NAME: _____ **PERIOD:** _____

Algebra 1 Readiness KEY - EXPRESSIONS

Adding and Subtracting Fractions - Leave answers as simplified improper fractions

EXAMPLE

What common denominator could we use?

$$\frac{1}{4} + \frac{3}{5}$$

Numerator & Denominator × 5

Numerator & Denominator × 4

$$\frac{5}{20} + \frac{12}{20} = \frac{17}{20}$$

$$\frac{1}{3} + \frac{1}{4}$$

Numerator & Denominator × 4

Numerator & Denominator × 3

$$\frac{4}{12} + \frac{3}{12} = \frac{7}{12}$$

1. Simplify

$$\frac{3}{7} + \frac{2}{7}$$

$$\frac{5}{7}$$

2. Simplify

$$\frac{2}{5} - \frac{4}{5}$$

$$-\frac{2}{5}$$

3. Simplify

$$\frac{5}{3} - \frac{1}{4}$$

$$\frac{20}{12} - \frac{3}{12}$$

$$\frac{17}{12}$$

4. Simplify

$$\frac{5}{6} + \frac{2}{3}$$

$$\frac{5}{6} + \frac{4}{6}$$

$$\frac{9}{6} = \frac{3}{2}$$

5. Simplify

$$\frac{1}{2} - \frac{7}{8}$$

$$\frac{4}{8} - \frac{7}{8}$$

$$-\frac{3}{8}$$

6. Simplify

$$\frac{4}{3} + \frac{3}{5}$$

$$\frac{20}{15} + \frac{9}{15}$$

$$\frac{29}{15}$$

Multiplying Fractions - Leave answers as simplified improper fractions

Example/Model

Whenever multiplying fractions together:

$$\frac{a}{b} \times \frac{c}{d} = \frac{a \times c}{b \times d}$$

Multiply the numerators together, then multiply the denominators together.

$$\frac{3}{4} \cdot \frac{2}{7} = \frac{6}{28}$$

$$\frac{6 \div 2}{28 \div 2} = \frac{3}{14}$$

7. Simplify

$$\frac{3}{4}\left(\frac{2}{9}\right)$$

$$\frac{6}{36} = \frac{1}{6}$$

8. Simplify

$$-\frac{2}{3}\left(\frac{1}{6}\right)$$

$$-\frac{2}{18} = -\frac{1}{9}$$

9. Simplify

$$-\frac{3}{10}\left(-\frac{5}{2}\right)$$

$$\frac{15}{20} = \frac{3}{4}$$

10. Simplify

$$-\frac{8}{3}\left(\frac{1}{4}\right)$$

$$-\frac{8}{12} = -\frac{2}{3}$$

11. Simplify

$$\frac{15}{2}\left(\frac{4}{5}\right)$$

$$\frac{60}{10} = 6$$

12. Simplify

$$\frac{2}{9}\left(\frac{18}{5}\right)$$

$$\frac{36}{45} = \frac{4}{5}$$

Distributive Property

Example/Model

$$a(b+c) = ab + ac$$

$$4(5x+2) = 4(5x) + 4(2) = 20x + 8$$

$$a(b+c) = ab + ac$$

$$6(3x-4) = 6(3x) + 6(-4) = 18x - 24$$

13. Simplify

$$3(n+2)$$

$$3n + 6$$

14. Simplify

$$5(3n+10)$$

$$15n + 50$$

15. Simplify

$$7(5+6x)$$

$$35 + 42x$$

NAME: _____ **PERIOD:** _____

16. Simplify

$$\frac{1}{2}(16y+22)$$

$8y+11$

17. Simplify

$$6\,(3x-1)$$

$18x-6$

18. Simplify

$$\frac{1}{3}(15x-18)$$

$5x-6$

19. Simplify

$$\frac{1}{4}\left(\frac{1}{2}a+\frac{4}{5}\right)$$

$\frac{1}{8}a-\frac{4}{20}$

$\frac{1}{8}a-\frac{1}{5}$

20. Simplify

$$4\,(6a-2b+c)$$

$24a-8b+4c$

21. Simplify

$$5\,(-4b-2)$$

$-20b-10$

22. Simplify

$$\frac{2}{3}(9x-21)$$

$\frac{18x}{3}-\frac{42}{3}$

$6x-14$

23. Simplify

$$(-3-4y)\,(2)$$

$-6-8y$

24. Simplify

$$3\,(5a-6b)$$

$15a-18b$

25. Create a problem that simplifies to **24x + 18** and show that it works.

$$\_\_\_\_\_\,(\_\_\_\_\_x+\_\_\_\_\_)$$

Examples: **3(8x + 6), 2(12x + 9), 6(4x + 3)**

Distributive Property with Negatives

Example/Model

$-a(b+c)$

$=-ab-ac$

$$-2\,(3x+5)$$
$$=-2\,(3x)-2\,(5)$$
$$=-6x-10$$

$-a(b-c)$

$=-ab+ac$

$$-4\,(x-3)$$
$$=-4\,(x)-4\,(-3)$$
$$=-4x+12$$

26. Simplify

$$-3\,(5n+10)$$

$-15n-30$

27. Simplify

$$-5\,(x-9)$$

$-5x+45$

28. Simplify

$$-(6y+3)$$

$-6y-3$

29. Simplify $-\frac{1}{2}(20a+14)$ $-10a-7$	30. Simplify $-\frac{1}{3}(6a-33)$ $-2a+11$	31. Simplify $-(3+2x)$ $-3-2x$
32. Simplify $-5(-2x-7)$ $10x+35$	33. Simplify $-3(5a-2b+2)$ $-15a+6b-6$	34. Simplify $(5b-3)(-6)$ $-30b+18$

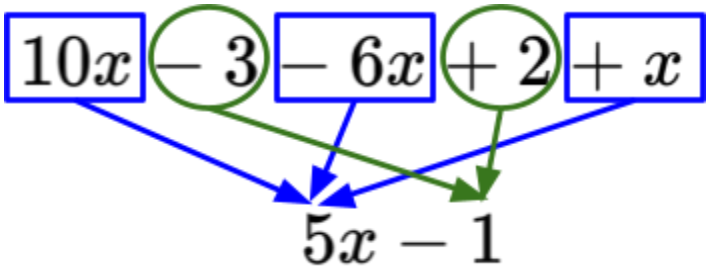
Combining Like Terms

Example/Model

Collect like terms

4a + 5 + 2a - 3

= 6a + 2



35. Simplify $6y+8-2y$ $4y+8$	36. Simplify $3-4x+9$ $-4x+12$	37. Simplify $9a-5-2a+1$ $7a-4$
38. Simplify $3-x+2x-10$ $x-7$	39. Simplify $-7b-6-2+b$ $-6b-8$	40. Simplify $3a+2b-1+7a$ $10a+2b-1$

NAME: _____ **PERIOD:** _____

41. Simplify

$9y - 2x + 7y - 5x$

$16y - 7x$

42. Simplify

$12a + 4b - 2a - 2b$

$10a + 2b$

43. Simplify

$\frac{1}{2}x - \frac{4}{3} + \frac{3}{4}x + \frac{2}{3}$

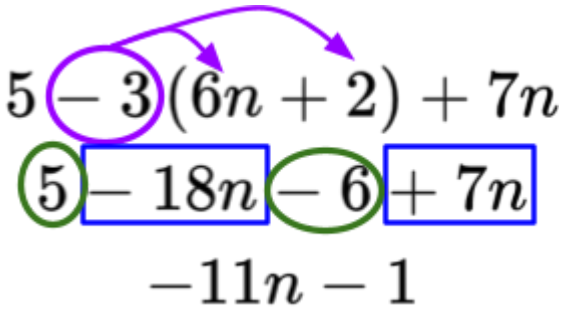
$\frac{5}{4}x - \frac{2}{3}$

Simplifying Expressions with Distribution and Combining Like Terms

Example/Model

Distribute

Combine like terms



44. Simplify

$2(d + 3) + d$

$2d + 6 + d$

$3d + 6$

45. Simplify

$4(2c - 3) - c$

$8c - 12 - c$

$7c - 12$

46. Simplify

$-2(3 - 4x) + 7x$

$-6 + 8x + 7x$

$15x - 6$

47. Simplify

$5(x + 7) + x$

$5x + 35 + x$

$6x + 35$

48. Simplify

$z + 4(2z + 3)$

$z + 8z + 12$

$9z + 12$

49. Simplify

$9 - 2(1 + 5x) + 3x$

$9 - 2 - 10x + 3x$

$-7x + 7$

50. Simplify

$4(7x-2)-3(2x+1)$

$28x-8-6x-3$

$22x-11$

51. Simplify

$8(m-1)-(3m+2)$

$8m-1-3m-2$

$5m-3$

52. Simplify

$\frac{1}{2}(12y-10)+3(x-5)$

$6y-5+2x-15$

$6y+3x-20$

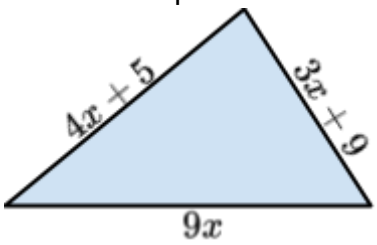
Simplifying Expressions - APPLICATIONS

Reminders –

Perimeter: the sum of the measures of all sides of a two-dimensional figure

Area: the amount of space a two-dimensional figure takes up – use area formulas

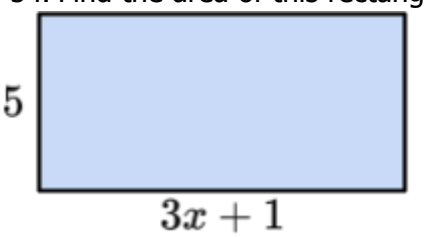
53. Find the perimeter of this triangle

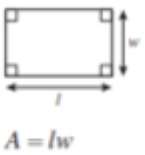


$4x+5+3x+9+9x$

$16x+14$

54. Find the area of this rectangle

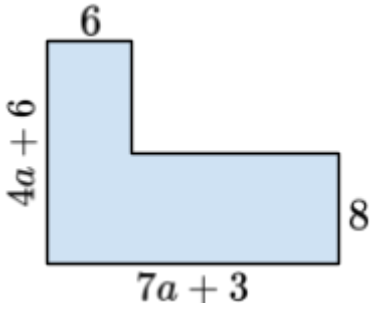




$5(3x+1)$

$15x+5$

55. Find the total area of the figure



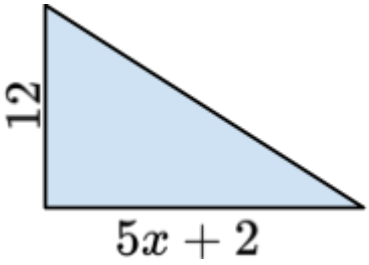
$6(4a+6)+8(7a+3-6)$

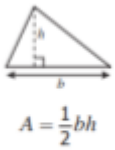
$24a+36+8(7a-3)$

$24a+36+56a-24$

$80a-12$

56. Find the area of the triangle





$\frac{1}{2}(12)(5x+2)$

$6(5x+2)$

$30x+12$

NAME: _____ **PERIOD:** _____

Algebra 1 Readiness KEY - EQUATIONS

Solving Two-Step Equations

Solving Two-Step Equations

1. Add or subtract to isolate the variable term.
2. Multiply or divide to solve for the variable.
3. Check your solutions.

Example:

$3x+5=-16$

$-5 \quad -5$ Subtract

$3x=-21$

$\frac{3x}{3}=\frac{-21}{3}$ Divide

$x=-7$

$3(-7)+5=-16$ Check

1. Solve $3x-4=-13$

$3x=-9$

$x=-3$

2. Solve $4x+9=17$

$4x=8$

$x=2$

3. Solve $10-3x=-11$

$-3x=-21$

$x=7$

4. Solve $-2x-8=-6$

$-2x=2$

$x=-1$

5. Solve $22=5x-8$

$30=5x$

$6=x$

6. Solve $51=9+7x$

$42=7x$

$6=x$

7. Solve $17=12-x$

$5=-x$

$-5=x$

8. Solve $5=11x+5$

$0=11x$

$0=x$

9. Solve $8x-9=-5$

$8x=4$

$x=\frac{1}{2}$

Solving Two-Step Equations with Fractions

Examples/Models

$$\frac{x}{2}+1=6$$
$$-1 \quad -1$$
$$(2)\frac{x}{2}=5\,(2)$$
$$x=10$$

$$\frac{1}{3}x-4=1$$
$$+4 \quad +4$$
$$(3)\frac{1}{3}x=5\,(3)$$
$$x=15$$

$$(3)\frac{x-2}{3}=4\,(3)$$
$$x-2=12$$
$$+2 \quad +2$$
$$x=14$$

10. Solve

$$2=\frac{x}{5}-1$$

$$3=\frac{x}{5}$$

$$15=x$$

11. Solve

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

$$\frac{x}{2}=-9$$

$$x=-18$$

12. Solve

$$\frac{x}{4}+9=14$$

$$\frac{x}{4}=5$$

$$x=20$$

13. Solve

$$\frac{1}{3}x-4=1$$

$$\frac{1}{3}x=5$$

$$x=15$$

14. Solve

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

$$\frac{1}{2}x=-9$$

$$x=-18$$

15. Solve

$$\frac{3}{2}x-2=19$$

$$\frac{3}{2}x=21$$

$$x=14$$

16. Solve

$$\frac{x-4}{5}=-2$$

$$x-4=-10$$

$$x=-6$$

17. Solve

$$\frac{9+x}{2}=8$$

$$9+x=16$$

$$x=7$$

18. Solve

$$\frac{x-7}{3}=-5$$

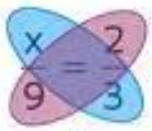
$$x-7=-15$$

$$x=-8$$

NAME: _____ **PERIOD:** _____

Solving Proportions

Example/Model



Cross-Multiply

$(x)(3) = (2)(9)$ Set the cross-products equal to each other.

$\frac{3x}{3} = \frac{18}{3}$ Simplify.

$x = 6$ Divide both sides by 3 to get x by itself.

$\frac{x}{4} \quad \frac{9}{20}$

$20(x) = 4(9)$

$\frac{20x}{20} = \frac{36}{20}$

$x = \frac{9}{5}$

19. Solve

$\frac{10}{5} = \frac{2}{x}$

$10x = 10$

$x = 1$

20. Solve

$\frac{3}{a} = \frac{2}{10}$

$2a = 30$

$a = 15$

21. Solve

$\frac{n}{2} = \frac{4}{6}$

$6n = 8$

$n = \frac{8}{6} = \frac{4}{3}$

22. Solve

$\frac{k}{6} = \frac{3}{9}$

$9k = 18$

$k = 2$

23. Solve

$\frac{8}{10} = \frac{2}{n}$

$8n = 20$

$n = \frac{20}{8} = \frac{5}{2}$

24. Solve

$\frac{3x}{4} = \frac{9}{8}$

$24x = 36$

$x = \frac{36}{24} = \frac{3}{2}$

Solving Equations with Variables on Both Sides

Example/Model

$$15+6x=45+8x$$

$$15+6x=45+8x$$
$$-6x \quad\quad -6x$$
$$15=45+2x$$
$$-45 \quad -45$$
$$\frac{-30}{2}=\frac{2x}{2}$$
$$-15=x$$

Check your answer:

$$15+6(-15)\stackrel{?}{=}45+8(-15)$$
$$15+(-90)\stackrel{?}{=}45+(-120)$$
$$-75=-75 \checkmark$$

25. Solve $7n+7=2+8n$

$7=2+n$

$5=n$

26. Solve $4+6x=-4+2x$

$4+4x=-4$

$4x=-8$

$x=-2$

27. Solve $-6n+8=8-3n$

$8=8+3n$

$0=3n$

$0=n$

28. Solve $1-4a=4-5a$

$1+a=4$

$a=3$

29. Solve $5n+3=-7+7n$

$3=-7+2n$

$10=2n$

$5=n$

30. Solve $b+2=4b+2$

$2=3b+2$

$0=3b$

$0=b$

31. Solve $7x=6+9x$

$-2x=6$

$x=-3$

32. Solve $3x+8=2x$

$8=-x$

$-8=x$

33. Solve $-10y=-5-5y$

$-5y=-5$

$y=1$

NAME: _____ **PERIOD:** _____

Solving Multistep Equations with Distribution

Example/Model

$3(5+2x)=8(5+x)$

$15+6x=40+8x$

$-8x \quad -8x$

$15-2x=40$

$-15 \quad -15$

$\frac{-2x}{-2}=\frac{25}{-2}$

$x=\frac{-25}{2}$

Check:

$3(5+2(\frac{-25}{2}))\stackrel{?}{=}8(5+(\frac{-25}{2}))$

$3(5-25)\stackrel{?}{=}8(\frac{10}{2}-\frac{25}{2})$

$3(-20)\stackrel{?}{=}8(-\frac{15}{2})$

$-60=-60$

34. Solve $38-4x=-7(x-8)$

$38-4x=-7x+56$

$38+3x=56$

$3x=18$

$x=6$

35. Solve $8x-40=-4(-2-5x)$

$8x-40=8+20x$

$-40=8+12x$

$-48=12x$

$-4=x$

36. Solve $-7(3b+8)=-8b+9$

$-21b-56=-8b+9$

$-56=13b+9$

$-65=13b$

$-5=b$

37. Solve $6(p+7)=-4(p-8)$

$6p+42=-4p+32$

$10p+42=32$

$10p=-10$

$p=-1$

38. Solve $4(5a+5)=7(a+1)$

$20a+20=7a+7$

$13a+20=7$

$13a=-13$

$a=-1$

39. Solve $-2(p+7)=3(p+7)$

$-2p-14=3p+21$

$-14=5p+21$

$-35=5p$

$-7=p$

Solving Multistep Equations with Combining Like Terms

Example/Model

$10z - 15 - 4z = 8 - 2z - 15$

$10z - 15 - 4z = 8 - 2z - 15$

$6z - 15 = -2z - 7$ *Combine like terms.*

$+ 2z \qquad + 2z$ *Add 2z to both sides.*

$8z - 15 = \quad - 7$

$+ 15 \qquad +15$ *Add 15 to both sides.*

$8z = 8$

$\frac{8z}{8} = \frac{8}{8}$ *Divide both sides by 8.*

$z = 1$

40. Solve $5x - 7 = -11 + 8x - 2x$

$5x - 7 = -11 + 6x$

$-7 = -11 + x$

$4 = x$

41. Solve $2n - 10 + 6n = 4n + 4 + 6n$

$8n - 10 = 10n + 4$

$-10 = 2n + 4$

$-14 = 2n$

$-7 = n$

42. Solve $m - 14 = 3m - 2 + 4m$

$m - 14 = 7m - 2$

$-14 = 6m - 2$

$-12 = 6m$

$-2 = m$

Solving Multistep Equations with Distribution & Combining Like Terms

43. Solve $-36 - 4x = -5x - 3(4x - 1)$

$-36 - 4x = -5x - 12x + 3$

$-36 - 4x = -17x + 3$

$-36 + 13x = 3$

$13x = 39$

$x = 3$

44. Solve $8(5 + 7a) - 5 = -15 + 6a$

$40 + 56a - 5 = -15 + 6a$

$56a + 35 = -15 + 6a$

$50a + 35 = -15$

$50a = -50$

$a = -1$

45. Solve $-24 - 7x = -8(3 + 8x) - 4x$

$-24 - 7x = -24 - 64x - 4x$

$-24 - 7x = -24 - 68x$

$-24 + 61x = -24$

$61x = 0$

$x = 0$