**1.** When $9x = 3y - 27$ is graphed in the standard $(x, y)$ coordinate plane, what is the y-intercept?

**A.** 3
**B.** 6
**C.** 9
**D.** 12
**E.** 15

**2.** In the standard $(x, y)$ coordinate plane, what is the x-intercept of the line expressed as $y = -\frac{x}{5} + 3$?

**A.** $-15$
**B.** $-3$
**C.** 3
**D.** 8
**E.** 15

**3.** Which of the following equations, when graphed in the standard $(x, y)$ coordinate plane, would cross the x-axis at $x = -13$ and at $x = 7$?

**A.** $y = -5(x+13)(x-7)$
**B.** $y = -6(x+13)(x+7)$
**C.** $y = 2(x-13)(x-7)$
**D.** $y = 3(x-13)(x+7)$
**E.** $y = -3(x-13)(x-7)$

**4.** A parabola with vertex $(5,-9)$ and axis of symmetry at $x = 5$ crosses the x-axis at $(5-\sqrt{35},0)$. At what other point, if any, does the parabola cross the x-axis?

**A.** $(5+\sqrt{35},0)$
**B.** $(-5-\sqrt{35},0)$
**C.** $(-5+\sqrt{35},0)$
**D.** No other point
**E.** Cannot be determined from given information

**5.** What is the $y$-intercept of a line that contains the points $(5,-2)$ and $(3,2)$ in the standard $(x, y)$ coordinate plane?

**A.** $\left(\frac{1}{2},0\right)$
**B.** $\left(0,-\frac{1}{2}\right)$
**C.** $(0,8)$
**D.** $(8,0)$
**E.** $(8,-8)$

**6.** What is the slope of the line containing the points $(15,8)$ and $(10,7)$ in the standard $(x, y)$ coordinate plane?

**A.** $\frac{7}{3}$
**B.** $\frac{3}{5}$
**C.** $\frac{3}{5}$
**D.** 5
**E.** $\frac{1}{5}$

**7.** Points $A(-10,2)$ and $B(8,-5)$ lie in the standard $(x, y)$ coordinate plane. What is the slope of $\overline{AB}$?

**A.** $-\frac{7}{18}$
**B.** $\frac{7}{18}$
**C.** $-\frac{3}{2}$
**D.** $\frac{3}{2}$
**E.** $\frac{2}{3}$

**8.** To check the slope of the roof of a house, an architect places an overlay of the standard $(x, y)$ coordinate plane on the blueprint so the x-axis aligns with the horizontal on the blueprint. The line segment representing the side view of the roof goes through the points $(3,-2)$ and $(15,5)$. What is the slope of the roof?

**A.** $-\frac{1}{6}$

**B.** $-\frac{1}{4}$

**C.** $4$

**D.** $\frac{7}{12}$

**E.** $\frac{12}{7}$

**9.** In the standard $(x, y)$ coordinate plane, what is the slope of a line passing through the points $(-3,-4)$ and $(5,0)$?

**A.** $-2$

**B.** $-\frac{1}{2}$

**C.** $\frac{1}{2}$

**D.** $-\frac{7}{5}$

**E.** $2$

**10.** What is the slope of the line through the points $(7,3)$ and $(12,9)$?

**A.** $\frac{10}{21}$

**B.** $\frac{12}{19}$

**C.** $\frac{5}{6}$

**D.** $\frac{6}{5}$

**E.** $\frac{21}{10}$

**11.** The graph of the line $6x = 4y - 20$ does NOT have any points in what quadrant(s) of the standard $(x, y)$ coordinate plane below?

**A.** Quadrant I only
**B.** Quadrant II only
**C.** Quadrant III only
**D.** Quadrant IV only
**E.** Quadrants I and III only

**12.** For some real number $k$, the graph of the line of $y = (k-3)x + 13$ in the standard $(x, y)$ coordinate plane passes through $(3,4)$. What is the slope of this line?

**A.** $-9$
**B.** $-3$
**C.** $0$
**D.** $4$
**E.** $9$

**13.** Which of the following has the largest slope?

**A.** $y = 5x - 3$

**B.** $y = x + 12$

**C.** $y = 3x - \frac{5}{2}$

**D.** $2y + 18x = 15$

**E.** $3y = 2x - 10$

**14.** Lines $a$ and $b$ lie in the same standard $(x, y)$ coordinate planes. The equation for line $a$ is $y = 0.035x + 150$. The slope of line $b$ is $0.01$ less that that slope of line $a$. What is the slope of line $b$?

**A.** $0.0035$
**B.** $0.025$
**C.** $0.034$
**D.** $0.135$
**E.** $1.035$

**15.** What is the slope of the line given by the equation $12x - 7y + 17 = 0$?

**A.** $-7$

**B.** $-\frac{12}{7}$

**C.** $-\frac{7}{12}$

**D.** $\frac{12}{7}$

**E.** $12$

**16.** In the standard $(x, y)$ coordinate plane, what is the slope of the line given by the equation $11x - 7y = 5$?

**A.** $-7$

**B.** $-\frac{11}{7}$

**C.** $\frac{7}{11}$

**D.** $\frac{11}{7}$

**E.** $11$

**17.** What is the slope of the line represented by the equation $8y - 22x = 9$?

**A.** $-22$

**B.** $\frac{9}{8}$

**C.** $\frac{11}{4}$

**D.** $8$

**E.** $22$

**18.** When graphed in the standard $(x, y)$ coordinate plane, the line $4x + 5y - 3 = 0$ has a slope of:

**A.** $-4$

**B.** $-\frac{4}{5}$

**C.** $\frac{4}{5}$

**D.** $\frac{5}{4}$

**E.** $4$

**19.** The line with the equation $9x + 5y = 7$ is graphed in the standard $(x, y)$ coordinate plane. What is the slope of this line?

**A.** $-\frac{9}{5}$

**B.** $-\frac{5}{9}$

**C.** $\frac{9}{5}$

**D.** $\frac{5}{9}$

**E.** $\frac{7}{5}$

**20.** For all $m \neq 0$, what is the slope of the line segment connecting $(-m, n)$ and $(m, -n)$ in the standard $(x, y)$ coordinate plane?

**A.** $0$

**B.** $-\frac{n}{m}$

**C.** $-\frac{m}{n}$

**D.** $2n$

**E.** Slope is undefined.

**21.** In the standard $(x, y)$ coordinate plane, if the $x$-coordinate of each point on a line is $3$ more than $\frac{1}{4}$ its $y$-coordinate, the slope of the line is:

**A.** $-4$

**B.** $-3$

**C.** $\frac{1}{4}$

**D.** $3$

**E.** $4$

**22.** What is the slope-intercept form of $3x - y + 9 = 0$?

**A.** $y = -3x - 9$

**B.** $y = -3x + 9$

**C.** $y = 9x + 3$

**D.** $y = 3x + 9$

**E.** $y = 3x - 9$

**23.** The points $(-3,7)$ and $(0,9)$ lie on a straight line. What is the slope-intercept equation of the line?

**A.** $y = 3x - 9$

**B.** $y = \frac{2}{3}x + 10$

**C.** $y = -\frac{2}{3}x + 9$

**D.** $y = \frac{2}{3}x + 9$

**E.** $y = -3x + 7$

**24.** The slope of the line with the equation $y = mx + b$ is less than the slope of the line with the equation $y = nx + b$. Which of the following statements *must* be true about the relationship between $m$ and $n$?

**A.** $m \geq n$

**B.** $m > n$

**C.** $m \leq n$

**D.** $m < n$

**E.** $m + .5 \leq n$

**25.** As part of a lesson on slopes and equations, Mr. Hurwitz rolled a barrel at a constant rate along a straight line. His students recorded the distance $(d)$, in feet, from a reference point at the start of the experiment and at $4$ additional times $(t)$, in seconds.

| $t$ | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| $d$ | 12 | 14.5 | 17 | 19.5 | 22 |

Which of the following equations represents this data?

**A.** $d = t + 12$

**B.** $d = \frac{5}{2}t + 7$

**C.** $d = \frac{5}{2}t + 12$

**D.** $d = 12t + \frac{5}{2}$

**E.** $d = 14.5t$

**26.** What is the slope of any line parallel to the y-axis in the $(x, y)$ coordinate plane?

**A.** $-1$

**B.** $0$

**C.** $1$

**D.** Undefined

**E.** Cannot be determined from the given information

**27.** If the graphs of $y = \frac{5}{3}x - 7$ and $y = ax + 12$ are parallel in the standard $(x, y)$ coordinate plane, then $a = ?$

**A.** $-12$

**B.** $-\frac{3}{5}$

**C.** $0$

**D.** $\frac{5}{3}$

**E.** $12$

**28.** When graphed in the standard $(x, y)$ coordinate plane, the graph of which of the following equations is parallel to the $x$-axis?

**A.** $x = -7$
**B.** $x = -7y$
**C.** $x = y$
**D.** $y = -7$
**E.** $y = -7x$

**29.** What is the slope of any line parallel to the line $6x + 7y = 5$ in the standard $(x, y)$ coordinate plane?

**A.** $-6$
**B.** $-\frac{6}{7}$
**C.** $\frac{6}{5}$
**D.** $\frac{7}{6}$
**E.** $6$

**30.** The table below contains coordinate pairs that satisfy a linear relationship. What does $a$ equal?

| $x$ | $y$ |
|---|---|
| $-4$ | $-11$ |
| $-2$ | $-8$ |
| $0$ | $-5$ |
| $2$ | $-2$ |
| $7$ | $a$ |

**A.** $\frac{11}{2}$
**B.** $2$
**C.** $-\frac{11}{2}$
**D.** $0$
**E.** $3$

**31.** Chris is planning a party for his friend. He receives the following prices from the restaurant:

| Number of Guests | Price |
|---|---|
| 30 | \$235 |
| 35 | \$250 |
| 40 | \$265 |
| 45 | \$280 |
| 50 | \$295 |

What equation, where $x$ is the number of guests and $y$ is the price in dollars, best fits the information in the table?

**A.** $y = 3x + 235$
**B.** $y = 3x + 145$
**C.** $y = 60x + 235$
**D.** $y = 30x + 235$
**E.** $y = 50x + 295$

**32.** What is the $y$-intercept of the line that contains the points $(-2, 4)$ and $(3, 1)$ in the standard $(x, y)$ coordinate plane?

**A.** $\frac{14}{3}$
**B.** $-\frac{14}{3}$
**C.** $-\frac{14}{5}$
**D.** $-\frac{3}{5}$
**E.** $\frac{14}{5}$

**33.** What is the $x$-intercept of the line that passes through the point $(4, -7)$ and has a slope of $-\frac{1}{2}$?

**A.** $4$
**B.** $-10$
**C.** $10$
**D.** $-5$
**E.** $18$

**34.** When $4x = 2y - 12$ is graphed in the standard $(x, y)$ coordinate plane, what is the x-intercept?

**A.** $-3$

**B.** $3$

**C.** $6$

**D.** $-6$

**E.** $-12$

**35.** A parabola with vertex $(2,5)$ and an axis of symmetry at $x = 2$ crosses the y-axis at $(0,13)$. At what other point, if any, does the parabola cross the y-axis?

**A.** $(0,-13)$

**B.** $(4,-13)$

**C.** $(0,-9)$

**D.** No other point

**E.** Cannot be determine from the given information

**36.** The table below lists the number of volunteer organizations in a certain county in Nevada for the years $2001$ through $2005$. Which expression, using $x$ as the number of years after $2001$, best models the approximate number of volunteer organizations in that county?

| Year | # Volunteer Orgs |
|---|---|
| 2001 | 212 |
| 2002 | 217 |
| 2003 | 221 |
| 2004 | 226 |
| 2005 | 230 |

**A.** $\frac{9}{2}x + 212$

**B.** $\frac{9}{2}x + 2001$

**C.** $4x + 212$

**D.** $\frac{2}{9}x + 212$

**E.** $\frac{2}{9}x + 2001$

## ANSWER KEY

**1. C** **2. E** **3. A** **4. A** **5. C** **6. E** **7. A** **8. D** **9. C** **10. D** **11. D** **12. B** **13. A** **14. B**
**15. D** **16. D** **17. C** **18. B** **19. A** **20. B** **21. E** **22. D** **23. D** **24. D** **25. C** **26. D** **27. D** **28. D**
**29. B** **30. A** **31. B** **32. E** **33. B** **34. A** **35. D** **36. A**

## ANSWER EXPLANATIONS

**1.** **C**. We convert the equation into slope-intercept form: $y = 3x + 9$. The $y$-intercept is the constant in the equation, $9$.

**2.** **E.** To find the $x$-intercept, set $y$ equal to $0$ and solve for $x$: $0 = -\frac{x}{5} + 3$. This becomes $\frac{x}{5} = 3$, so $x = 15$.

**3.** **A.** The equation that crosses the $x$-axis at $x = -13$ and $x = 7$ has roots that are equal to zero at both of those points, respectively. Thus, it must have $(x+13)$ and $(x-7)$ in its factorization. The only answer choice that has both is A.

**4.** **A**. Since the parabola has a vertical axis of symmetry, its second crossing must be as equidistant from the axis of symmetry to the first crossing, but on the right instead of the left. Thus, it must cross the $x$-axis a second time at $\left(5+\sqrt{35}, 0\right)$.

**5.** **C**. We find the slope of the line as the change in $y$ over the change in $x$: $\frac{2-(-2)}{3-5} = -2$. We put this into the point-slope form using one of the given points: $2 = -2(3) + b$. From this, we can easily find that $b = 8$. Since $b$ represents the $y$-intercept, the $y$-intercept is $(0,8)$.

**6.** **E**. The slope of a line is the change in the $y$ coordinate divided by the change in the $x$ coordinate. Here, it is:

$$\frac{8-7}{15-10} = \frac{1}{5}$$

**7.** **A.** The slope of a line is the change in the $y$ coordinate divided by the change in the $x$ coordinate. Here, it is:

$$\frac{2-(-5)}{-10-(8)} = -\frac{7}{18}$$

**8.** **D.** The slope of the roof is equal to the change in the vertical direction divided by the change in the horizontal direction. Thus, the slope of the roof is equal to $\frac{5-(-2)}{15-3} = \frac{7}{12}$.

**9.** **C**. The slope is the change in $y$ over the change in $x$: $\frac{-4-0}{-3-5} = \frac{-4}{-8}$ g $\frac{1}{2}$.

**10.** **D**. The slope is the change in $y$ over the change in $x$: $\frac{9-3}{12-7} = \frac{6}{5}$.

**11.** **D**. We change the formula into $4y = 6x + 20$, and divide by $4$ on both sides to express it in slope-intercept form: $y = \frac{3}{2}x + 5$. We can graph this to see that it does not pass through quadrant IV.

**12.** **B.** The line passes through the $y$-intercept, $(0,13)$, and $(3,4)$. The slope is equal to the change in the $y$ direction divided by the change in the $x$ direction: $\frac{13-4}{0-3} \rightarrow \frac{9}{-3} \rightarrow -3$.

**13.** **A**. By transforming each equation into slope-intercept form, we can easily compare the slopes by comparing the coefficients of $x$ in each formula. When we do this, we see that (A) has the largest slope, of $5$.

**14.** **B**. The slope of $a$ is the coefficient of $x$, $0.035$. The slope of $b$ is $0.035-0.01=0.025$.

**15.** **D**. Isolate the term that contains $y$ by moving it to the other side: $7y=12x+17$. Then, isolate $y$ by dividing by $7$: $y=\frac{12}{7}x+\frac{17}{7}$. The slope is the coefficient of $x$ in slope-intercept form: $\frac{12}{7}$.

**16.** **D.** Express the equation in slope-intercept form by isolating $y$. The equation becomes $7y=11x-5$, which simplified is $y=\frac{11}{7}x-\frac{5}{7}$. From this form we see that the slope is $\frac{11}{7}$.

**17.** **C.** Rewrite the equation and isolate $y$: $8y=22x+9$ becomes $y=\frac{22}{8}x+\frac{9}{8}$. Simplifying to $y=\frac{11}{4}x+\frac{9}{8}$, the slope is $\frac{11}{4}$.

**18.** **B**. Isolate $y$: $5y=-4x+3$ becomes $y=-\frac{4}{5}x+\frac{3}{5}$. The slope is the coefficient of $x$ : $-\frac{4}{5}$.

**19.** **A**. Isolate $y$: $5y=-9x+7$ becomes $y=-\frac{9}{5}x+\frac{7}{5}$. The slope is the coefficient of $x$ : $-\frac{9}{5}$.

**20.** **B**. The slope is the change in $y$ over the change in $x$. Plugging into the slope formula yields $\frac{n-(-n)}{-m-m}=\frac{2n}{-2m}=-\frac{n}{m}$.

**21.** **E.** At every point on this line, $x=\frac{1}{4}y+3$. This can be expressed as $y=4x-12$. The slope is $4$.

**22.** **D.** Isolating $y$ is simple in this problem: $y=3x+9$.

**23.** **D**. The $y$-intercept is given as $(0,9)$. We can partially fill out the slope-intercept form of the line as $y=mx+9$. Using the slope formula, $m=\frac{9-7}{0-(-3)}=\frac{2}{3}$. Thus, $y=\frac{2}{3}x+9$.

**24.** **D**. The slope of the first equation, $m$, is less than the slope of the second equation, $n$. Thus, $m<n$.

**25.** **C**. The $d$-intercept of the equation (note: the $d$-axis is vertical and the $t$-axis is horizontal) is $12$, as given in the table. The slope is the change in $d$ over the change in $t$. We can use any $2$ sets of points from the table. The slope is $\frac{17-12}{2-0}=\frac{5}{2}$. In slope-intercept form, the equation of the line is $d=\frac{5}{2}t+12$.

**26.** **D**. The slope of a vertical line is undefined. A line parallel to the $y$-axis in the $(x,y)$ coordinate plain is vertical, so the slope of the line is undefined.

**27.** **D.** The slope of the second line is the coefficient of its $x$, $a$. The slope of the first line is the coefficient of its respective $x$, which is $\frac{5}{3}$. Since the lines are parallel, the slopes are equal. Thus, $a=\frac{5}{3}$.

**28.** **D**. A horizontal line is parallel to the $x$-axis. The general equation for a horizontal line is $y=b$ where $b$ is some constant. The only line that fits this general equation is $y=-7$.

**29.** **B**. The slopes of parallel lines are equal. We can find the slope by expressing the line in slope-intercept form by isolating $y$. The equation becomes $7y=-6x+5$, which gives us $y=-\frac{6}{7}x+\frac{5}{7}$. The slope is $-\frac{6}{7}$.

**30.** **A**. The slope of a linear relationship is constant. From this, we can tell that $\frac{a-(-2)}{7-2}=\frac{-2-(-5)}{2-0}$. Simplifying $\frac{a+2}{5}=\frac{3}{2}$ gives us $a+2=\frac{15}{2}$. Isolating $a$: $a=\frac{15}{2}-2=\frac{11}{2}$.

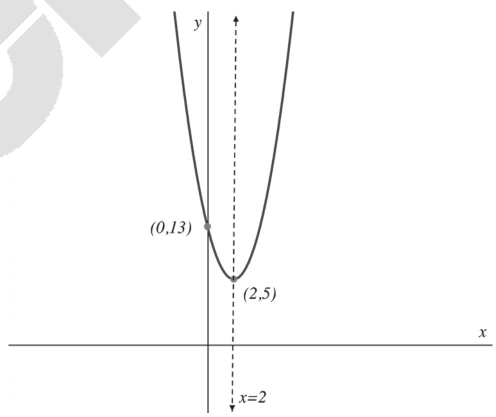
**31.** **B.** If $x$ is the number of guests and $y$ is the price in dollars, then we want to look at the table and find a function that would describe $y$ in terms of $x$. We notice that each $x$-value increases by $5$ while each $y$-value increases by $15$. This means the slope of the function is $\frac{rise}{run}=\frac{15}{5}=3.$ So, $y=3x+b.$ Plugging in the first given point $(30,235)$ for values of $x$ and $y$, we get $235=30(3)+b\rightarrow 235=90+b\rightarrow 145=b.$ So, the function that describes the given table is $y=3x+145.$

**32.** **E**. Find the slope given the two points: $m=\frac{y_2-y_1}{x_2-x_1}=\frac{1-4}{3-(-2)}=-\frac{3}{5}$. We can use the slope-intercept form and one of the points given to find $b$, which essentially is the $y$-intercept. If $y=mx+b$, then $4=\left(-\frac{3}{5}\right)(-2)+b\rightarrow b=\frac{14}{5}$.

**33.** **B**. We could use point-slope form, because we know both the slope and all but one coordinate value (since we are looking for the $x$-intercept, we know that the $y$-value of that point is $0$ so we only need to find the $x$-value). Using point-slope form: $y_2-y_1=m(x_2-x_1)\rightarrow(-7-0)=\left(-\frac{1}{2}\right)(4-x)\rightarrow -14=4-x\rightarrow x=-10$. Or, we could take a slightly longer route. First finding the point-slope form: $y=mx+b\rightarrow -7=\left(-\frac{1}{2}\right)(4)+b\rightarrow b=-5.$ Then, plug in $0$ for y: $0=\left(-\frac{1}{2}\right)(x)-5\rightarrow 5=-\frac{x}{2}\rightarrow x=-10.$

**34.** **A**. The $x$-intercept is the point where $y$ is $0$, so if we plug in $0$ for $y$ we get: $4x=2(0)-12\rightarrow 4x=-12\rightarrow x=-3.$

**35.** **D**. Because the parabola has a vertical axis of symmetry, it must either be facing up or down, and not left or right. Upward and downward facing parabolas can only have 1 $y$-intercept. You can sketch the parabola to confirm.




**36.** **A**. We can represent the data we have as coordinate points in the form $(x,y)$ where $x=$ the number of years after 2001 and $y=$ the number of volunteer organizations. Then, we have the points $(0,212)$, $(1,217)$, $(2,221)$, $(3,226)$, and $(4,230)$. Now, we look for a pattern so we can represent these points with a function. From $(0,212)$ to $(1,217)$, the $x$-value increased by $1$ and the $y$-value increased by $5$. From $(1,217)$ to $(2,221)$, the $x$-value increased by $1$ and the $y$-value increased by $4$. From $(2,221)$ to $(3,226)$, the $x$-value increased by $1$ and the $y$-value increased by $5$. From

$(3,226)$ to $(4,230)$, the $x$-value increased by $1$ and the $y$-value increased by $4$. So, we see a general pattern where the $x$-value increases by $1$ and the $y$-value increases by $4$ or $5$. Taking the average of $4$ and $5$, we can say that each $y$-value increases by approximately $4.5$. So, the slope of the equation would be $\frac{4.5}{1}=\frac{9}{2}$. The $y$-intercept would be the value of $y$ where $x=0$. So, that is $y=212$. The function with slope $\frac{9}{2}$ and $y$-intercept $212$ is $y=\frac{9}{2}x+212$.