Please Note: This is a resource for students in standard Algebra I and Algebra 1 2 x 2.

The list of websites below contains tutorials and quizzes on these topics and more.

http://www.regentsprep.org
http://www.math.com
http://education.jlab.org/solquiz/

Part 1 – Rational Number Operations

Integers – You should be able to complete these problems without a calculator.

1. \((4)(-5)\)
2. \(-6 + (-9)\)
3. \(22 - (-4)\)
4. \(\frac{-36}{-4}\)
5. \(-16 + 5\)
6. \((-15)(4)\)
7. \(\frac{42}{-7}\)
8. \((-7)(2)(-5)\)
Fractions – Write your answer as an improper fraction in simplest form.

Model Problems:
Best strategy for numbers you will encounter in Algebra:
- Convert all mixed numbers to improper fractions.
- Find a common denominator.
- Simplify. In Algebra, we leave our answers as improper fractions.

Example A:
\[
\frac{31}{8} + \frac{55}{12}
\]
\[
\frac{93}{24} + \frac{110}{24} \quad \text{(Find a common denominator.)}
\]
\[
\frac{203}{24} \quad \text{(Add and simplify.)}
\]

Example B:
\[
\frac{7}{3} + \frac{38}{5}
\]
\[
\frac{35}{15} - \frac{114}{15} \quad \text{(Find a common denominator.)}
\]
\[
\frac{79}{15} \quad \text{(Subtract and simplify.)}
\]

9. \[
\frac{46}{7} - \frac{41}{8}
\]

10. \[
\frac{3}{4} - \frac{1}{3}
\]

11. \[
\frac{25}{6} + \frac{43}{8}
\]

12. \[
\frac{20}{7} - \frac{36}{5}
\]
Model Problems:
Best strategy for numbers you will encounter in Algebra:
- Convert all mixed numbers to improper fractions.
- (If dividing, remember to multiply by the reciprocal.)
- Simplify a numerator and a denominator, if possible.
- Multiply straight across. In Algebra, we leave our answers as improper fractions.

Example A:
\[
\begin{align*}
\frac{-8}{5} \cdot \frac{25}{8} &= \frac{-1}{5} \cdot \frac{25}{8} \\
\frac{-32}{3} \div \left( -\frac{16}{9} \right) &= \frac{-32}{3} \cdot -\frac{9}{16} \\
\frac{-5}{1} &= -5 \quad \text{(Simplify.)}
\end{align*}
\]

Example B:
\[
\begin{align*}
\frac{32}{3} \div \left( -\frac{16}{9} \right) &= \frac{32}{3} \cdot -\frac{9}{16} \\
\frac{6}{1} &= 6 \quad \text{(Multiply.)}
\end{align*}
\]

13. \( \frac{8}{3} \div \left( \frac{24}{5} \right) \)  

14. \(-10 \cdot \frac{4}{5} \)

15. \( \frac{-2}{5} \div -\frac{9}{16} \)

16. \( \frac{16}{5} \cdot \left( -\frac{3}{2} \right) \)

Part 2 – Algebraic and Numerical Expressions

Simplify each expression by applying the correct order of operations. You should be able to complete these without a calculator.

17. \((-4)^2 \div 2 + (4 - 7) \cdot 4\)  

18. \(2(3^3 + 8) \div (-5)\)  

19. \(\frac{-24 - 2 + 10}{(-5 - 3)^2}\)

20. \( (60 \div 15 \cdot 2) \left( \frac{2}{5} \right) - \frac{3}{5} \)

21. \(\frac{4 + 5 \cdot 3}{2^3 - 12}\)
Simplify each expression by combining like terms.

22. $4x + 8 + 3x - 5$
23. $7y - 4 - y + 9$
24. $3x + x + 5x + 2x + 10$

25. $-2x + 8y - 3x + 12y - 16$
26. $2 + 4x - 9 - 10x$

Simplify each expression by applying the distributive property.

27. $6(x - 5)$
28. $4(2x + 1)$
29. $-3(x - 7)$

Evaluate each expression. You should be able to complete these without a calculator. Express your answers as fractions, not decimals.

30. $3a + 7$ when $a = 5$
31. $c^2 + b$ when $b = -3$ and $c = 4$
32. $5d - 6f + 2$ when $d = 8$, $f = 3$
33. $20 - (m - n)$ when $m = 3$ and $n = -2$.
34. $3x + 5xy$ when $x = \frac{2}{3}$ and $y = \frac{1}{2}$

Part 3 – Equations

Solve each equation. You should be able to complete these without a calculator.

35. $4x - 7 = -15$
36. $4 = \frac{n}{3} + 10$
37. $3 \cdot \frac{a}{7} = 42$
38. $\frac{3}{2} n + 2 = 14$
39. $5 - 9x = 68$
40. $4(x + 2) = -16$
41. $15 = 3x + 5 - 8x$
42. $10 = -5(2x - 1)$
43. $13 = \frac{5}{9} x - 2$
Part 4 – Translations

Translate each verbal expression to an algebraic expression.

44. The sum of a number and fourteen.
45. Five less than two times a number
46. Three times the sum of a number and 2
47. Six times the square of a number minus seven.

Solve each problem.

48. Mari has 2 dogs and 1 cat, Jon has 1 dog, and Suzi has 2 cats and 2 hamsters. How many cats do they have? They have __________ cats. How many animals do they have in total? __________

49. Logan ate 3 pieces of pizza. His brother, Andy, ate twice as many as Logan. How many pieces of pizza did Andy eat? __________

50. Sara’s age plus Holly’s age added to Kristen’s age is 25 years. If Sara is 8 and Kristen is 10, how old is Holly? Holly is __________ years old.
Answers:

1. \(-20\)
2. \(-15\)
3. 26
4. 9
5. \(-11\)
6. \(-60\)
7. \(-6\)
8. 70
9. \(\frac{81}{56}\)
10. \(\frac{5}{12}\)
11. \(\frac{229}{24}\)
12. \(\frac{-152}{35}\)
13. \(\frac{5}{9}\)
14. \(-8\)
15. \(\frac{32}{45}\)
16. \(\frac{-24}{5}\)
17. \(-4\)
18. \(-14\)
19. \(\frac{1}{4}\)
20. \(\frac{13}{5}\)
21. \(\frac{-19}{4}\)
22. \(7x + 3\)
23. \(6y + 5\)
24. \(11x + 10\)

25. \(-5x + 20y - 16\)
26. \(-6x - 7\)
27. \(6x - 30\)
28. \(8x + 4\)
29. \(-3x + 21\)
30. 22
31. 13
32. 24
33. 15
34. \(\frac{11}{3}\)
35. \(x = -2\)
36. \(n = -18\)
37. \(a = 98\)
38. \(n = 8\)
39. \(x = -7\)
40. \(x = -6\)
41. \(x = -2\)
42. \(x = -\frac{1}{2}\)
43. \(x = 27\)
44. \(n + 14\)
45. \(2n - 5\)
46. \(3(n + 2)\)
47. \(6n^2 - 7\)
48. 3 cats, 8 animals in total
49. 6 pieces of pizza
50. Holly is 7 years old.