

Pre-Calc Summer Packet**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

To which sets of numbers does the number belong?

- _____ 1. $\sqrt{31}$
- irrational numbers, real numbers
 - integers, rational numbers, real numbers
 - rational numbers, irrational numbers
 - whole numbers, integers, rational numbers, real numbers
- _____ 2. $-\frac{2}{15}$
- integers, rational numbers, real numbers
 - rational numbers, real numbers
 - irrational numbers, real numbers
 - rational numbers, irrational numbers, real numbers

Evaluate the expression for the given value of the variable(s).

- _____ 3. $\frac{4(3h - 6)}{1 + h}; h = -2$
- 32
 - 48
 - 48
 - 30
- _____ 4. $-2x^3 - x^2 + 5x + 2; x = -3$
- 76
 - 62
 - 32
 - 30
- _____ 5. The expression $-16t^2 + 1800$ models the height of an object t seconds after it has been dropped from a height of 1800 feet. Find the height of an object after falling for 4.8 seconds.
- 2168.64 ft
 - 1431.36 ft
 - 1723.2 ft
 - 7698.24 ft

Solve for x . State any restrictions on the variables.

- _____ 6. $a(bx + 2) = cx - 12$
- $x = \frac{-12 - 2a}{ab - c}; ab \neq c$
 - $x = \frac{-12 + 2a}{c + ab}; ab \neq c$
 - $x = \frac{2a + 12}{c - ab};$ no restrictions
 - $x = \frac{ab - c}{-12 - 2a}; a \neq -1$
- _____ 7. The sides of a triangle are in the ratio 3 : 4 : 5. What is the length of each side if the perimeter of the triangle is 90 cm?
- 10.5 cm, 11.5 cm, and 12.5 cm
 - 22.5 cm, 30 cm, and 37.5 cm
 - 7.5 cm, 11.5 cm, and 32.1 cm
 - 19.3 cm, 25.7 cm, and 32.1 cm

- _____ 8. Michael has \$12,500 to invest. He invests part in an account which earns 4.2% annual interest and the rest in an account which earns 6.2% annual interest. He earns \$669.50 in interest at the end of the year. How much was invested at each rate?
- a. \$5,000 at 4.2%, \$7,500 at 6.2% c. \$7,500 at 4.2%, \$5,000 at 6.2%
b. \$7,225 at 4.2%, \$5,275 at 6.2% d. \$5,275 at 4.2%, \$7,225 at 6.2%

- _____ 9. Suppose $f(x) = 4x - 2$ and $g(x) = -2x + 1$.

Find the value of $\frac{f(5)}{g(-3)}$.

- a. $1\frac{5}{9}$ b. $2\frac{4}{7}$ c. -2 d. 2

Find the slope of the line.

- _____ 10. $3x + 5y = -15$

- a. $-\frac{5}{3}$ b. $\frac{5}{3}$ c. $-\frac{3}{5}$ d. $\frac{3}{5}$

- _____ 11. $x = a$

- a. a b. 0 c. undefined d. 1

Find an equation for the line:

- _____ 12. through $(2, 6)$ and perpendicular to $y = -\frac{5}{4}x + 1$.

- a. $y = \frac{5}{4}x + \frac{7}{2}$ b. $y = -\frac{4}{5}x + \frac{38}{5}$ c. $y = \frac{4}{5}x + \frac{22}{5}$ d. $y = -\frac{5}{4}x + \frac{17}{2}$

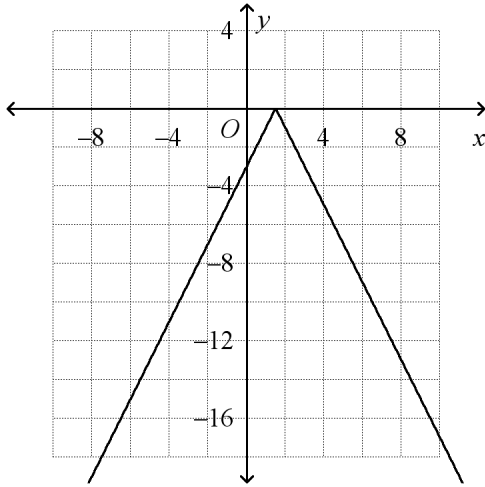
- _____ 13. through $(-4, 6)$ and parallel to $y = -3x + 4$.

- a. $y = -3x - 6$ b. $y = 3x + 18$ c. $y = \frac{1}{3}x + \frac{22}{3}$ d. $y = -\frac{1}{3}x + \frac{14}{3}$

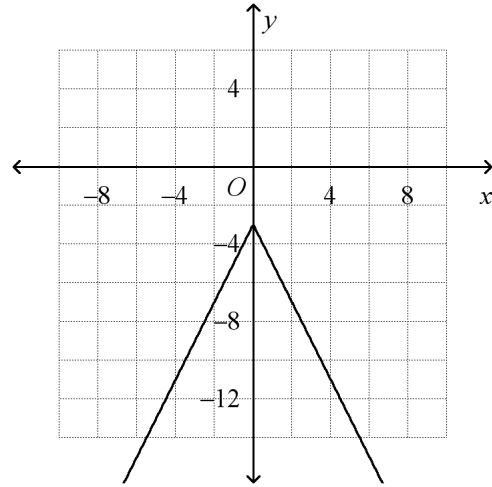
Graph the absolute value equation.

_____ 14. $y = -|2x + 3|$

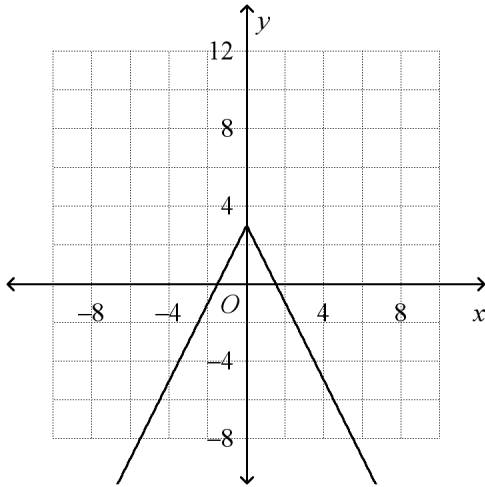
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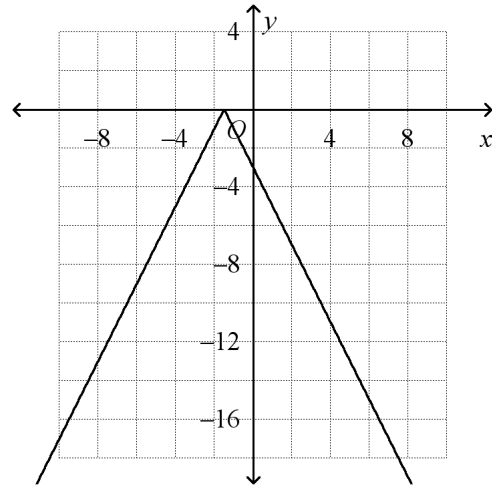
c.



b.



d.



Factor the expression.

_____ 15. $x^2 + 14x + 48$

a. $(x + 6)(x - 8)$

b. $(x + 8)(x - 6)$

c. $(x - 8)(x - 6)$

d. $(x + 6)(x + 8)$

_____ 16. $3x^2 + 26x + 35$

a. $(x + 5)(3x + 7)$

b. $(3x + 7)(x - 5)$

c. $(3x + 5)(x - 7)$

d. $(3x + 5)(x + 7)$

_____ 17. $9x^2 - 16$

a. $(3x + 4)(-3x - 4)$

b. $(3x + 4)(3x - 4)$

c. $(-3x + 4)(3x - 4)$

d. $(3x - 4)^2$

- _____ 18. $c^3 - 512$
 a. $-(c - 8)(c^2 + 8c + 64)$ c. $(c + 8)(c^2 + 8c + 64)$
 b. $(c - 8)(c^2 + 8c + 64)$ d. $(c - 8)(c^2 - 8c - 64)$
- _____ 19. $x^4 - 20x^2 + 64$
 a. $(x - 2)(x - 2)(x + 4)(x + 4)$ c. $(x - 2)(x + 2)(x - 4)(x + 4)$
 b. $(x - 2)(x - 4)(x^2)$ d. no solution
- _____ 20. Solve by factoring.
 $4x^2 + 28x - 32 = 0$
 a. $8, -\frac{1}{2}$ b. $-8, 4$ c. $-8, 1$ d. $1, -\frac{1}{2}$
- _____ 21. Simplify $\sqrt{-175}$ using the imaginary number i .
 a. $i\sqrt{175}$ b. $5i\sqrt{7}$ c. $5\sqrt{-7}$ d. $-5\sqrt{7}$

Simplify the expression.

- _____ 22. $(-6i)(-6i)$
 a. 36 b. -36 c. $-36i$ d. $36i$
- _____ 23. $(2 + 5i)(-1 + 5i)$
 a. $-27 + 5i$ c. $-2 + 25i$
 b. $23 + 5i$ d. $-2 + 5i$

Use the Quadratic Formula to solve the equation.

- _____ 24. $5x^2 + 9x - 2 = 0$
 a. $\frac{2}{5}, -4$ b. $\frac{1}{5}, -2$ c. $\frac{56}{5}, -13$ d. $2, -\frac{1}{5}$
- _____ 25. Ian designed a child's tent in the shape of a cube. The volume of the tent in cubic feet can be modeled by the equation $s^3 - 64 = 0$, where s is the side length. What is the side length of the tent?
 a. 4 feet b. 16 feet c. 64 feet d. 8 feet
- _____ 26. Solve $x^4 - 34x^2 = -225$.
 a. no solution c. 3, -3, 5, -5
 b. 3, -5 d. 3, -3

Simplify the radical expression. Use absolute value symbols if needed.

- _____ 27. $\sqrt[4]{81x^{20}y^8}$
 a. $3|x^5|y^2$ b. $9|x^{25}|y^4$ c. $9x^{25}|y^4|$ d. $3x^5|y^2|$

Multiply and simplify if possible.

_____ 28. $\sqrt{7x}(\sqrt{x} - 7\sqrt{7})$

a. $x\sqrt{7} - 49\sqrt{x}$

b. $\sqrt{7x} - 49x$

c. $x\sqrt{7} - x\sqrt{49}$

d. $-\sqrt{42x}$

_____ 29. Multiply and simplify $\sqrt[3]{7x^7} \cdot \sqrt[3]{6x^8}$. Assume that all variables are positive.

a. $x^5 \cdot \sqrt[3]{42}$

b. $\sqrt[3]{42x^{15}}$

c. $x^5 \cdot \sqrt[3]{42x^{15}}$

d. none of these

_____ 30. $\frac{\sqrt{90x^{18}}}{\sqrt{2x}}$

a. $3x^8\sqrt{5x}$

b. $\sqrt{18x^{17}}$

c. $5x\sqrt{3x^8}$

d. none of these

Rationalize the denominator of the expression. Assume that all variables are positive.

_____ 31. $\frac{\sqrt{6x^8y^9}}{\sqrt{5x^2y^4}}$

a. $\frac{x^3y^2\sqrt{30y}}{5}$

b. $\frac{\sqrt{30x^{10}y^{13}}}{5x^2y^4}$

c. $5x^3y^2\sqrt{30y}$

d. none of these

_____ 32. $\frac{\sqrt{3} - \sqrt{6}}{\sqrt{3} + \sqrt{6}}$

a. $\frac{-1 - 2\sqrt{18}}{3}$

b. $\frac{-3 - 2\sqrt{18}}{9}$

c. $-3 + 2\sqrt{2}$

d. $9 - 2\sqrt{18}$

Simplify.

_____ 33. $-\sqrt{5} - 3\sqrt{36} + 6\sqrt{5}$

a. $5\sqrt{5} - 18$

b. $5\sqrt{5} - 3\sqrt{36}$

c. $-5\sqrt{5} - 18$

d. none of these

_____ 34. $3^{\frac{1}{3}} \cdot 9^{\frac{1}{3}}$

a. 9 b. $\sqrt[3]{3}$ c. 3 d. $\sqrt{3}$

Multiply.

_____ 35. $(8 - \sqrt{2})(9 + \sqrt{5})$

a. $72 - \sqrt{10}$ c. $72 - 2\sqrt{10}$
 b. $72 + 8\sqrt{5} - 9\sqrt{2} - \sqrt{10}$ d. $72 - \sqrt{3} - \sqrt{10}$

Solve the equation.

_____ 36. $\sqrt{x+10} - 7 = -5$

a. 14 b. -8 c. 4 d. -6

Solve. Check for extraneous solutions.

_____ 37. $6x = \sqrt{24 + 12x}$

a. $-\frac{2}{3}$ b. -1 c. 1 and $-\frac{2}{3}$ d. 1

_____ 38. $(-2x + 6)^{\frac{1}{5}} = (-8 + 10x)^{\frac{1}{5}}$

a. $\frac{7}{6}$ b. $\frac{2}{3}$ c. $-\frac{1}{4}$ d. $\frac{6}{7}$

_____ 39. Let $f(x) = 3x + 2$ and $g(x) = 7x + 6$. Find $f \cdot g$ and its domain.

- a. $6x^2 + 4x + 42$; all real numbers except $x = -\frac{2}{3}$
 b. $6x^2 + 4x + 42$; all real numbers
 c. $21x^2 + 32x + 12$; all real numbers
 d. $21x^2 + 32x + 12$; all real numbers except $x = -\frac{6}{7}$

_____ 40. Let $f(x) = 3x - 6$ and $g(x) = x - 2$. Find $\frac{f}{g}$ and its domain.

- a. 3; all real numbers
 b. 3; all real numbers except $x = 2$
 c. 1; all real numbers
 d. -3; all real numbers except $x = 3$

_____ 41. Let $f(x) = 4 + 5x$ and $g(x) = 2x - 1$. Find $f(g(x))$ and $g(f(x))$.

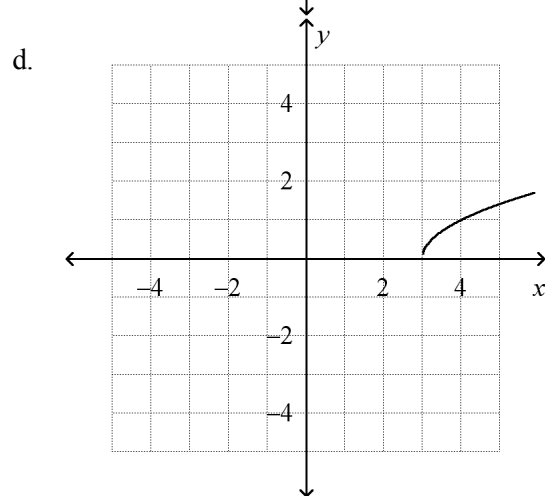
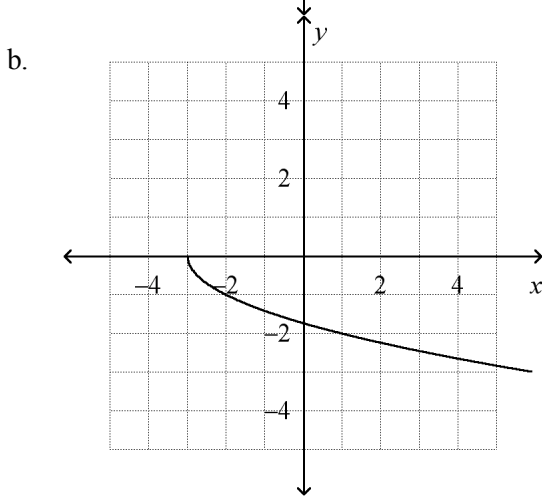
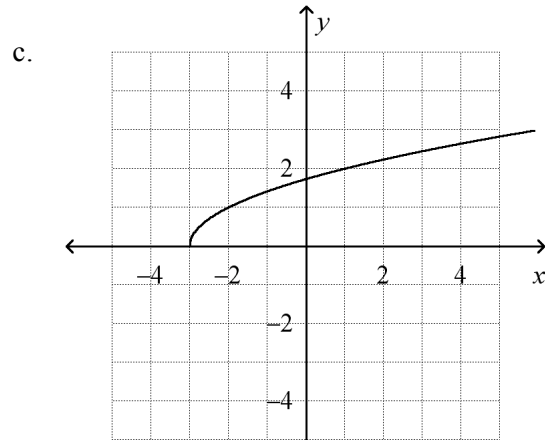
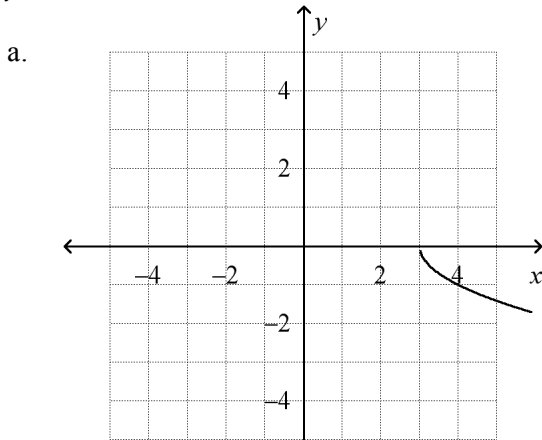
- a. $f(g(x)) = 10x - 1$; $g(f(x)) = 10x + 7$
- b. $f(g(x)) = 7x + 3$; $g(f(x)) = 10x + 7$
- c. $f(g(x)) = -7x - 3$; $g(f(x)) = -10x + 7$
- d. $f(g(x)) = -10x - 7$; $g(f(x)) = 7x + 3$

_____ 42. Find the inverse of $y = 7x^2 - 3$.

- a. $y = \pm \sqrt{\frac{x+3}{7}}$
- b. $x = \sqrt{\frac{y+3}{7}}$
- c. $y^2 = \frac{x-3}{7}$
- d. $y = \pm \sqrt{\frac{x-3}{7}}$

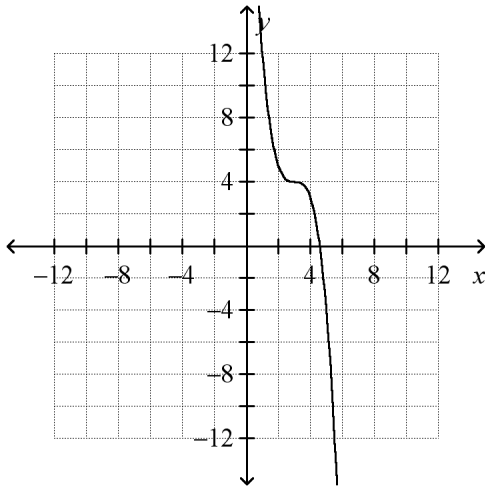
Graph the function.

_____ 43. $y = \sqrt{x+3}$

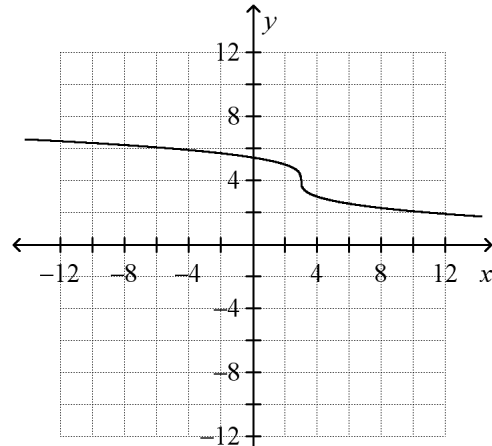


_____ 44. $y = -\sqrt[3]{x - 3} + 4$

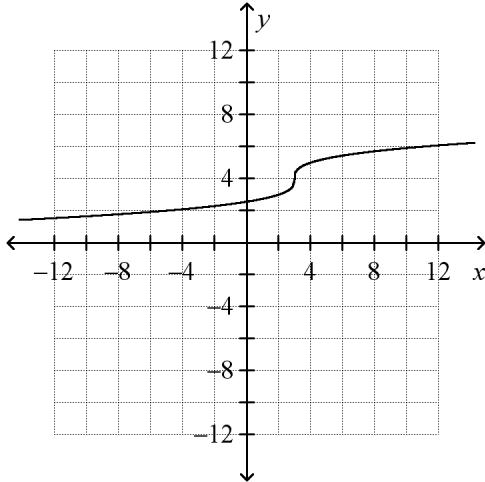
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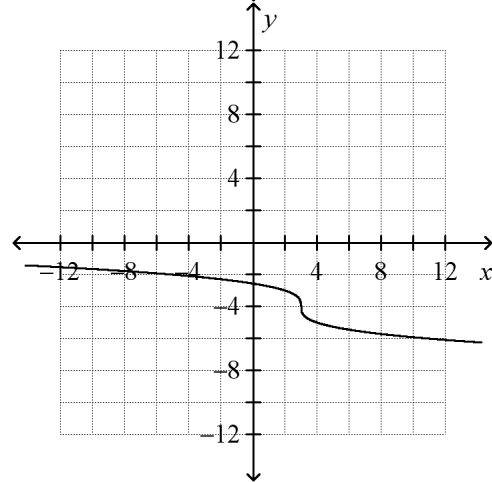
c.



b.



d.



_____ 45. An initial population of 895 quail increases at an annual rate of 7%. Write an exponential function to model the quail population.

a. $f(x) = 895(1.07)^x$

c. $f(x) = 895(0.07)^x$

b. $f(x) = 895(7)^x$

d. $f(x) = (895 \cdot 0.07)^x$

Write the equation in logarithmic form.

_____ 46. $6^4 = 1,296$

a. $\log_6 1,296 = 4$

c. $\log 1,296 = 4 \cdot 6$

b. $\log 1,296 = 4$

d. $\log_4 1,296 = 6$

_____ 47. $125^{\frac{4}{3}} = 625$

a. $\log_{\frac{4}{3}} 625 = 125$

c. $\log_{125} 625 = \frac{4}{3}$

b. $3 \log_4 625 = 125$

d. $\log_{625} 125 = \frac{3}{4}$

Evaluate the logarithm.

_____ 48. $\log_5 \frac{1}{625}$

a. -3

b. 5

c. -4

d. 4

_____ 49. $\log 0.01$

a. -10

b. -2

c. 2

d. 10

Write the expression as a single logarithm.

_____ 50. $4 \log x - 6 \log (x + 2)$

a. $24 \log \frac{x}{x+2}$

c. $\log x(x+2)^{24}$

b. $\log x^4(x+2)^6$

d. none of these

_____ 51. Solve $\frac{1}{16} = 64^{4x-3}$.

a. $\frac{1}{12}$

b. $\frac{1}{4}$

c. $\frac{7}{12}$

d. $\frac{11}{12}$

_____ 52. Solve $125^{9x-2} = 150$.

a. -1.8847

b. -0.1069

c. 0.3375

d. 1.0378

_____ 53. Solve $3 \log 2x = 4$. Round to the nearest ten-thousandth.

a. 10.7722

b. 5

c. 2.7826

d. 0.6309

_____ 54. Solve $\log 3x + \log 9 = 0$. Round to the nearest hundredth if necessary.

a. 0.33

b. 0.04

c. 3

d. 27

_____ 55. Solve $\log(x+9) - \log x = 3$.

a. 0.0090

b. 0.3103

c. 3.2222

d. 111

_____ 56. Simplify $\ln e^3$.

a. 3

b. $\frac{1}{3e}$

c. $3e$

d. $\frac{1}{3}$

Add or subtract. Simplify if possible.

----- 61. $\frac{b^2 - 2b - 8}{b^2 + b - 2} - \frac{6}{b - 1}$

a. $b - 10$

c. $\frac{b - 4}{b - 1}$

b. $\frac{b^2 - 2b - 14}{b^2 + b - 2}$

d. $\frac{b - 10}{b - 1}$

Simplify the complex fraction.

----- 62. $\frac{\frac{4}{x + 3}}{\frac{1}{x} + 3}$

a. $\frac{12x + 4}{x^2 + 3x}$

c. $\frac{4x}{3x^2 + 10x + 3}$

b. $\frac{4x}{3x + 9}$

d. not here

----- 63. $\frac{\frac{n - 6}{n^2 + 11n + 24}}{\frac{n + 1}{n + 3}}$

a. $\frac{(n - 6)(n + 1)}{(n + 3)^2(n + 8)}$

c. $\frac{(n - 6)(n + 1)}{(n + 3)(n + 8)}$

b. $\frac{(n - 6)(n + 8)}{(n + 1)(n - 8)}$

d. $\frac{n - 6}{(n + 1)(n + 8)}$

Solve the equation. Check the solution.

----- 64. $\frac{a}{a^2 - 36} + \frac{2}{a - 6} = \frac{1}{a + 6}$

a. -9 b. -6

c. -9 and -6 d. 6

----- 65. $\frac{5}{6w} + \frac{1}{w} = -4$

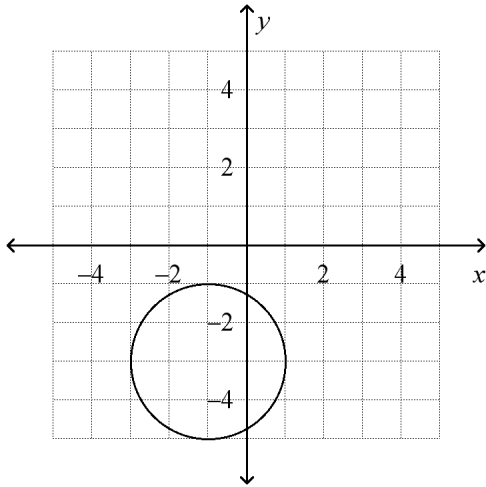
a. $-\frac{3}{14}$ b. $\frac{11}{6}$

c. $-\frac{11}{24}$ d. $-\frac{31}{24}$

Name: _____

ID: A

_____ 66. Write an equation in standard form for the circle.



a. $(x - 1)^2 + (y - 3)^2 = 4$

c. $(x + 1)^2 + (y - 3)^2 = 4$

b. $(x + 1)^2 + (y + 3)^2 = 4$

d. $(x - 1)^2 + (y + 3)^2 = 4$

_____ 67. Find the center and radius of the circle with equation $(x - 1)^2 + (y + 1)^2 = 4$.

a. center $(-1, 1)$; radius 4

c. center $(-1, 1)$; radius 2

b. center $(1, -1)$; radius 4

d. center $(1, -1)$; radius 2