and length $L$ of the string. What is $T$ in terms of $m$, $v$, and $L$ ?

A. $T = \frac{mv^2}{L}$

B. $T = \frac{m}{v^2 L}$

C. $T = \frac{mL}{v^2}$

D. $T = \frac{L}{mv^2}$

**2.18** 876a731c

$$\begin{array}{|c|}\hline y = x^2 \\ \hline 2y + 6 = 2(x + 3) \\ \hline \end{array}$$

If $(x, y)$ is a solution of the system of equations above and $x > 0$, what is the value of $xy$ ?

A. 1

B. 2

C. 3

D. 9

**2.19** 928498f3

$$6x^2 + 5x - 7 = 0$$

What are the solutions to the given equation?

A. $\frac{-5 \pm \sqrt{25 + 168}}{12}$

B. $\frac{-6 \pm \sqrt{25 + 168}}{12}$

C. $\frac{-5 \pm \sqrt{36 - 168}}{12}$

D. $\frac{-6 \pm \sqrt{36 - 168}}{12}$

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**2.20** 2d2ab76b

$y = x^2 - 1$
$y = 3$

When the equations above are graphed in the *xy*-plane, what are the coordinates (*x*, *y*) of the points of intersection of the two graphs?

A. $(2,3)$ and $(-2,3)$

B. $(2,4)$ and $(-2,4)$

C. $(3,8)$ and $(-3,8)$

D. $(\sqrt{2},3)$ and $(-\sqrt{2},3)$

**2.21** 3b4b8831

$$38x^2 = 38(9)$$

What is the negative solution to the given equation?

**2.22** f5247e52

$y = ax^2 - c$

In the equation above, *a* and *c* are positive constants. How many times does the graph of the equation above intersect the graph of the equation $y = a + c$ in the *xy*-plane?

A. Zero

B. One

C. Two

D. More than two

**2.23** f76c1858

$7x^2 - 20x - 32 = 0$ What is the positive solution to the given equation?

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**2.24** 4e18fc5d

$v = -\frac{w}{150x}$

The given equation relates the distinct positive numbers $v$, $w$, and $x$. Which equation correctly expresses $w$ in terms of $v$ and $x$?

A. $w = -150vx$

B. $w = -\frac{150v}{x}$

C. $w = -\frac{x}{150v}$

D. $w = v + 150x$

**2.25** bef4b1c6

$\frac{55}{x+6} = x$

What is the positive solution to the given equation?

**2.26** 11ccf3e1

$14j + 5k = m$

The given equation relates the numbers $j$, $k$, and $m$. Which equation correctly expresses $k$ in terms of $j$ and $m$?

A. $k = \frac{m-14j}{5}$

B. $k = \frac{1}{5}m - 14j$

C. $k = \frac{14j-m}{5}$

D. $k = 5m - 14j$

**2.27** 29ed5d39

$p = 9 + \frac{14}{n}$

The given equation relates the numbers $p$ and $n$, where $n$ is not equal to $0$ and $p > 9$. Which equation correctly expresses $n$ in terms of $p$?

A. $n = \frac{p-9}{14}$

B. $n = \frac{p}{14} + 9$

C. $n = \frac{p}{14} - 9$

D. $n = \frac{14}{p-9}$

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**2.28** 895628b5

$$y = (x - 2)(x + 4)$$
$$y = 6x - 12$$

Which ordered pair $(x, y)$ is the solution to the given system of equations?

A. $(0, 2)$

B. $(-4, 2)$

C. $(2, 0)$

D. $(2, -4)$

**2.29** 13e57f0a

$$-4x^2 - 7x = -36$$

What is the positive solution to the given equation?

A. $\frac{7}{4}$

B. $\frac{9}{4}$

C. $4$

D. $7$

**2.30** 6acdcece

$$b - 72 = \frac{x}{y}$$

The given equation relates the positive numbers $b$, $x$, and $y$. Which equation correctly expresses $x$ in terms of $b$ and $y$?

A. $x = \frac{b-72}{y}$

B. $x = by - 72$

C. $x = \frac{by-72}{y}$

D. $x = by - 72y$

**2.31** 09e5e4d3

If $\frac{42}{x} = 7x$, what is the value of $7x^2$?

A. $6$

B. $7$

C. $42$

D. $294$

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**2.32** 4b6f0a3f

$$x^2 - 5x - 24 = 0$$

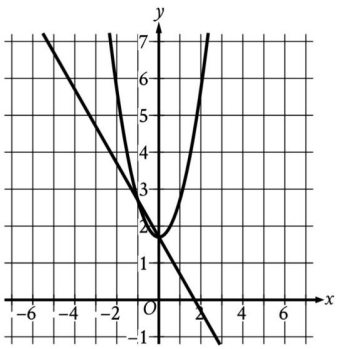
What is the sum of the solutions to the given equation?

**2.33** 75a32330

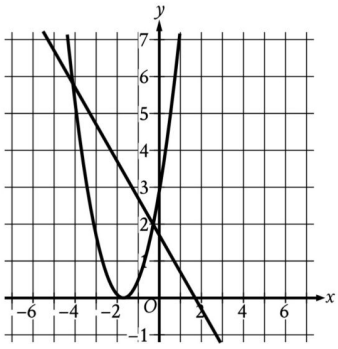
$$y = x^2 + 1.7$$
$$y = 1.7 - x$$

Which graph represents the given system of equations?

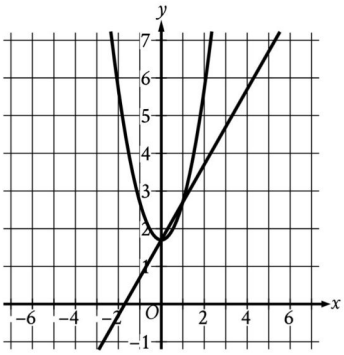
A.

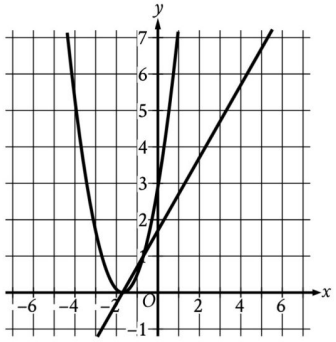



C.




B.




D.