

Name: _____

Algebra I Honors Prerequisite Skills Review Packet

Congratulations!

Your choice to enroll in Algebra I Honors represents a commitment to academic excellence. The concepts and computational skills you learned in Pre-Algebra are the foundation for success in Algebra I Honors. This packet is designed to aid you in brushing up on these essential skills. This packet only serves as a guide and additional reinforcement may be necessary to ensure success in the course.

Complete all problems WITHOUT the use of a calculator.

Be sure to show work for every problem.

A quiz on these Pre-Algebra Essential Topics will be given in the first week of school.

Section I - Fractions

Write your answers in simplest form. Leave as improper fractions.

Find each sum or difference. Write in simplest form.

a. $\frac{1}{2} + \frac{2}{3}$
 $\frac{1}{2} + \frac{2}{3} = \frac{3}{6} + \frac{4}{6}$ The LCD for 2 and 3 is 6. Rename $\frac{1}{2}$ as $\frac{3}{6}$ and $\frac{2}{3}$ as $\frac{4}{6}$.
 $= \frac{3+4}{6}$ Add the numerators.
 $= \frac{7}{6}$ or $1\frac{1}{6}$ Simplify.

b. $\frac{3}{8} - \frac{1}{3}$
 $\frac{3}{8} - \frac{1}{3} = \frac{9}{24} - \frac{8}{24}$ The LCD for 8 and 3 is 24. Rename $\frac{3}{8}$ as $\frac{9}{24}$ and $\frac{1}{3}$ as $\frac{8}{24}$.
 $= \frac{9-8}{24}$ Subtract the numerators.
 $= \frac{1}{24}$ Simplify.

c. $\frac{2}{5} - \frac{3}{4}$
 $\frac{2}{5} - \frac{3}{4} = \frac{8}{20} - \frac{15}{20}$ The LCD for 5 and 4 is 20. Rename $\frac{2}{5}$ as $\frac{8}{20}$ and $\frac{3}{4}$ as $\frac{15}{20}$.
 $= \frac{8-15}{20}$ Subtract the numerators.
 $= -\frac{7}{20}$ Simplify.

Find each product.

a. $\frac{2}{5} \cdot \frac{1}{3}$
 $\frac{2}{5} \cdot \frac{1}{3} = \frac{2 \cdot 1}{5 \cdot 3}$ Multiply the numerators.
 $= \frac{2}{15}$ Multiply the denominators.
 Simplify.

b. $\frac{3}{5} \cdot 1\frac{1}{2}$
 $\frac{3}{5} \cdot 1\frac{1}{2} = \frac{3}{5} \cdot \frac{3}{2}$ Write $1\frac{1}{2}$ as an improper fraction.
 $= \frac{3 \cdot 3}{5 \cdot 2}$ Multiply the numerators.
 $= \frac{9}{10}$ Multiply the denominators.
 Simplify.

c. $\frac{1}{4} \cdot \frac{2}{9}$
 $\frac{1}{4} \cdot \frac{2}{9} = \frac{1}{\cancel{4}^2} \cdot \frac{\cancel{2}^1}{9}$ Divide by the GCF, 2.
 $= \frac{1 \cdot 1}{2 \cdot 9}$ or $\frac{1}{18}$ Multiply the numerators.
 Multiply the denominators and simplify.

Find each quotient.

a. $\frac{1}{3} \div \frac{1}{2}$
 $\frac{1}{3} \div \frac{1}{2} = \frac{1}{3} \cdot \frac{2}{1}$ Multiply $\frac{1}{3}$ by $\frac{2}{1}$, the reciprocal of $\frac{1}{2}$.
 $= \frac{2}{3}$ Simplify.

b. $\frac{3}{8} \div \frac{2}{3}$
 $\frac{3}{8} \div \frac{2}{3} = \frac{3}{8} \cdot \frac{3}{2}$ Multiply $\frac{3}{8}$ by $\frac{3}{2}$, the reciprocal of $\frac{2}{3}$.
 $= \frac{9}{16}$ Simplify.

c. $\frac{3}{4} \div 2\frac{1}{2}$
 $\frac{3}{4} \div 2\frac{1}{2} = \frac{3}{4} \div \frac{5}{2}$ Write $2\frac{1}{2}$ as an improper fraction
 $= \frac{3}{4} \cdot \frac{2}{5}$ Multiply $\frac{3}{4}$ by $\frac{2}{5}$, the reciprocal of $2\frac{1}{2}$.
 $= \frac{6}{20}$ or $\frac{3}{10}$ Simplify.

d. $\frac{1}{5} \div \left(-\frac{3}{10}\right)$
 $-\frac{1}{5} \div \left(-\frac{3}{10}\right) = -\frac{1}{5} \cdot \left(-\frac{10}{3}\right)$ Multiply $-\frac{1}{5}$ by $-\frac{10}{3}$, the reciprocal of $-\frac{3}{10}$.
 $= \frac{10}{15}$ or $\frac{2}{3}$ Same sign \rightarrow positive quotient; simplify.

1. $\frac{2}{3} + \frac{7}{8}$

2. $\frac{13}{20} - \frac{2}{5}$

3. $\frac{5}{6} - \frac{8}{9}$

4. $1\frac{2}{3} + \frac{3}{4}$

5. $\frac{11}{3} \cdot \frac{9}{44}$

6. $\frac{3}{5} \cdot \frac{5}{6}$

7. $3\frac{1}{2} \cdot 1\frac{1}{2}$

8. $2\frac{1}{4} \div \frac{1}{2}$

9. $\frac{3}{25} \div \frac{2}{15}$

10. $-\frac{9}{10} \div 3$

Section II - Algebraic Expressions

1. Clear any parentheses using the Distributive Property
2. Add or subtract like terms (use the sign in front of each term to determine whether to add or subtract)

ex: $2(3x - 4) - 12x + 9$

$$2(3x - 4) - 12x + 9$$

$$6x - 8 - 12x + 9$$

$$\boxed{-6x + 1}$$

1. Substitute the given values for the variables in the expression
2. Evaluate the expression using the order of operations
 - Parentheses/Brackets (inside to outside)
 - Exponents
 - Multiplication/Division (left to right)
 - Addition/Subtraction (left to right)

ex: $9x^2 - 4(y + 3z)$
for $x = -3, y = 2, z = 5$

$$9(-3)^2 - 4(2 + 3 \cdot 5)$$

$$9(-3)^2 - 4(2 + 15)$$

$$9(-3)^2 - 4 \cdot 17$$

$$9 \cdot 9 - 4 \cdot 17$$

$$81 - 4 \cdot 17$$

$$81 - 68 = \boxed{13}$$

Simplify each expression.

21. $8(x + 1) - 12x$	22. $6w - 7 + 12w - 3z$	23. $9n - 8 + 3(2n - 11)$	24. $3(7x + 4y) - 2(2x + y)$
25. $15 + 8d - 24d + d - 3$	26. $9(b - 1) - c + 3b + c$	27. $20f - 4(5f + 4) + 16$	28. $8(h - 4) - h - (h + 7)$

Evaluate each expression for $a = 9, b = -3, c = -2, d = 7$

29. $a - cd$	30. $2b^3 + c^2$	31. $\frac{a+d-c}{b}$	32. $(a - b)^2 + d(a + c)$
33. $4c - (b - a)$	34. $\frac{a}{b} - 5a$	35. $2bc + d(12 - a)$	36. $b + \frac{1}{2}[8 - (2c + a)]$

Section III - Algebraic Equations

1. Undo operations one at a time with inverse operations, using the order of operations in reverse (i.e. undo addition/subtraction before multiplication/division)

2. Be sure to always do the same thing to both sides of the equation!

ex: $\frac{a}{7} - 12 = -9$

$$\frac{a}{7} - 12 = -9$$

$$+ 12 \quad + 12$$

$$7 \times \frac{a}{7} = 3 \times 7$$

$$\boxed{a = 21}$$

1. Clear any parentheses using the Distributive Property

2. Combine like terms on each side of the equal sign

3. Get the variable terms on the same side of the equation by adding/subtracting a variable term to/from both sides of the equation to cancel it out on one side

4. The equation is now a two-step equation, so finish solving it as described above

ex: $5(2x - 1) = 3x + 4x - 1$

$$10x - 5 = 3x + 4x - 1$$

$$10x - 5 = 7x - 1$$

$$- 7x \quad - 7x$$

$$3x - 5 = -1$$

$$+ 5 \quad + 5$$

$$3x = 4$$

$$\frac{3}{3} \quad \frac{4}{3}$$

$$\boxed{x = \frac{4}{3}}$$

Solve each equation. Leave all answers as simplified fractions if necessary.

45. $5x - 3 = -28$	46. $\frac{w+8}{-3} = -9$	47. $-8 + \frac{h}{4} = 13$	48. $22 = 6y + 7$
49. $2x + 1 = 11$	50. $9 - v = 10$	51. $\frac{7+p}{2} = 14$	52. $3 + 2a = 12$

Solve each equation. Leave all answers as simplified fractions if necessary.

53. $8x - 4 = 3x + 1$	54. $-2(5d - 8) = 20$
55. $5(3r - 2) = 5(4r + 1)$	56. $-2(y - 1) = 4y - (y + 2)$