

Students entering Grade 8.

① Add Integers

Do all work on yellow math paper.
Write your answers in the spaces
on each sheet.

Add with **like signs**: $-1 + -3$.

- Add the absolute value of the addends.

$$|-1| + |-3| = 1 + 3 = 4$$

- Use the sign of the addends for the sum.

$$-1 + -3 = -4$$

Add with **unlike signs**: $-6 + +3$.

- Subtract the absolute values.

$$|-6| - |+3| = 6 - 3 = 3$$

- Use the sign of the addend with the greater absolute value for the sum.

$$-6 + +3 = -3$$

Add.

- | | | |
|------------------------|-------------------------|------------------------|
| 1. $+6 + +6 =$ _____ | 2. $+3 + +5 =$ _____ | 3. $-4 + -5 =$ _____ |
| 4. $-1 + -1 =$ _____ | 5. $-3 + -6 =$ _____ | 6. $+9 + +9 =$ _____ |
| 7. $-20 + -42 =$ _____ | 8. $+17 + +5 =$ _____ | 9. $+11 + +12 =$ _____ |
| 10. $-5 + +7 =$ _____ | 11. $-4 + +3 =$ _____ | 12. $+5 + -5 =$ _____ |
| 13. $+1 + -11 =$ _____ | 14. $-8 + +4 =$ _____ | 15. $+13 + -6 =$ _____ |
| 16. $-4 + +6 =$ _____ | 17. $-15 + +16 =$ _____ | 18. $-23 + +7 =$ _____ |

② Subtract Integers

Subtract: $-6 - +7$.

- Find the opposite of the subtrahend.
- Rewrite as an addition sentence. Then add.

$$-6 - +7 = n$$

$$\longrightarrow -6 + -7 = -13$$

$$n = -13$$

Subtracting an integer is the same as
adding the opposite of that integer.

Subtract.

- | | | |
|-------------------------|------------------------|-------------------------|
| 1. $+10 - +5 =$ _____ | 2. $-4 - -4 =$ _____ | 3. $-9 - -15 =$ _____ |
| 4. $+7 - -8 =$ _____ | 5. $+7 - +10 =$ _____ | 6. $-10 - -12 =$ _____ |
| 7. $+12 - -16 =$ _____ | 8. $-13 - +11 =$ _____ | 9. $-5 - -4 =$ _____ |
| 10. $-5 - -10 =$ _____ | 11. $-6 - -8 =$ _____ | 12. $+6 - +4 =$ _____ |
| 13. $+7 - -17 =$ _____ | 14. $+4 - +9 =$ _____ | 15. $-8 - -7 =$ _____ |
| 16. $+5 - -8 =$ _____ | 17. $-9 - -16 =$ _____ | 18. $+10 - -10 =$ _____ |
| 19. $+17 - +15 =$ _____ | 20. $-6 - +56 =$ _____ | 21. $-1 - -5 =$ _____ |

③ Multiply Integers

The product of two integers is *positive* if they have *like* signs.

$$\begin{aligned} +4 \times +2 &= +8 \\ -4 \times -2 &= +8 \end{aligned}$$

The product of two integers is *negative* if they have *unlike* signs.

$$\begin{aligned} -4 \times +2 &= -8 \\ +4 \times -2 &= -8 \end{aligned}$$

The product of two integers is *zero* if one or both is *zero*.

$$\begin{aligned} 0 \times -4 &= 0 \\ 0 \times +4 &= 0 \\ 0 \times 0 &= 0 \end{aligned}$$

Find the product.

1. $-5 \times +3$ _____
2. -6×0 _____
3. $+11 \times -3$ _____
4. -8×-5 _____
5. $-5 \times +5$ _____
6. $+3 \times +3$ _____
7. -5×-5 _____
8. $0 \times +2$ _____
9. -8×-3 _____
10. $+9 \times +3$ _____
11. $-3 \times +5$ _____
12. $+10 \times +3$ _____
13. $-16 \times +9$ _____
14. $+12 \times -18$ _____
15. $+5 \times +24$ _____
16. -13×-14 _____
17. $+11 \times -12$ _____
18. -36×0 _____
19. -12×-12 _____
20. $0 \times +48$ _____

④ Divide Integers

The quotient of two integers is *positive* if the integers have *like* signs.

$$\begin{aligned} +18 \div +9 &= +2 \\ -18 \div -9 &= +2 \end{aligned}$$

The quotient of two integers is *negative* if the integers have *unlike* signs.

$$\begin{aligned} -14 \div +2 &= -7 \\ +14 \div -2 &= -7 \end{aligned}$$

The quotient of two integers is *zero* if the dividend is *zero*.

$$\begin{aligned} 0 \div +8 &= 0 \\ 0 \div -8 &= 0 \\ 0 \div 0 &\text{ is impossible.} \end{aligned}$$

Find each quotient.

1. $+24 \div -8$ _____
2. $-20 \div -2$ _____
3. $+36 \div -9$ _____
4. $-32 \div -4$ _____
5. $-48 \div +6$ _____
6. $0 \div -1$ _____
7. $+10 \div -2$ _____
8. $+99 \div 0$ _____
9. $\frac{-16}{-4}$ _____
10. $\frac{+72}{-9}$ _____
11. $\frac{0}{-10}$ _____
12. $\frac{-50}{-5}$ _____
13. $\frac{-64}{+8}$ _____
14. $\frac{-54}{-9}$ _____
15. $\frac{-1}{0}$ _____
16. $\frac{-85}{+5}$ _____

5) Adding and Subtracting Mixed Numbers

Find each sum or difference. Reduce to lowest terms.

Example:

$$1\frac{1}{2} + 2\frac{3}{4} = \frac{3}{2} + \frac{11}{4} = \frac{6}{4} + \frac{11}{4} = \frac{17}{4} = 4\frac{1}{4}$$

1. $5\frac{3}{4} + 6\frac{1}{3}$

= _____

2. $4\frac{5}{12} - 3\frac{2}{3}$

= _____

3. $-4\frac{3}{10} + 7\frac{3}{4}$

= _____

4. $-4 - 2\frac{4}{7}$

= _____

5. $3\frac{3}{5} - \frac{2}{3}$

= _____

6. $3\frac{5}{9} - (-3\frac{2}{5})$

= _____

7. $4\frac{1}{3} - 1\frac{1}{3}$

= _____

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

= _____

6) Fractions, Decimals, and Percents

Complete the table.

	Fraction	Decimal	Percent
1.	$\frac{1}{8}$		
2.		0.17	
3.			63%
4.		0.53	
5.	$\frac{7}{20}$		
6.			80%
7.		1.25	
8.	$\frac{1}{3}$		



Proportions

Solve for x.

Proportions are equivalent ratios, or fractions. Cross multiply to solve.

Example:

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

$$\frac{3}{4} \times \frac{x}{20}$$

$$\begin{aligned} 3 \cdot 20 &= 4 \cdot x \\ 60 &= 4x \\ 15 &= x \end{aligned}$$

1. $\frac{1}{2} = \frac{x}{16}$

x = _____

2. $\frac{4}{5} = \frac{x}{65}$

x = _____

3. $\frac{6}{9} = \frac{4}{x}$

x = _____

4. $\frac{8}{12} = \frac{x}{15}$

x = _____

5. $\frac{10}{18} = \frac{x}{27}$

x = _____

6. $\frac{12}{60} = \frac{10}{x}$

x = _____

7. $\frac{100}{x} = \frac{90}{45}$

x = _____

8. $\frac{8}{15} = \frac{x}{45}$

x = _____

9. $\frac{8}{x} = \frac{12}{27}$

x = _____

10. $\frac{4}{9} = \frac{40}{x}$

x = _____



Solving Inequalities Using Multiplication and Division

Solve each inequality.

Examples:

When multiplying or dividing by a negative number, remember to reverse the inequality symbol.

$$\begin{aligned} -4x &< 20 \\ \frac{-4x}{-4} &> \frac{20}{-4} \\ x &> -5 \end{aligned}$$

$$\begin{aligned} 5m &> -3 \\ \frac{5m}{5} &> \frac{-3}{5} \\ m &> \frac{-3}{5} \end{aligned}$$

1. $6x \geq -24$

2. $-4m < 32$

3. $-5y \leq -25$

4. $20p > -400$

5. $-x < \frac{1}{4}$

6. $-3y \geq \frac{3}{8}$

7. $9x \leq -6.3$

8. $27 < -10n + n$

9 Solving Two-Step Equations

Solve each equation.

Example:

$$\begin{aligned}6x + 36 &= 144 \\6x + 36 - 36 &= 144 - 36 \\ \frac{6x}{6} &= \frac{108}{6} \\ x &= 18\end{aligned}$$

1. $7y - 13 = 50$

$y =$ _____

2. $5x + 43 = 68$

$x =$ _____

3. $3p - 6 = 9$

$p =$ _____

4. $0.8c + 3.4 = 7.2$

$c =$ _____

5. $m + \frac{4}{6} = -4$

$m =$ _____

6. $\frac{x}{8} + 10 = 13$

$x =$ _____

7. $49 = 7(y - 7)$

$y =$ _____

8. $3p + 5 = -37$

$p =$ _____

10 Solving Multi-Step Equations

Solve each equation.

1. $19x - 13x = 12$

$x =$ _____

2. $15y = 3(y + 8)$

$y =$ _____

3. $a + \frac{8}{4} = 20$

$a =$ _____

4. $7p + 8 = 3p - 12$

$p =$ _____

5. $\frac{7}{9}y + 2 = \frac{5}{9}y + 6$

$y =$ _____

6. $3(x + 4) + 6x = 66$

$x =$ _____

7. $7y - 4 = 5y + 14$

$y =$ _____

8. $12m - 6 + 4(3m) = 90$

$m =$ _____

(11)

Polynomials

Simplify.

Example:

$$\begin{aligned} &4a^5b^3 + 3ab^2 - 2a^5b^3 - 5ab^2 \\ &= (4 - 2)a^5b^3 + (3 - 5)ab^2 \\ &= 2a^5b^3 - 2ab^2 \end{aligned}$$

1. $2y - 5y^3 - 32 - 8y^3$

2. $8n^3 - n - n^3 - 8$

3. $6y^2 + 5y^2 - 4$

4. $4c^4 - 2c + 2c + c^4$

5. $7x^3 + 6xy^2 - 2x^3 - 3xy^2$

6. $-9a^2b^2 + 3ab - 6a^2b^2 - 5ab$

7. $3xy^2 + 4xy - 10xy^2 + xy$

8. $3m^2n^2 - m^2 + m^3 - 2 - 2m^2n^2$

9. $4x^2y + xy - 4x^2y - xy + 3x^2y$

(12)

Multiplying Monomials

Multiply.

Example:

$$\begin{aligned} 3x(4x + 5) &= (3x)(4x) + (3x)(5) \\ &= 12x^2 + 15x \end{aligned}$$

1. $6c(5c + 3)$

2. $4m^2(-3m^3 + 2)$

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

4. $-m^2(6m^2 + n)$

5. $2y(4y^2 + 5y - 2)$

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

7. $3x^5(x^4 - 2x^3 - x)$

8. $-2n^3(n^4 + 2n^3 - n^2 - n)$

9. $3a^2(-a^2b + b^2 - 6ab)$

10. $5x(-y^4 - xy^2 + 5x)$