Student Name: _____

Missouri
DEPARTMENT OF ELEMENTARY & SECONDARY
EDUCATION™

End-of-Course Assessment

Algebra I

Algebra 1 Pre-Test

1. What is the product of the following expression?

$(3x+6)^2$

A. $6x^2+12$

B. $9x^2+36$

C. $9x^2+18x+36$

D. $9x^2+36x+36$

2. If the first Now = -9, which equation represents this sequence?

- 9, -4, 1,6, 11, ...

A. $\text{Next} = \text{Now} - 5$

B. $\text{Next} = \text{Now} + 5$

C. $\text{Next} = 5 \cdot \text{Now} - 1$

D. $\text{Next} = 5 \cdot \text{Now} + 1$

3. The senior class at a local high school is raising money to purchase a new $1,350 lighting system for the school auditorium. To date, the senior class has raised $450. If the seniors plan to raise $90 per week for *x* weeks, which inequality can be used to determine how many weeks they will need to raise at least $1,350 ?

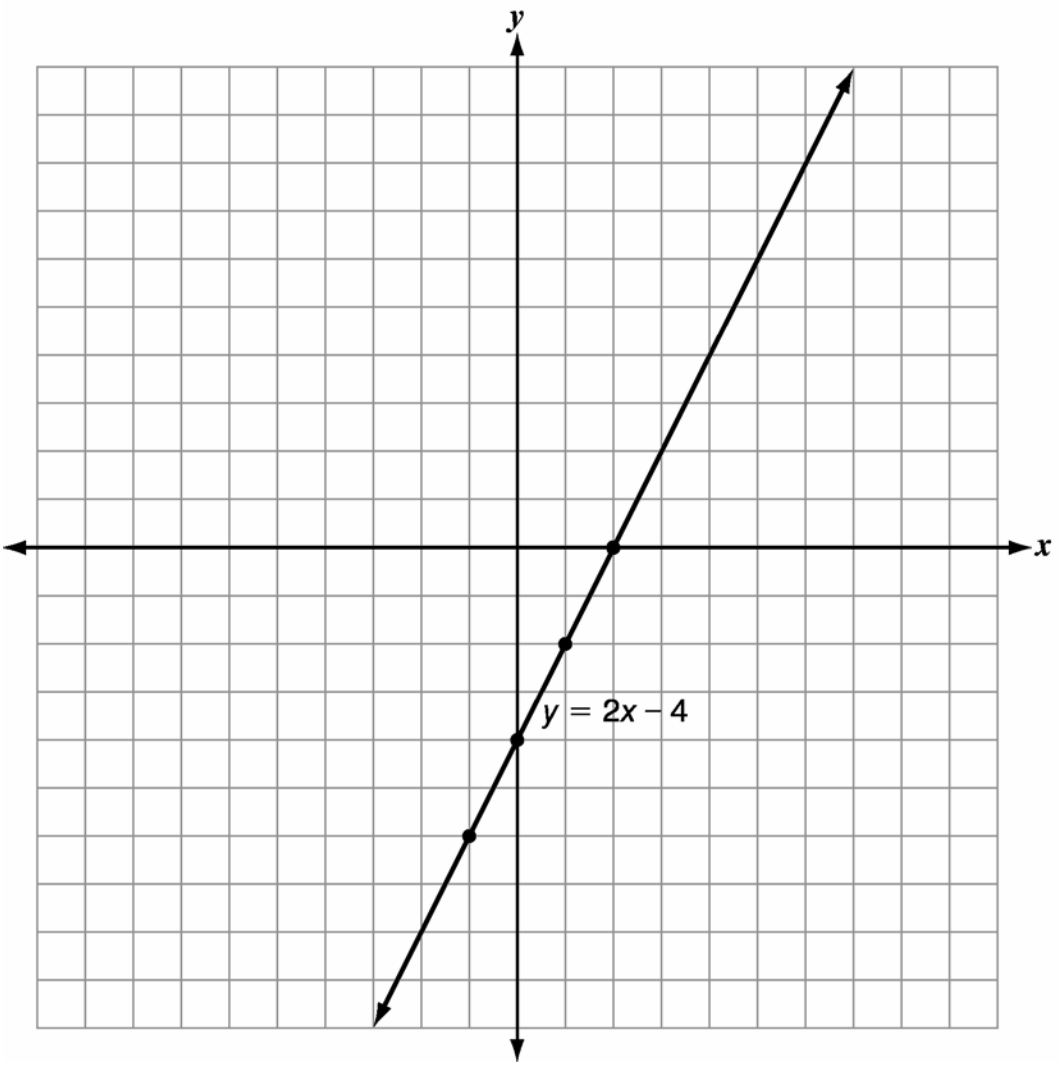
A. $450 - 90x \leq 1{,}350$

B. $450 + 90x \leq 1{,}350$

C. $90x - 450 \geq 1{,}350$

D. $90x + 450 \geq 1{,}350$

4. The graph of $y = 2x - 4$ is shown below.



If the slope of the line is doubled, the new equation is $y = 4x - 4$. Which of these is a correct comparison of the two lines?

A. The *x*-intercept and *y*-intercept change.

B. The *x*-intercept and *y*-intercept stay the same.

C. The *x*-intercept changes, and the *y*-intercept is the same.

D. The *x*-intercept is the same, and the *y*-intercept changes.

5. **Which of these shows the following expression factored completely?**

$$6x^2 + 15x - 36$$

A. $(2x - 3)(x + 4)$

B. $(6x + 9)(x - 4)$

C. $3(2x - 3)(x + 4)$

D. $3(2x + 3)(x - 4)$

6. **A computer technician charges a one-time fee of $50 plus an additional $20 per hour of labor. If an equation is created to determine the technician's total charge, what does the $50 represent?**

A. **slope**

B. **coefficient**

C. ***x*-intercept**

D. ***y*-intercept**

7. **What is the solution to the following equation?**

$$10x^2 + x = 9x^2 + 2$$

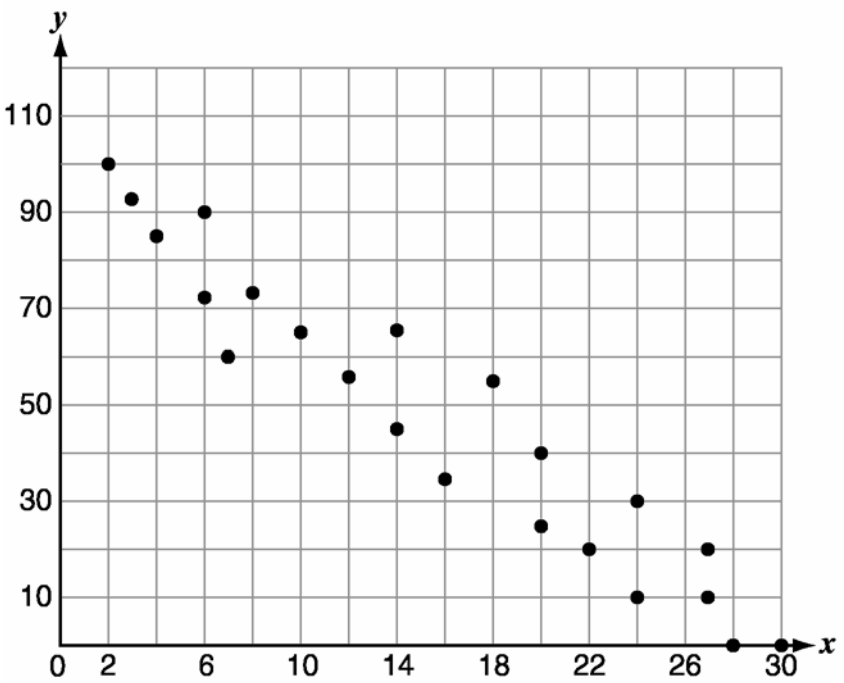
A. $x = -1$ or $x = -2$

B . $x = -1$ or $x = 2$

C. $x = 1$ or $x = -2$

D. $x = 1$ or $x = 2$

8. **Based on this scatter plot, which equation *could* be a line of best fit?**



A. $y = -5x + 110$

B. $y = -5x + 85$

C. $y = 5x + 110$

D. $y = 5x + 85$

9. **Which equation represents a nonlinear function?**

A. $y = x^5$

B. $y = \frac{x}{5}$

C. $y = 5x$

D. $y = 5$

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10. What is the product of the following expression?

$$2x(x^2+x-5)$$

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

B. $2x^3+2x-10$

C. $2x^3+2x^2-5x$

D. $2x^3+2x^2-10x$

11. The enrollment at High School R has been increasing by 20 students per year. Currently High School R has 200 students attending. High School T currently has 400 students, but its enrollment is decreasing in size by an average of 30 students per year. If the two schools continue their current enrollment trends over the next few years, how many years will it take the schools to have the same enrollment?

A. 4 years

B. 5 years

C. 10 years

D. 20 Years

12. Students were asked to write a trinomial that could *not* be factored using integers.

Pat Wrote: $x^2+3x-10$

Sam wrote: x^2+x-12

Mel wrote: x^2+2x-1

Lee wrote: x^2+2x-3

Which student followed the given directions?

A. **Pat**

B. **Sam**

C. **Mel**

D. **Lee**

13. **The population of a type of bacteria triples every minute. The chart below represents the population of bacteria after *t* minutes.**

t	Bacteria Population
0	1
1	3
2	9
3	27
4	81
5	243

Which type of function represents the data?

A. **linear**

B. **quadratic**

C. **exponential**

D. **absolute value**

14. **Simplify:** $\left(\frac{2x^3}{x}\right)^5$

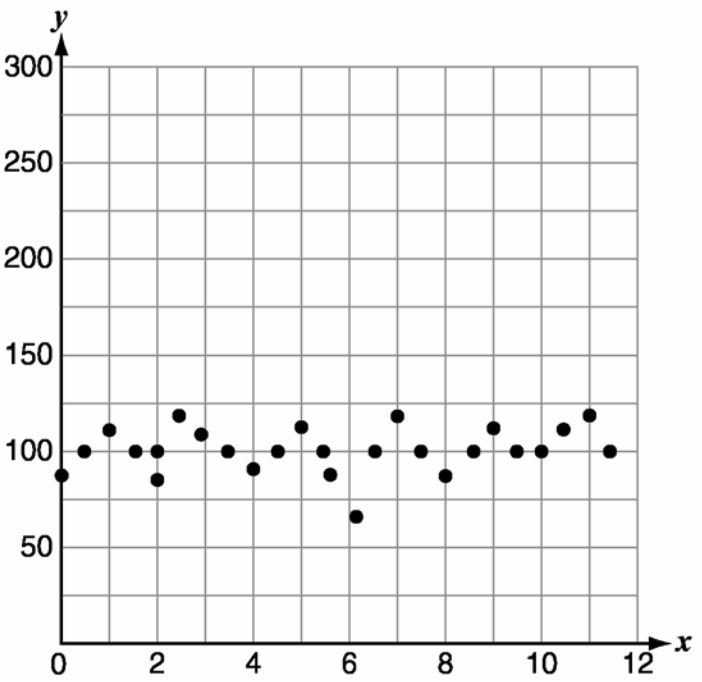
A. $10x^{10}$

B. $10x^{14}$

C. $32x^{10}$

D. $32x^{14}$

15. **A scatterplot is shown on the graph below.**



Which of these could be a line of best fit?

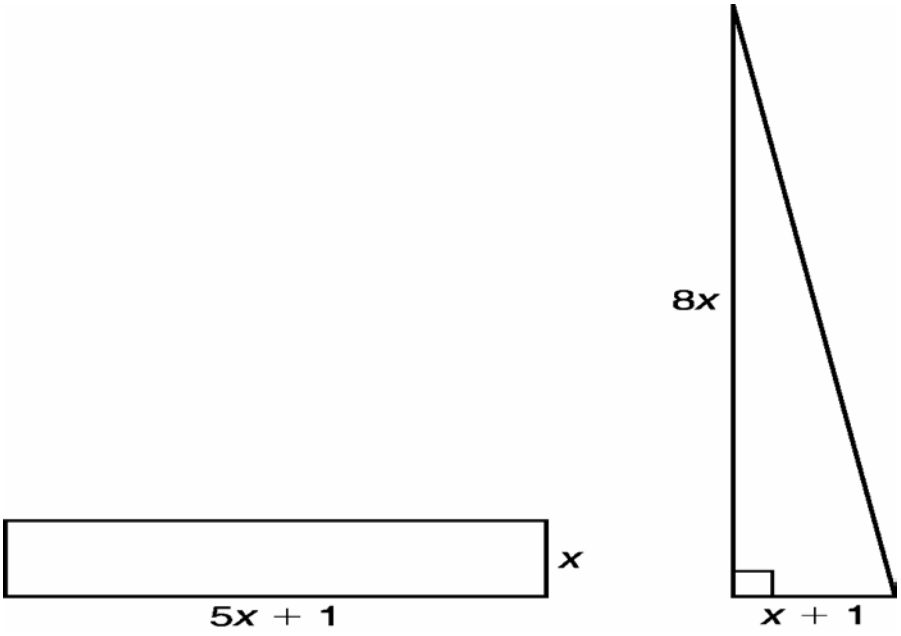
A. $y = x + 100$

B. $y = x - 100$

C. $x = 100$

D. $y = 100$

16. **The areas of the two figures shown below are equal.**



What is the area of the rectangle, in square units?

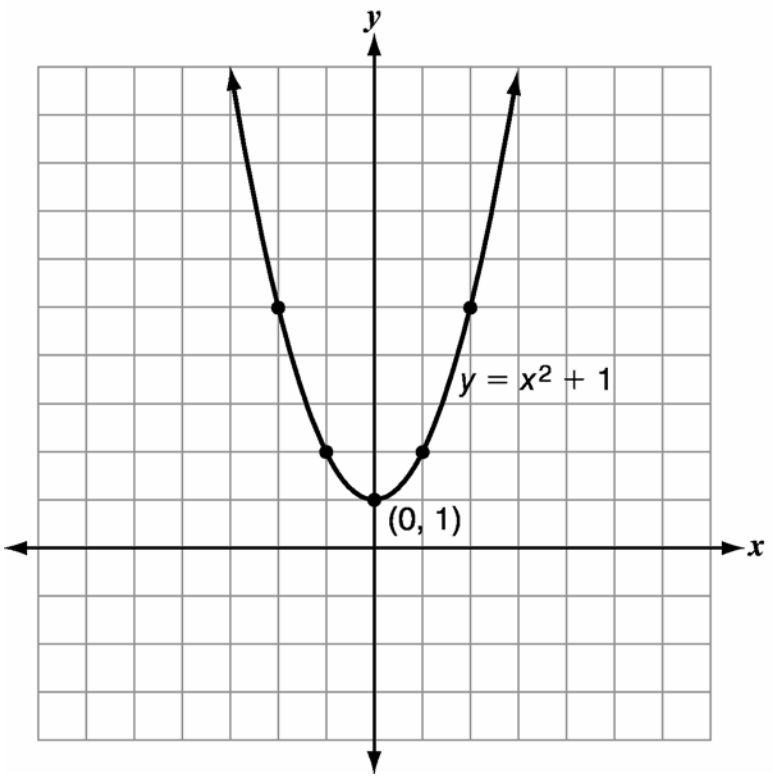
A. **38**

B. **48**

C. **96**

D. **130**

17. **Beth and Jacob are graphing two equations on a coordinate grid. Beth has graphed the equation $y = x^2 + 1$**



If Jacob graphs $y = x^2 + 3$, where will his graph be in relation to the graph Beth made?

A. **2 Units up**

B. **3 Units up**

C. **2 units to the left**

D. **3 units to the right**

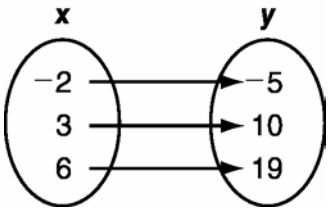
18. **Which pattern is *different* from the others?**

A. $f(x) = 3x + 1$

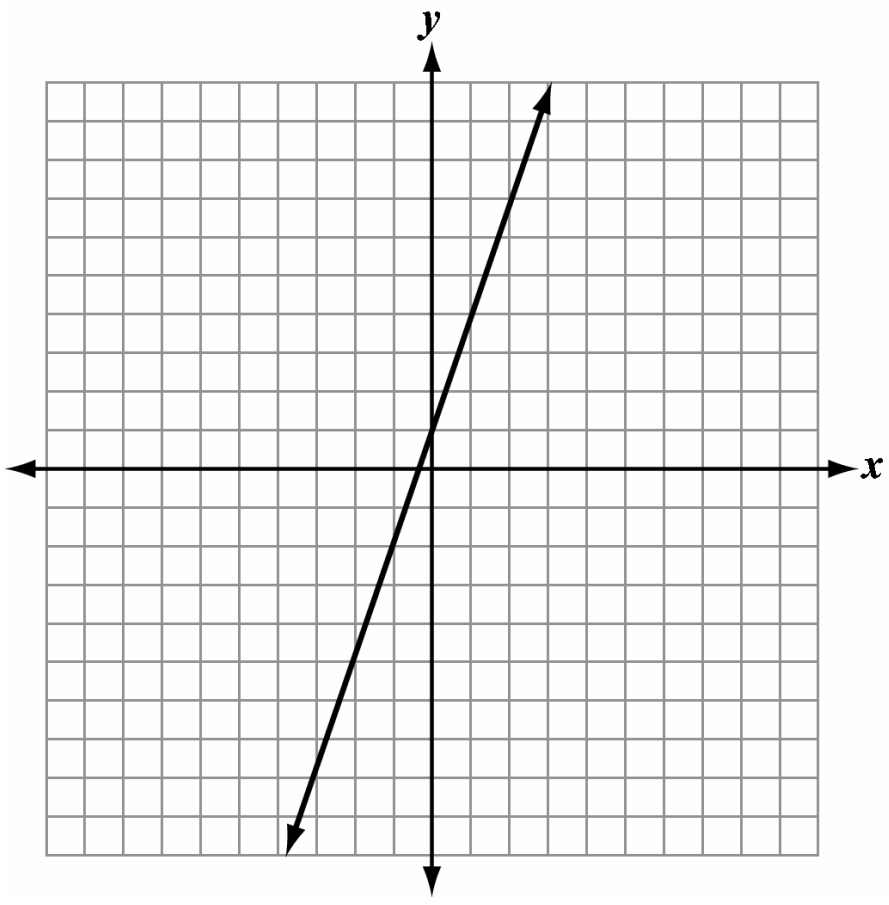
B.

x	y
−5	−14
4	12
12	36

C.



D.



19. What are the *x*-intercepts of the following equation?

$$y = x^2 + 3x + 2$$

A. $(-2, 0)$ and $(-1, 0)$

B. $(-2, 0)$ and $(1, 0)$

C. $(2, 0)$ and $(-1, 0)$

D. $(2, 0)$ and $(1, 0)$

20. Which expression represents the output of the *n*th term?

Input	1	2	3	4	5	*n*
Output	1	3	5	7	9	

A. $n + 2$

B. $n + 11$

C. $2n + 1$

D. $2n - 1$

21. What is the solution for the system of equations?

$$y = 2x - 3$$

$$4x - 3y = 31$$

A. $(-11, -25)$

B. $(-11, -19)$

C. $(11, 19)$

D. $(14, 25)$

22. **A group of students surveyed classmates about how far each student travels to school each day, in miles. Ten students' responses were selected at random.**

43, 20, 15, 12, 17, 8, 20, 6, 9, 12

The student who lives 43 miles from school decides to transfer to a closer school. Once this number is removed from the set above, by how much does the median change?

A. **0**

B. **1.5**

C. **3**

D. **4.5**

23. **Given two equations of lines:**

$y = -\frac{1}{4}x + 2$ **and** $-2y = \frac{1}{2}x - 4$

How do the lines compare?

A. **They are different lines with the same slope.**

B. **They are different lines with the same *y*-intercept.**

C. **They are the same line, both with a slope of 1/2 and a *y*-intercept of -4**

D. **They are the same line, both with a slope of - 1/4 and a *y*-intercept of 2.**

24. **If the first Now = 5, what formula can be used to find the terms of this pattern?**

$$5, -10, 20, -40, 80 \ldots$$

A. $\text{Next} = \text{Now} - 15$

B. $\text{Next} = (-2) \cdot \text{Now}$

C. $\text{Next} = 2 \cdot \text{Now}$

D. $\text{Next} = (-4) \cdot \text{Now} + 10$

25. **Which is the simplified form of this expression?**

$$(2x+3)(x-6)-2x^2+3x+30$$

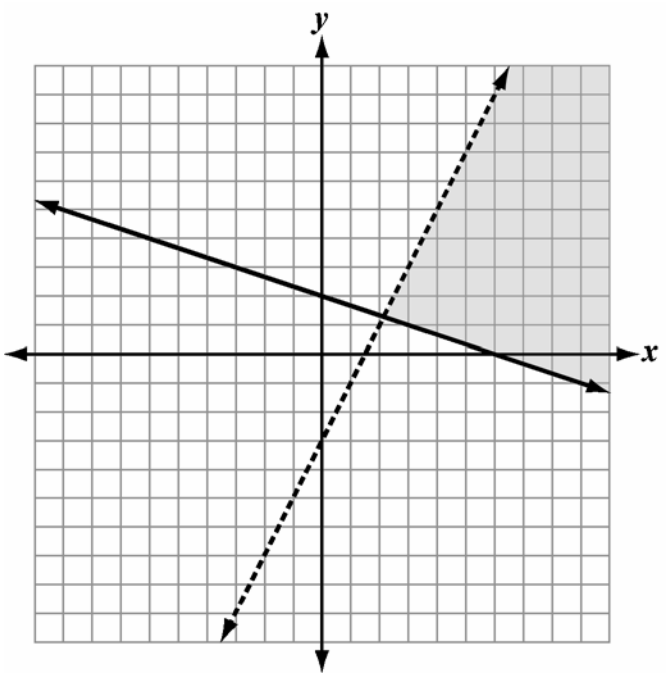
A. $4x^2 - 6x + 12$

B. $-2x^2 + 6x + 27$

C. $-6x - 12$

D. $-6x + 12$

26. Which system of inequalities describes the graph?



A. $y < 2x - 3$

$y \geq -\frac{1}{3}x + 2$

B. $y \leq 2x - 3$

$y > -\frac{1}{3}x + 2$

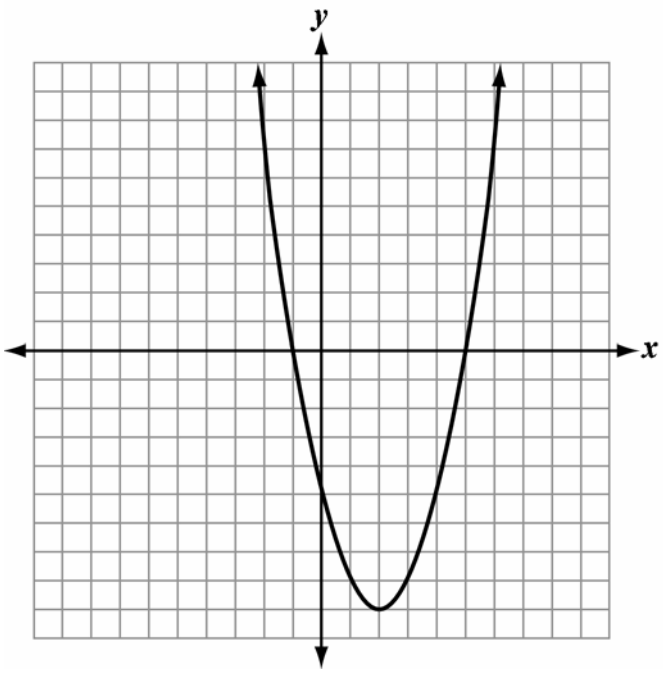
C. $y > 2x - 3$

$y \leq -\frac{1}{3}x + 2$

D. $y \geq 2x - 3$

$y < -\frac{1}{3}x + 2$

2 7 . **What are the *x*-intercepts of the parabola?**



A. $(0,-1)$ **and** $(0,\ 5)$

B. $(2,\ 0)$ **and** $(-9,\ 0)$

C. $(-1,\ 0)$ **and** $(5,\ 0)$

D. **(0, -5) and (-5, 0)**

28. **Which equation represents a linear function?**

A. $y = x + 1$

B. $xy = 1$

C. $y = x^2$

D. $x = \frac{1}{y}$

29. **What is the *y*-coordinate in the solution for the system of linear equations below?**

-3x + 2y = 6

4x - y = 2

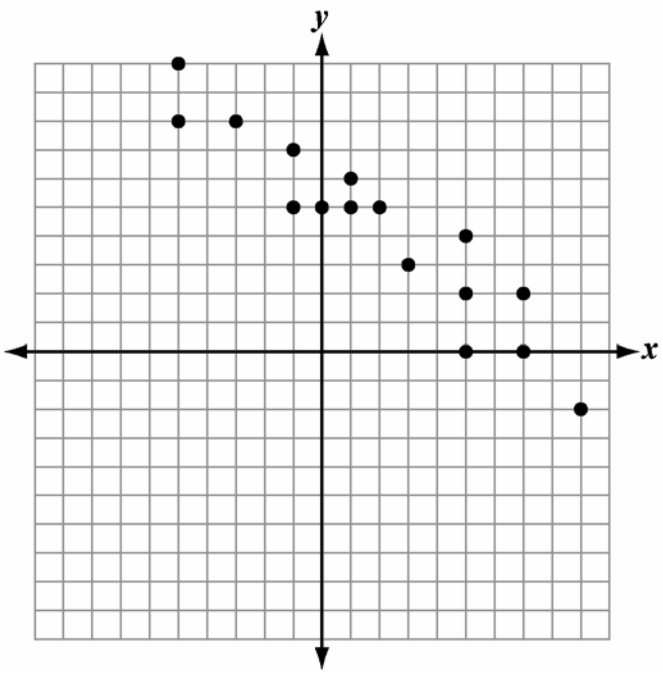
A. **-6**

B. **1**

C. **2**

D. **6**

30. **Which equation describes the line of best fit for the scatterplot below?**



A. $y = -\frac{2}{3}x + 4$

B. $y = -\frac{2}{3}x + 5$

C. $y = -\frac{3}{2}x + 4$

D. $y = -\frac{3}{2}x + 5$

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31. **What is the simplified form of the expression?**

$$\frac{4x^3y^3}{8x^5y^2}$$

A. $\frac{y}{2x^2}$

B. $\frac{2y}{x^2}$

C. $2x^2y$

D. $2x^8y^5$

32. **Sam and Candy begin at the same place and drive in opposite directions at constant rates. Sam drives 15 miles per hour faster than Candy. After 2 hours, they are 230 miles apart. If Candy's car gets 20 miles per gallon, how many gallons of gas did she use?**

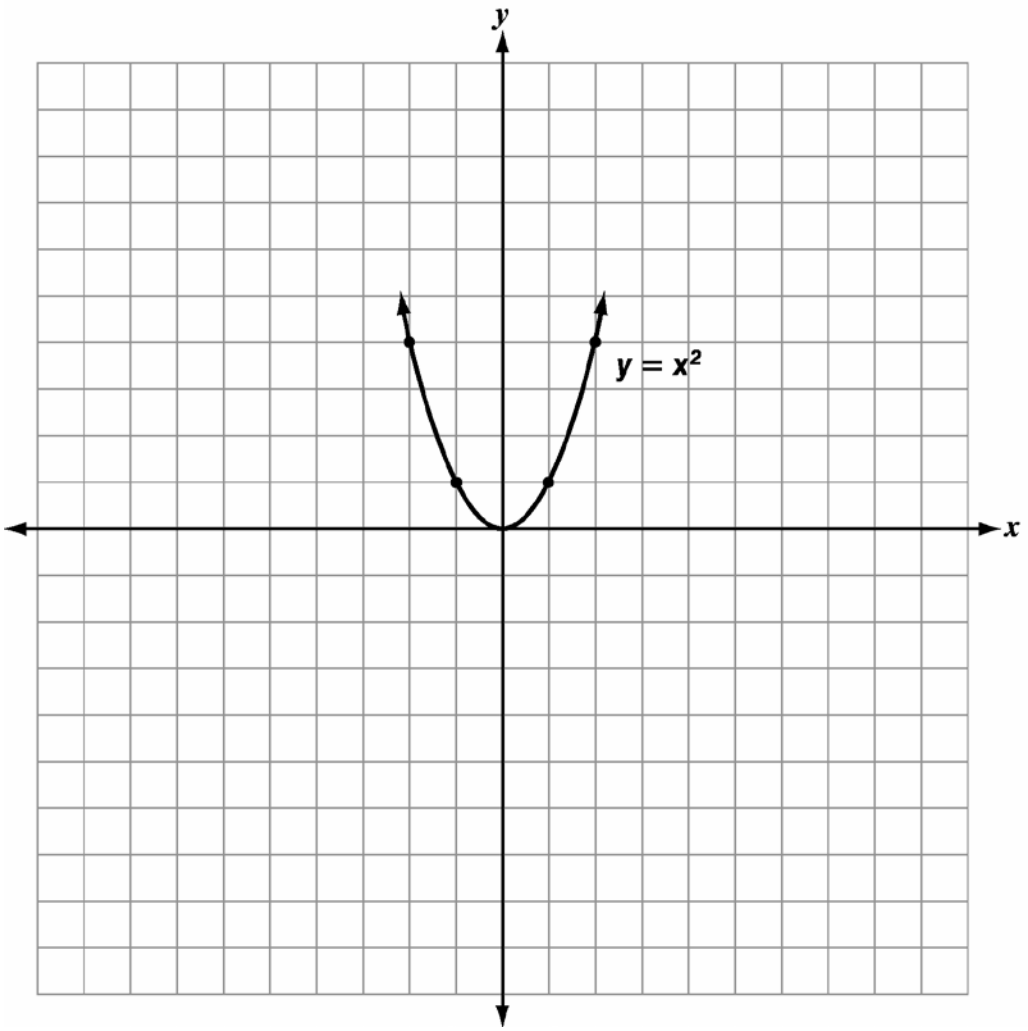
A. **5.0 gallons**

B. **5.8 gallons**

C. **6.5 gallons**

D. **11.5 gallons**

33. The graph o $y = x^2$ is shown below.



If the graphed function is translated to $y = x^2 + 2$, which ordered pair would represent the new *y*-intercept?

A. $(0, 2)$

B. $(2, 0)$

C. $(-2, 0)$

D. $(0, -2)$

34. **Sandy has a total of 35 coins in her money jar. If Sandy's jar contains only nickels and dimes and the value of all the coins is $2.50, how many nickels does Sandy have?**

A. **5**

B. **15**

C. **20**

D. **30**

35. **A line is represented by the equation $3x + 2y = 4$. What is another way to represent the same line?**

A. $y = -\frac{3}{2}x + 2$

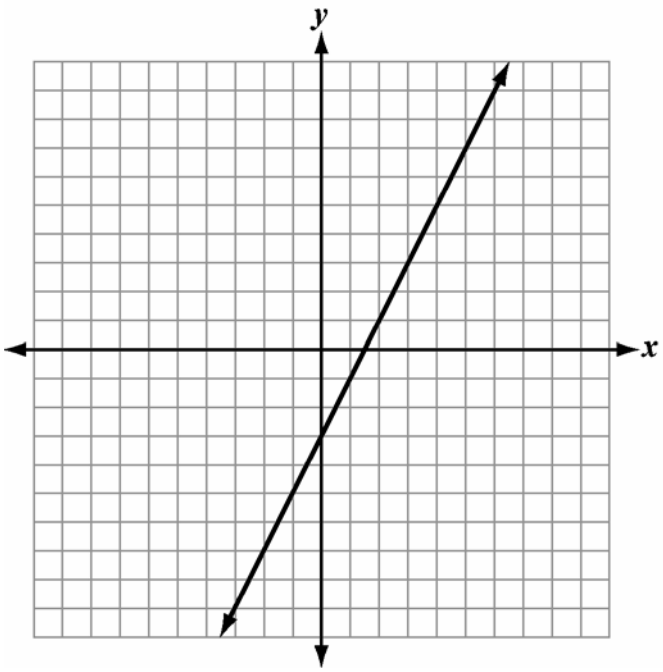
B . $y = \frac{3}{2}x + 2$

C. $y = \frac{3}{2}x + 4$

D. $y = -\frac{3}{2}x + 4$

36. **Two linear functions are represented by the set of ordered pairs and the graph below.**

$$\{(-4, -6), (-2, -2), (2, 6), (4, 10)\}$$



Which statement describes the relationship between the functions?

A. **The lines are parallel.**

B. **The lines are the same.**

C. **The lines are perpendicular.**

D. **The lines are intersecting but not perpendicular.**

37. **What is the equation of the function represented by this table of values?**

x	-2	-1	0	1	2
y	$\frac{3}{25}$	$\frac{3}{5}$	3	15	75

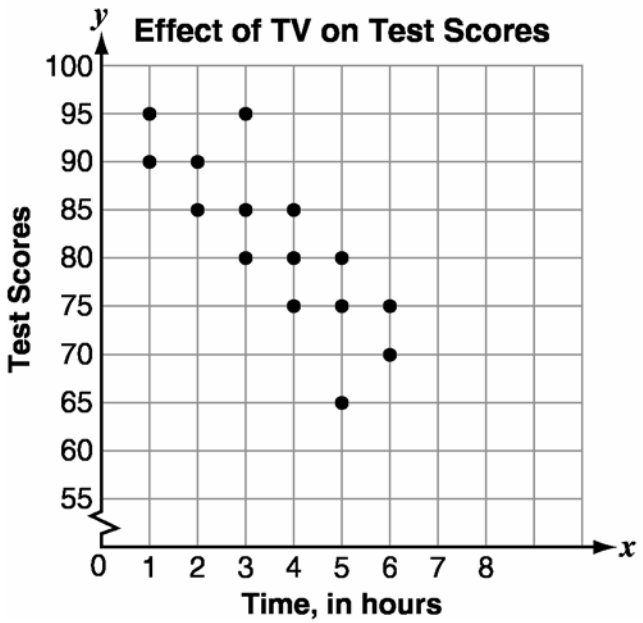
A. $y = 5x + 3$

B. $y = 12x + 3$

C. $y = 3 \cdot 5^x$

D. $y = 5 \cdot 3^x$

38. **Alex noticed a relationship between the amount of television he watched each week and his test scores.**



If this pattern continues, what will he likely score on a test after watching 10 hours of TV?

A. **41**

B. **48**

C. **54**

D. **58**

39. What is the solution to the following inequality?

1/3 (6 – *x*) ≥ -2

A. $x \geq 0$

B. $x \leq 0$

C. $x \geq 12$

D. $x \leq 12$

40. The director of a play must decide how much to charge per ticket. If tickets cost *c* dollars each, a total of (75 – 5*c*) people will attend the play. Which ticket price will generate the most income?

A. $1.00

B. $7.50

C. $15.00

D. $20.50

Item Position	Answer Key	DOK	Standards Key
1	D	DOK 2	Mathematics-HSA|APR|A|1
2	B	DOK 2	Mathematics-HSF|BF|A|1|a
3	D	DOK 2	Mathematics-HSA|CED|A|3
4	C	DOK 3	Mathematics-HSF|BF|B|3
5	C	DOK 2	Mathematics-HSA|SSE|B|3|a
6	D	DOK 2	Mathematics-HSF|IF|B|4
7	C	DOK 2	Mathematics-HSA|REI|B|4|b
8	A	DOK 2	Mathematics-HSS|ID|B|6|c
9	A	DOK 1	Mathematics-HSF|LE|A|1|a
10	D	DOK 2	Mathematics-HSA|APR|A|1
11	A	DOK 2	Mathematics-HSA|REI|C|6
12	C	DOK 2	Mathematics-HSA|SSE|A|2
13	C	DOK 2	Mathematics-HSF|LE|A|1|c
14	C	DOK 2	Mathematics-HSN|RN|A|2

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15	D	DOK 2	Mathematics-HSS|ID|B|6|a
16	B	DOK 3	Mathematics-HSA|REI|B|4|b
17	A	DOK 2	Mathematics-HSF|BF|B|3
18	B	DOK 2	Mathematics-HSF|IF|C|9
19	A	DOK 3	Mathematics-HSA|REI|B|4|b
20	D	DOK 2	Mathematics-HSF|LE|A|2
21	A	DOK 2	Mathematics-HSA|REI|C|6
22	B	DOK 2	Mathematics-HSS|ID|A|3
23	D	DOK 3	Mathematics-HSF|IF|B|4
24	B	DOK 2	Mathematics-HSF|BF|A|1|a
25	D	DOK 2	Mathematics-HSA|APR|A|1
26	A	DOK 2	Mathematics-HSA|REI|D|12
27	C	DOK 2	Mathematics-HSF|IF|C|7|a
28	A	DOK 1	Mathematics-HSF|LE|A|1|b
29	D	DOK 2	Mathematics-HSA|REI|C|6

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30	B	DOK 2	Mathematics-HSS|ID|B|6|c
31	A	DOK 2	Mathematics-HSN|RN|A|2
32	A	DOK 3	Mathematics-HSA|CED|A|1
33	A	DOK 2	Mathematics-HSF|BF|B|3
34	C	DOK 2	Mathematics-HSA|REI|C|6
35	A	DOK 2	Mathematics-HSA|CED|A|4
36	A	DOK 2	Mathematics-HSF|IF|C|9
37	C	DOK 2	Mathematics-HSF|LE|A|2
38	B	DOK 2	Mathematics-HSS|ID|B|6|c
39	D	DOK 2	Mathematics-HSA|REI|B|3
40	B	DOK 3	Mathematics-HSA|SSE|B|3|a
1A	n/a	DOK 3	Mathematics-HSA|CED|A|2
1B	n/a	DOK 3	Mathematics-HSA|REI|B|3
1C	n/a	DOK 3	Mathematics-HSA|CED|A|3

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