

1. Solve the equations:

a.  $3(2x-1) = 2(4x+7)$

b.  $4(x-2) - 3(x-1) = 2(x+6)$

c.  $\frac{2x}{5} + \frac{x}{3} = \frac{44}{15}$

d.  $\frac{x-2}{3} + \frac{x+1}{4} = \frac{5}{2}$

e.  $|3y-1| = 14$

f.  $|x+3| + 6 = 15$

g.  $\left|x - \frac{3}{4}\right| = \frac{5}{6}$

h.  $|y+2|-1 = 11$

i.  $|2x+9| = -8$

2. Solve the following equations for the given variable:

a.  $2x + 4y = 12$  Solve for y.

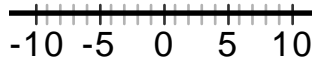
b.  $D = ab + c$  Solve for b.

c.  $F = \frac{9}{5}C + 32$  Solve for C.

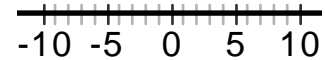
d.  $5x - 3y = -15$  Solve for x.

3. Solve and graph these inequalities on the given number line. Write your answers in interval notation.

a.  $4 - 2x > 12$



b.  $a - 4 \leq 2a + 5$



c.  $3(b + 1) > 2b - 5$



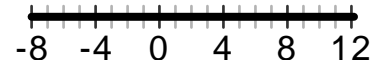
d.  $\frac{3a-2}{5} \geq 2$



e.  $|2x+1| < 5$



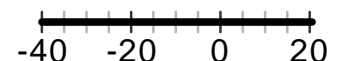
f.  $|2x-5|-6 > 11$



g.  $3|x-3| \leq 12$



h.  $\left|\frac{x+5}{3}\right| \geq 5$



4. Make a table of values for the following equations. Graph using graph paper.

a.  $y = -5$

b.  $x = 4$

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

d.  $y = \frac{3}{4}x - 1$

5. Find the x and y intercepts. Use them to graph the equations on a piece of graph paper.

a.  $2x + 4y = 8$

b.  $y = \frac{1}{2}x - 4$

c.  $6x - 2y = -12$

d.  $5x - 3y = -15$

6. A) Find the slope of the line passing through the given points. B) Use the Slope Intercept formula to find the y-intercept. C) Use the slope and y-intercept to write an equation of the line passing through the points. D) Graph the equation of each line on graph paper.

a.  $(3,2)$  and  $(4,-2)$

b.  $(3,1)$  and  $(6,5)$

c.  $(4,3)$  and  $(5,0)$

d.  $(-5,4)$  and  $(-7,6)$

e.  $(-3,2)$  and  $(-3,-5)$

f.  $(-5,2)$  and  $(-3,2)$

7. Use the Point Slope formula to find the equation of the line:

a. passing through  $\left(0, -\frac{3}{5}\right)$  and having a slope of  $-\frac{8}{5}$ .

b. passing through  $(-2,5)$  and  $(2,3)$ .

c. passing through  $(3,7)$  and parallel to a line with slope of  $-2$ .

d. perpendicular to the line with the equation  $2x + 3y = 1$  and passing through the point  $(2,5)$ .

e. parallel to the line with the equation  $2x - y = 6$  and passing through the point  $(-2,1)$ .

8. Solve the systems by graphing on graph paper:

a. 
$$\begin{cases} 3x + 6y = 12 \\ 2y = 4x - 6 \end{cases}$$

b. 
$$\begin{cases} 2x + 6y = 12 \\ 3x - 2y = 7 \end{cases}$$

c. 
$$\begin{cases} y = -2x + 4 \\ y = \frac{3}{2}x + 4 \end{cases}$$

9. Solve the systems by substitution:

a. 
$$\begin{cases} x = 3y - 7 \\ 2x + 3y = 4 \end{cases}$$

b. 
$$\begin{cases} y = -2x \\ 9x - 2y = 26 \end{cases}$$

c. 
$$\begin{cases} x - 3y = 11 \\ -4x + y = -11 \end{cases}$$

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10. Solve the systems by the elimination method:

a. 
$$\begin{cases} 3x - 7y = -4 \\ 7x + 3y = 10 \end{cases}$$

b. 
$$\begin{cases} 3x + 5y = -10 \\ 4x - 7y = 14 \end{cases}$$

c. 
$$\begin{cases} x + 7y = 23 \\ -2x - 3y = -2 \end{cases}$$

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11. Solve the inequalities by graphing. Use graph paper:

a.  $y < -2x + 3$

b.  $-x + 2y > -8$

c.  $5x - 3y \geq -15$

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12. Add or subtract the polynomials as indicated:

a.  $(6x^4 + 2x^3 - 7x^2) + (-9x^5 + 3x^4 - x^3 + 5x)$

b.  $(-5x^2 + 8) - (2x^2 - 9)$

c.  $(-7x^3 - 11x^2 + 4x - 3) + (5x^2 + 4x + 9)$

d.  $(7y^2 - 4y - 8) - (-2y^2 + 6y + 7)$

e.  $(x^3 + 5x - 2) - (-9x^3 + 16x^2 + 11x)$

f.  $(18x^2 - 2x - 1) + (2x + 7)$

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13. Multiply and simplify:

a.  $-10a^5(-2a^5 + 2a^4 - 8a)$

b.  $(y + 3)(y - 12)$

c.  $(4a - 5)(a - 6)$

d.  $(25x^9y^6)(-4xy^3)$

e.  $(3x + 4)^2$

f.  $9x^3(x^2 - 2x + 8)$

g.  $(5y - 3)(y + 9)$

h.  $(8y - 1)(8y + 1)$

i.  $(4x - 7)(4x + 7)$

j.  $(x + 1)(x^2 - 3x - 5)$

k.  $(10x^4y^6z)(6xy^2z^2)$

l.  $(5x - 11)^2$

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14. Factor these expressions completely:

a.  $5y^3 - 20y^2 + 20y$

b.  $x^2 + 8x - 33$

c.  $x^2 - 4x - 32$

d.  $4a^2b^3 + 8a^3b^2 - 12a^2b^2$

e.  $y^2 - 10y + 21$

f.  $3x^2 + 9x - 30$

g.  $2x^2 + 5x + 3$

h.  $6x^2 + x - 15$

i.  $x^2 - 36$

j.  $5x^3 - 45x$

k.  $3x^2 - 10x - 8$

l.  $4x^2 + 20x + 25$

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15. Solve these equations, using the Zero Product Property:

a.  $x^2 - 3x - 40 = 0$

b.  $(x + 8)(x - 11) = 0$

c.  $x^2 + 12x = -35$

d.  $3x^2 + x - 2 = 0$

e.  $7x^3 - 28x = 0$

f.  $5x^2 - 14x = 3$

g.  $4x^2 + 4x - 3 = 0$

h.  $x^2 - 10x = -25$

i.  $6x^2 - x - 15 = 0$

16. Reduce to simplest terms:

a.  $\frac{y - x}{x^2 - y^2}$

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

c.  $\frac{x^2 - 49}{7 - x}$

d.  $\frac{2x^2 - 16x + 32}{4x^2 - 64}$

e.  $\frac{4x^2 - 25}{2x^2 + 3x - 20}$

f.  $\frac{36x^2 - 9x}{9x}$

g.  $\frac{54x^6 + 81x^4 - 36x^3}{9x^3}$

h.  $\frac{72a^{19}b^{24}c^{12}}{-12a^{12}b^{24}c^5}$

i.  $\frac{x^4 + 5x^3 + 6x^2}{x^2 + 3x}$

17. Add or subtract as indicated; then reduce to lowest terms, if possible.

a.  $\frac{2x}{x - 3} + \frac{6}{3 - x}$

b.  $\frac{x + 2}{x^2 + 11x + 28} + \frac{10}{x^2 + 8x + 7}$

c.  $\frac{2}{x + 1} + \frac{3}{x + 2}$

d.  $\frac{x + 6}{2x^2 + 11x + 5} - \frac{2x - 1}{4x^2 - 1}$

e.  $\frac{1}{y^2 + 14y + 48} - \frac{8}{y^2 - 64}$

f.  $\frac{2}{x^2 + 3x} - \frac{3}{x^2 + 5x + 6}$

18. Multiply or divide as indicated; then reduce to lowest terms, if possible.

a.  $\frac{x^2 + 6x + 9}{x^2 + x - 6} \cdot \frac{x^2 - 4}{x^2 - 9}$

b.  $\frac{x^2 + 4x - 5}{x^2 - 12x + 27} \cdot \frac{x^2 - 11x + 18}{x^2 - 3x + 2}$

c.  $\frac{3x^2 - 5x - 12}{x^2 - 7x - 18} \cdot \frac{2x^2 + 5x + 2}{2x^2 - 5x - 3}$

d.  $\frac{y^2 - 16}{4y + 16} \div \frac{y^2 - 6y + 8}{3y - 6}$

e.  $\frac{15x^2 + 5x}{5x^3 - 5x} \div \frac{3x^2 - 11x - 4}{x^2 - x - 2}$

f.  $\frac{x^2 + 11x + 18}{x^2 + 9x} \div \frac{x^2 - 2x - 8}{x^2 + 5x - 36}$

19. Solve these equations for the variable.

a.  $\frac{x-2}{3} + \frac{x+1}{8} = \frac{5}{6}$

b.  $\frac{x-1}{2x+5} = \frac{1}{4}$

c.  $\frac{4}{x} = \frac{5}{x} - \frac{1}{2}$

d.  $\frac{3}{2x-1} = \frac{-6}{3x+2}$

e.  $\frac{y}{y-2} + \frac{5}{y+2} = \frac{8}{y^2-4}$

f.  $\frac{4}{x^2-x-2} + \frac{8}{x^2-2x-3} = \frac{10}{x^2-5x+6}$

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20. Simplify. Write without negative exponents in your answer. Evaluate, if possible.

a.  $(-2)^5$

b.  $(4x^3y^{-2})^{-3}$

c.  $(3x^2)^{-3}$

d.  $\frac{2y^7}{y^4}$

e.  $3^5 \times 3^4$

f.  $(-2c^{12})^4$

g.  $(-2)^{-3}$

h.  $\frac{x^{-9}}{y^{-5}}$

i.  $(9x)^0$

j.  $\frac{a^{-3}b^{-3}}{a^2b^{-4}}$

k.  $\frac{x^{-4}y^5}{x^{-2}y^{-2}}$

l.  $\frac{2x^{-2}}{y^{-3}}$

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21. Simplify the radicals:

a.  $\sqrt{124}$

b.  $\sqrt{320x^8y^{19}}$

c.  $\sqrt{18x^3y^4}$

d.  $\sqrt{64x^5y^3}$

e.  $2\sqrt{48a^3b^4}$

f.  $\sqrt{\frac{4a^{19}b^8}{c^4}}$

g.  $-4\sqrt{75x^4y^5}$

h.  $\sqrt{\frac{75}{81}}$

i.  $\sqrt{\frac{12xy^4}{3}}$

j.  $\sqrt{-12}$

k.  $\sqrt{-90}$

l.  $\sqrt{-243}$

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22. Rewrite as a radical and simplify:

a.  $32^{\frac{2}{5}}$

b.  $25^{\frac{3}{2}}$

c.  $(-27)^{\frac{2}{3}}$

d.  $(4y^5)^{\frac{1}{2}}$

e.  $64^{\frac{5}{3}}$

f.  $(-125)^{\frac{4}{3}}$

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23. Write with rational exponents:

a.  $(\sqrt[3]{y})^2$

b.  $(\sqrt[5]{7})^2$

c.  $\sqrt[5]{x^4y^3}$

d.  $(\sqrt[3]{5x})^2$

24. Perform the indicated operations. Give answers in simplest radical form:

a.  $3\sqrt{75} + 7\sqrt{12} - 9\sqrt{3}$

b.  $2\sqrt{48} - 5\sqrt{300} + 3\sqrt{27}$

c.  $7\sqrt{15} - 11\sqrt{15} + 8\sqrt{60}$

d.  $3\sqrt{50} + 8\sqrt{98} - 4\sqrt{32}$

e.  $2\sqrt{7}(-4\sqrt{14})$

f.  $(2\sqrt{3} - 5)(\sqrt{3} + 5)$

g.  $\sqrt{5}(5\sqrt{8} - 6\sqrt{18})$

h.  $(\sqrt{3} - \sqrt{6})(4 - \sqrt{2})$

25. Rationalize the denominators:

a.  $\frac{6}{\sqrt{2}}$

b.  $\frac{10 - \sqrt{30}}{\sqrt{5}}$

c.  $\sqrt{\frac{2}{3}}$

d.  $\frac{5\sqrt{18}}{3\sqrt{6}}$

e.  $\frac{3\sqrt{45}}{\sqrt{5}}$

f.  $\sqrt{\frac{42}{3}}$

26. Solve the equations. Remember to do a check for each solution:

a.  $\sqrt{2y - 4} = 8$

b.  $\sqrt{7y - 3} - 4 = 5$

c.  $\sqrt{11x - 6} = x + 2$

d.  $\sqrt{x + 2} - 2 = 8$

e.  $\sqrt{7x - 5} = -4$

f.  $\sqrt{3y + 3} - 4 = 5$

27. Express in terms of  $i$ :

a.  $\sqrt{-4}$

b.  $\sqrt{-12}$

c.  $(2i)(5i)$

28. Perform the indicated operations. Express your answers in  $a + bi$  form:

a.  $(5 - 2i) - (7 - 6i)$

b.  $(3 - 7i) + (-8 + 4i)$

c.  $(15 - 2i) + (2 + 4i)$

d.  $(-12 - 7i) - (7 - 11i)$

e.  $(6i)(2 + i)$

f.  $(8 - 2i)(4 + 3i)$

g.  $\sqrt{-8} \cdot \sqrt{-12}$

h.  $-11i(6 + 8i)$

i.  $(3 + 5i)(3 - 5i)$

29. Solve the quadratic equations by factoring:

a.  $6x^2 - 18x - 60 = 0$

b.  $x^2 - 17x = -72$

c.  $x^2 + 9x + 20 = 0$

30. Solve the quadratic equations by taking roots:

a.  $(x-1)^2 = 16$

b.  $x^2 = -24$

c.  $(x+2)^2 - 3 = 5$

d.  $(x-4)^2 = 25$

e.  $(x+7)^2 + 5 = 6$

f.  $x^2 = 75$

31. Solve the quadratic equations by completing the square:

a.  $x^2 - 12x + 11 = 0$

b.  $x^2 - 4x + 8 = 0$

c.  $x^2 + 6x = 18$

d.  $x^2 - 10x + 13 = 0$

e.  $x^2 + 8x - 16 = 0$

f.  $x^2 + 2x = -10$

32. Solve the quadratic equations by using the Quadratic Formula:

a.  $x^2 - 4x - 3 = 0$

b.  $2x^2 + 3x + 4 = 0$

c.  $x^2 - 50 = 5x$

d.  $x^2 - 4x = -32$

e.  $3x^2 - 4x + 2 = 0$

f.  $x^2 - 5x = 0$

33. Make a table of values. For each equation find: 1) the vertex, 2) the x intercepts, ( if they exist ), 3) the y intercept, and 4) the equation of the axis of symmetry. Graph the equation using graph paper.

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

b.  $y = -x^2 - 1$

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

d.  $y = x^2 + 4x - 6$

e.  $y = x^2 + 6x + 7$

f.  $y = -2x^2 - 4$

34. Write the equation in standard form by completing the square if necessary. Find the center and the radius of each circle and use them to graph the circle:

a.  $x^2 + y^2 = 16$

b.  $(x-5)^2 + (y+2)^2 = 25$

c.  $x^2 + y^2 + 10x + 6y - 30 = 0$

d.  $x^2 + y^2 + 6x - 8y - 24 = 0$

35. Find the equation of each circle with the given radius and center:

a. Center  $(6,-3)$  Radius = 2

b. Center  $(-2,-7)$  Radius =  $\sqrt{7}$

c. Center  $(0,8)$  Radius = 6

d. Center  $(2,0)$  Radius = 4

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36. Write an algebraic equation and solve it.

a. When 28 is subtracted from five times a number the result is 232. Find the number.

b. The sum of three consecutive odd integers is 171. Find the numbers.

c. The length of a rectangle is 13 feet more than twice its width. The perimeter is 260 feet. Find the length and width of the rectangle.

d. Find two consecutive integers whose product is 210. (There will be a set of positive integers and a set of negative integers.)

e. Find two consecutive even integers whose product is 360. (There will be a set of positive integers and a set of negative integers.)

f. Is the point  $(2,3)$  a solution for the equation  $y = x^2 - 1$ ?

g. If the sum of the reciprocal of a number and  $\frac{2}{5}$  is  $\frac{9}{20}$ , what is the number?

h. If  $m$  varies directly with  $n$ , and  $m = 10$  when  $n = 5$ , find  $m$  when  $n$  is 100.

i. Find the quadratic equation with roots  $(2,-7)$ .