

# AMS SUMMER MATH PACKET

## *SUMMER MATH PACKET DIRECTIONS*

You are expected to complete this Summer Math Packet to be best prepared for your math class when you return to school. The completed math packet is due the first day of school.

### DIRECTIONS:

Complete each problem on all of the pages of the packet.

Complete all work neatly and organized on the packet page. If you need additional work space, please neatly label and organize your scrap paper.

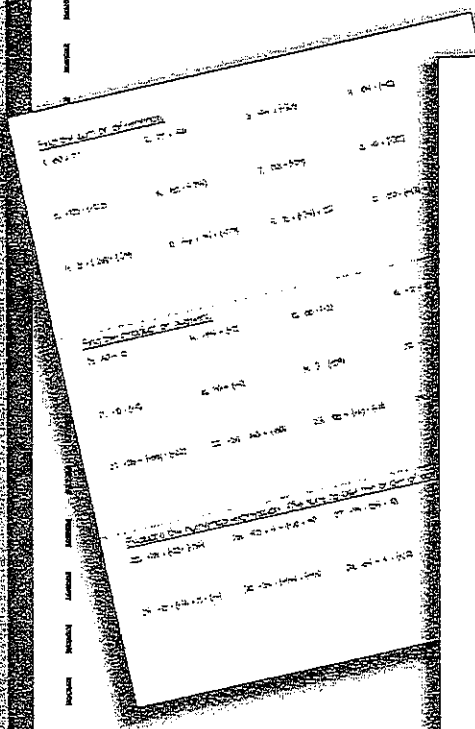
The Summer Math Packet itself will be considered the first math assignment for the new school year and will be graded accordingly.

It is best that you do not use calculators when completing your work in order to strengthen your math fact fluency.

The follow up Summer Math Packet quiz/assessment will not allow calculator use.



# Math Review Packet for 7th — 8th Grade



### Operations with Integers

#### Adding Integers

- INTERNAL (ADDING):** Add the absolute values of the two numbers and take the greater sign.
- EXTERNAL (POSITIVE + POSITIVE):** Subtract the absolute values of the two numbers (larger minus smaller) and take the sign of the number with the greater absolute value.

Examples:

- ac  $2 + 4 \Rightarrow 2 + 4 = 6 \Rightarrow 6$  answer  $\oplus$
- ac  $7 + 2 \Rightarrow 7 + 2 = 9 \Rightarrow 9$  answer  $\oplus$
- ac  $1 + 2 \Rightarrow 1 + 2 = 3 \Rightarrow 3$  answer  $\oplus$
- ac  $3 + 4 \Rightarrow 3 + 4 = 7 \Rightarrow 7$  answer  $\oplus$
- ac  $5 + 6 \Rightarrow 5 + 6 = 11 \Rightarrow 11$  answer  $\oplus$
- ac  $8 + 9 \Rightarrow 8 + 9 = 17 \Rightarrow 17$  answer  $\oplus$
- ac  $10 + 11 \Rightarrow 10 + 11 = 21 \Rightarrow 21$  answer  $\oplus$
- ac  $12 + 13 \Rightarrow 12 + 13 = 25 \Rightarrow 25$  answer  $\oplus$
- ac  $14 + 15 \Rightarrow 14 + 15 = 29 \Rightarrow 29$  answer  $\oplus$
- ac  $16 + 17 \Rightarrow 16 + 17 = 33 \Rightarrow 33$  answer  $\oplus$
- ac  $18 + 19 \Rightarrow 18 + 19 = 37 \Rightarrow 37$  answer  $\oplus$
- ac  $20 + 21 \Rightarrow 20 + 21 = 41 \Rightarrow 41$  answer  $\oplus$
- ac  $22 + 23 \Rightarrow 22 + 23 = 45 \Rightarrow 45$  answer  $\oplus$
- ac  $24 + 25 \Rightarrow 24 + 25 = 49 \Rightarrow 49$  answer  $\oplus$
- ac  $26 + 27 \Rightarrow 26 + 27 = 53 \Rightarrow 53$  answer  $\oplus$
- ac  $28 + 29 \Rightarrow 28 + 29 = 57 \Rightarrow 57$  answer  $\oplus$
- ac  $30 + 31 \Rightarrow 30 + 31 = 61 \Rightarrow 61$  answer  $\oplus$
- ac  $32 + 33 \Rightarrow 32 + 33 = 65 \Rightarrow 65$  answer  $\oplus$
- ac  $34 + 35 \Rightarrow 34 + 35 = 69 \Rightarrow 69$  answer  $\oplus$
- ac  $36 + 37 \Rightarrow 36 + 37 = 73 \Rightarrow 73$  answer  $\oplus$
- ac  $38 + 39 \Rightarrow 38 + 39 = 77 \Rightarrow 77$  answer  $\oplus$
- ac  $40 + 41 \Rightarrow 40 + 41 = 81 \Rightarrow 81$  answer  $\oplus$
- ac  $42 + 43 \Rightarrow 42 + 43 = 85 \Rightarrow 85$  answer  $\oplus$
- ac  $44 + 45 \Rightarrow 44 + 45 = 89 \Rightarrow 89$  answer  $\oplus$
- ac  $46 + 47 \Rightarrow 46 + 47 = 93 \Rightarrow 93$  answer  $\oplus$
- ac  $48 + 49 \Rightarrow 48 + 49 = 97 \Rightarrow 97$  answer  $\oplus$
- ac  $50 + 51 \Rightarrow 50 + 51 = 101 \Rightarrow 101$  answer  $\oplus$

#### Subtracting Integers

- When the first number is positive, change the subtraction sign to an addition sign and change the sign of the second number. Then use the integer addition rules.

Examples:

- ac  $2 - 3 \Rightarrow 2 + 3 = 5$  answer  $\ominus$
- ac  $4 - 5 \Rightarrow 4 + 5 = 9$  answer  $\ominus$
- ac  $6 - 7 \Rightarrow 6 + 7 = 13$  answer  $\ominus$
- ac  $8 - 9 \Rightarrow 8 + 9 = 17$  answer  $\ominus$
- ac  $10 - 11 \Rightarrow 10 + 11 = 21$  answer  $\ominus$
- ac  $12 - 13 \Rightarrow 12 + 13 = 25$  answer  $\ominus$
- ac  $14 - 15 \Rightarrow 14 + 15 = 29$  answer  $\ominus$
- ac  $16 - 17 \Rightarrow 16 + 17 = 33$  answer  $\ominus$
- ac  $18 - 19 \Rightarrow 18 + 19 = 37$  answer  $\ominus$
- ac  $20 - 21 \Rightarrow 20 + 21 = 41$  answer  $\ominus$
- ac  $22 - 23 \Rightarrow 22 + 23 = 45$  answer  $\ominus$
- ac  $24 - 25 \Rightarrow 24 + 25 = 49$  answer  $\ominus$
- ac  $26 - 27 \Rightarrow 26 + 27 = 53$  answer  $\ominus$
- ac  $28 - 29 \Rightarrow 28 + 29 = 57$  answer  $\ominus$
- ac  $30 - 31 \Rightarrow 30 + 31 = 61$  answer  $\ominus$
- ac  $32 - 33 \Rightarrow 32 + 33 = 65$  answer  $\ominus$
- ac  $34 - 35 \Rightarrow 34 + 35 = 69$  answer  $\ominus$
- ac  $36 - 37 \Rightarrow 36 + 37 = 73$  answer  $\ominus$
- ac  $38 - 39 \Rightarrow 38 + 39 = 77$  answer  $\ominus$
- ac  $40 - 41 \Rightarrow 40 + 41 = 81$  answer  $\ominus$
- ac  $42 - 43 \Rightarrow 42 + 43 = 85$  answer  $\ominus$
- ac  $44 - 45 \Rightarrow 44 + 45 = 89$  answer  $\ominus$
- ac  $46 - 47 \Rightarrow 46 + 47 = 93$  answer  $\ominus$
- ac  $48 - 49 \Rightarrow 48 + 49 = 97$  answer  $\ominus$
- ac  $50 - 51 \Rightarrow 50 + 51 = 101$  answer  $\ominus$
- ac  $52 - 53 \Rightarrow 52 + 53 = 105$  answer  $\ominus$
- ac  $54 - 55 \Rightarrow 54 + 55 = 109$  answer  $\ominus$
- ac  $56 - 57 \Rightarrow 56 + 57 = 113$  answer  $\ominus$
- ac  $58 - 59 \Rightarrow 58 + 59 = 117$  answer  $\ominus$
- ac  $60 - 61 \Rightarrow 60 + 61 = 121$  answer  $\ominus$
- ac  $62 - 63 \Rightarrow 62 + 63 = 125$  answer  $\ominus$
- ac  $64 - 65 \Rightarrow 64 + 65 = 129$  answer  $\ominus$
- ac  $66 - 67 \Rightarrow 66 + 67 = 133$  answer  $\ominus$
- ac  $68 - 69 \Rightarrow 68 + 69 = 137$  answer  $\ominus$
- ac  $70 - 71 \Rightarrow 70 + 71 = 141$  answer  $\ominus$
- ac  $72 - 73 \Rightarrow 72 + 73 = 145$  answer  $\ominus$
- ac  $74 - 75 \Rightarrow 74 + 75 = 149$  answer  $\ominus$
- ac  $76 - 77 \Rightarrow 76 + 77 = 153$  answer  $\ominus$
- ac  $78 - 79 \Rightarrow 78 + 79 = 157$  answer  $\ominus$
- ac  $80 - 81 \Rightarrow 80 + 81 = 161$  answer  $\ominus$
- ac  $82 - 83 \Rightarrow 82 + 83 = 165$  answer  $\ominus$
- ac  $84 - 85 \Rightarrow 84 + 85 = 169$  answer  $\ominus$
- ac  $86 - 87 \Rightarrow 86 + 87 = 173$  answer  $\ominus$
- ac  $88 - 89 \Rightarrow 88 + 89 = 177$  answer  $\ominus$
- ac  $90 - 91 \Rightarrow 90 + 91 = 181$  answer  $\ominus$
- ac  $92 - 93 \Rightarrow 92 + 93 = 185$  answer  $\ominus$
- ac  $94 - 95 \Rightarrow 94 + 95 = 189$  answer  $\ominus$
- ac  $96 - 97 \Rightarrow 96 + 97 = 193$  answer  $\ominus$
- ac  $98 - 99 \Rightarrow 98 + 99 = 197$  answer  $\ominus$
- ac  $100 - 101 \Rightarrow 100 + 101 = 201$  answer  $\ominus$

#### Multiplying & Dividing Integers

- Ignore the sign and multiply or divide as usual. Then determine the sign of the answer using the following rules:

Examples:

- ac  $2 \times 3 \Rightarrow 2 \times 3 = 6 \Rightarrow 6$  answer  $\oplus$
- ac  $4 \times 5 \Rightarrow 4 \times 5 = 20 \Rightarrow 20$  answer  $\oplus$
- ac  $6 \times 7 \Rightarrow 6 \times 7 = 42 \Rightarrow 42$  answer  $\oplus$
- ac  $8 \times 9 \Rightarrow 8 \times 9 = 72 \Rightarrow 72$  answer  $\oplus$
- ac  $10 \times 11 \Rightarrow 10 \times 11 = 110 \Rightarrow 110$  answer  $\oplus$
- ac  $12 \times 13 \Rightarrow 12 \times 13 = 156 \Rightarrow 156$  answer  $\oplus$
- ac  $14 \times 15 \Rightarrow 14 \times 15 = 210 \Rightarrow 210$  answer  $\oplus$
- ac  $16 \times 17 \Rightarrow 16 \times 17 = 272 \Rightarrow 272$  answer  $\oplus$
- ac  $18 \times 19 \Rightarrow 18 \times 19 = 342 \Rightarrow 342$  answer  $\oplus$
- ac  $20 \times 21 \Rightarrow 20 \times 21 = 420 \Rightarrow 420$  answer  $\oplus$
- ac  $22 \times 23 \Rightarrow 22 \times 23 = 506 \Rightarrow 506$  answer  $\oplus$
- ac  $24 \times 25 \Rightarrow 24 \times 25 = 600 \Rightarrow 600$  answer  $\oplus$
- ac  $26 \times 27 \Rightarrow 26 \times 27 = 702 \Rightarrow 702$  answer  $\oplus$
- ac  $28 \times 29 \Rightarrow 28 \times 29 = 812 \Rightarrow 812$  answer  $\oplus$
- ac  $30 \times 31 \Rightarrow 30 \times 31 = 930 \Rightarrow 930$  answer  $\oplus$
- ac  $32 \times 33 \Rightarrow 32 \times 33 = 1056 \Rightarrow 1056$  answer  $\oplus$
- ac  $34 \times 35 \Rightarrow 34 \times 35 = 1190 \Rightarrow 1190$  answer  $\oplus$
- ac  $36 \times 37 \Rightarrow 36 \times 37 = 1332 \Rightarrow 1332$  answer  $\oplus$
- ac  $38 \times 39 \Rightarrow 38 \times 39 = 1482 \Rightarrow 1482$  answer  $\oplus$
- ac  $40 \times 41 \Rightarrow 40 \times 41 = 1640 \Rightarrow 1640$  answer  $\oplus$
- ac  $42 \times 43 \Rightarrow 42 \times 43 = 1806 \Rightarrow 1806$  answer  $\oplus$
- ac  $44 \times 45 \Rightarrow 44 \times 45 = 1980 \Rightarrow 1980$  answer  $\oplus$
- ac  $46 \times 47 \Rightarrow 46 \times 47 = 2162 \Rightarrow 2162$  answer  $\oplus$
- ac  $48 \times 49 \Rightarrow 48 \times 49 = 2352 \Rightarrow 2352$  answer  $\oplus$
- ac  $50 \times 51 \Rightarrow 50 \times 51 = 2550 \Rightarrow 2550$  answer  $\oplus$
- ac  $52 \times 53 \Rightarrow 52 \times 53 = 2756 \Rightarrow 2756$  answer  $\oplus$
- ac  $54 \times 55 \Rightarrow 54 \times 55 = 2970 \Rightarrow 2970$  answer  $\oplus$
- ac  $56 \times 57 \Rightarrow 56 \times 57 = 3192 \Rightarrow 3192$  answer  $\oplus$
- ac  $58 \times 59 \Rightarrow 58 \times 59 = 3422 \Rightarrow 3422$  answer  $\oplus$
- ac  $60 \times 61 \Rightarrow 60 \times 61 = 3660 \Rightarrow 3660$  answer  $\oplus$
- ac  $62 \times 63 \Rightarrow 62 \times 63 = 3918 \Rightarrow 3918$  answer  $\oplus$
- ac  $64 \times 65 \Rightarrow 64 \times 65 = 4192 \Rightarrow 4192$  answer  $\oplus$
- ac  $66 \times 67 \Rightarrow 66 \times 67 = 4482 \Rightarrow 4482$  answer  $\oplus$
- ac  $68 \times 69 \Rightarrow 68 \times 69 = 4692 \Rightarrow 4692$  answer  $\oplus$
- ac  $70 \times 71 \Rightarrow 70 \times 71 = 4970 \Rightarrow 4970$  answer  $\oplus$
- ac  $72 \times 73 \Rightarrow 72 \times 73 = 5268 \Rightarrow 5268$  answer  $\oplus$
- ac  $74 \times 75 \Rightarrow 74 \times 75 = 5586 \Rightarrow 5586$  answer  $\oplus$
- ac  $76 \times 77 \Rightarrow 76 \times 77 = 5928 \Rightarrow 5928$  answer  $\oplus$
- ac  $78 \times 79 \Rightarrow 78 \times 79 = 6294 \Rightarrow 6294$  answer  $\oplus$
- ac  $80 \times 81 \Rightarrow 80 \times 81 = 6580 \Rightarrow 6580$  answer  $\oplus$
- ac  $82 \times 83 \Rightarrow 82 \times 83 = 6836 \Rightarrow 6836$  answer  $\oplus$
- ac  $84 \times 85 \Rightarrow 84 \times 85 = 7116 \Rightarrow 7116$  answer  $\oplus$
- ac  $86 \times 87 \Rightarrow 86 \times 87 = 7422 \Rightarrow 7422$  answer  $\oplus$
- ac  $88 \times 89 \Rightarrow 88 \times 89 = 7764 \Rightarrow 7764$  answer  $\oplus$
- ac  $90 \times 91 \Rightarrow 90 \times 91 = 8142 \Rightarrow 8142$  answer  $\oplus$
- ac  $92 \times 93 \Rightarrow 92 \times 93 = 8556 \Rightarrow 8556$  answer  $\oplus$
- ac  $94 \times 95 \Rightarrow 94 \times 95 = 8910 \Rightarrow 8910$  answer  $\oplus$
- ac  $96 \times 97 \Rightarrow 96 \times 97 = 9306 \Rightarrow 9306$  answer  $\oplus$
- ac  $98 \times 99 \Rightarrow 98 \times 99 = 9742 \Rightarrow 9742$  answer  $\oplus$
- ac  $100 \times 101 \Rightarrow 100 \times 101 = 10140 \Rightarrow 10140$  answer  $\oplus$

#### Order of Operations

Remember:

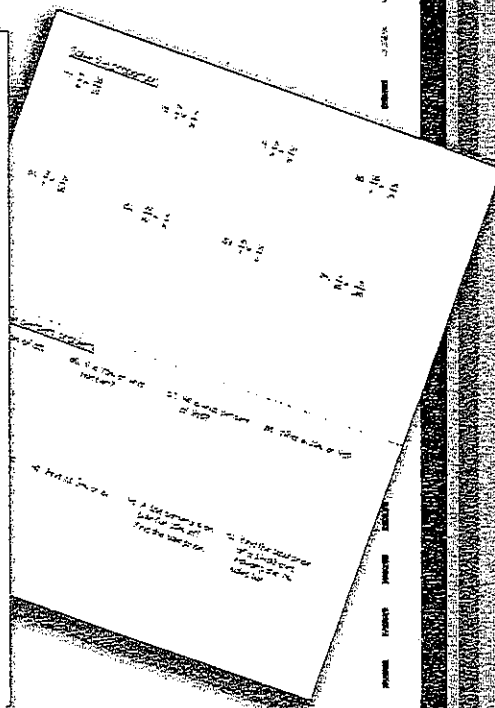
PEMDAS

1. PARENTHESIS

2. EXPONENTS

3. MULTIPLICATION & DIVISION (left to right)

4. ADDITION & SUBTRACTION (left to right)



Integers, Rational Numbers, Equations, Proportions, Percent, & Geometry



# Operations with Integers

## Adding Integers

- Negative + Negative: Add the absolute values of the two numbers and make the answer negative.

$$\text{ex: } -5 + (-9) \longrightarrow 5 + 9 = 14 \longrightarrow \text{answer: } (-14)$$

- Negative + Positive (or Positive + Negative): Subtract the absolute values of the two numbers (larger minus smaller) and take the sign of the number with the greater absolute value.

$$\text{ex: } -7 + 12 \longrightarrow 12 - 7 = 5 \longrightarrow 12 > 7, \text{ so answer is positive} \longrightarrow \text{answer: } (5)$$

$$\text{ex: } 6 + (-9) \longrightarrow 9 - 6 = 3 \longrightarrow 9 > 6, \text{ so answer is negative} \longrightarrow \text{answer: } (-3)$$

## Subtracting Integers

- Keep the first number the same, change the subtraction sign to an addition sign, and change the sign of the second number. Then use the integer addition rules.

$$\text{ex: } -3 - 9 \longrightarrow -3 + (-9) = (-12)$$

$$\text{ex: } 15 - (-8) \longrightarrow 15 + 8 = (23)$$

$$\text{ex: } -6 - (-4) \longrightarrow -6 + 4 = (-2)$$

## Multiplying & Dividing Integers

Ignore the signs and multiply or divide as usual. Then determine the sign of the answer using the following rules:

- Negative  $\cdot$  or  $\div$  Negative = Positive
- Negative  $\cdot$  or  $\div$  Positive (or Positive  $\cdot$  or  $\div$  Negative) = Negative

$$\text{ex: } -3 \cdot (-5) \longrightarrow 3 \cdot 5 = 15 \longrightarrow \text{neg} \cdot \text{neg} = \text{pos} \longrightarrow \text{answer: } (15)$$

$$\text{ex: } 48 \div (-6) \longrightarrow 48 \div 6 = 8 \longrightarrow \text{pos} \div \text{neg} = \text{neg} \longrightarrow \text{answer: } (-8)$$

## Order of Operations

Parentheses

Exponents

Multiplication & Division (left to right)

Addition & Subtraction (left to right)

Find the sum or difference.

1.  $-80 + 77$

2.  $77 + 160$

3.  $-64 + (-33)$

4.  $104 - (-92)$

5.  $-105 - (-122)$

6.  $185 - (-154)$

7.  $-53 - (-59)$

8.  $-6 + (-35)$

9.  $15 - (-26) - (-39)$

10.  $-93 + 191 + (-179)$

11.  $18 + (-34) + 52$

12.  $-50 - (-93) + (-17)$

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Find the product or quotient.

13.  $60 \div 12$

14.  $-194 \div (-2)$

15.  $88 \cdot (-2)$

16.  $-12 \cdot 10$

17.  $-10 \cdot (-11)$

18.  $90 \div (-6)$

19.  $3 \cdot (-59)$

20.  $-7 \cdot (-2)$

21.  $-28 \cdot (-22) \div (-88)$

22.  $-56 \cdot 140 \div (-80)$

23.  $108 \div (-12) \cdot (-12)$

24.  $-84 \cdot (-17) \div 42$

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Evaluate the numerical expression. (Be sure to use the order of operations!)

25.  $-78 + (-2) \cdot (-56)$

26.  $-65 + 6 \div (-3) + 40$

27.  $-94 - (84 - 10)$

28.  $43 + (-23) - (-57)$

29.  $-15 - (-11) + 5 \cdot (-4)$

30.  $-26 - (-64) + (-93)$

31.  $-84 \div 4 + (-20)$

32.  $-56 + (-50) + (-10) \cdot (-9)$

# Operations with Rational Numbers

## Adding & Subtracting Rational Numbers

Determine whether you should add or subtract using integer rules. Then add or subtract.

- Decimals: Line up the decimal points. Then add or subtract and bring the decimal point down. Use integer rules to determine the sign of the answer.

$$\text{ex: } -9.8 + 6.24 \longrightarrow \text{neg} + \text{pos: subtract} \longrightarrow \begin{array}{r} 9.80 \\ -6.24 \\ \hline 3.56 \end{array} \longrightarrow \text{answer: } (-3.56)$$

- Fractions/Mixed Numbers: Find a common denominator and then add or subtract. Borrow or convert an improper fraction answer, if necessary. Use integer rules to determine the sign of the answer.

$$\text{ex: } 5\frac{3}{4} - (-3\frac{7}{8}) \longrightarrow 5\frac{3}{4} + 3\frac{7}{8} \longrightarrow \text{pos} + \text{pos: add} \longrightarrow \begin{array}{r} 5\frac{3}{4} = \frac{6}{8} \\ + 3\frac{7}{8} = \frac{7}{8} \\ \hline 8\frac{13}{8} \end{array} \longrightarrow \text{answer: } (9\frac{5}{8})$$

## Multiplying & Dividing Rational Numbers

Determine the sign of the answer using integer rules. Then multiply or divide.

- Multiplying Decimals: Ignore the decimal points. Multiply the numbers. Then count the decimal places in the problem to determine the location of the decimal point in the answer.

$$\text{ex: } -9.23 \cdot (-1.1) \longrightarrow \text{neg} \cdot \text{neg} = \text{pos} \longrightarrow \begin{array}{r} 9.23 \\ \times 1.1 \\ \hline 923 \\ 9230 \\ \hline 10153 \end{array} \longrightarrow \text{answer: } (10.153)$$

- Dividing Decimals: Move the decimal in the divisor to the end of the number. Move the decimal in the dividend the same number of places and then bring it straight up in quotient.

$$\text{ex: } -5.2 \div 0.2 \longrightarrow \text{neg} \div \text{pos} = \text{neg} \longrightarrow 02 \overline{) 52} \longrightarrow \text{answer: } (-26)$$

- Multiplying Fractions: Convert mixed numbers to improper fractions. Then cross-simplify. Multiply the numerators and multiply the denominators. Simplify if necessary.

$$\text{ex: } -1\frac{3}{4} \cdot \frac{6}{14} \longrightarrow \text{neg} \cdot \text{pos} = \text{neg} \longrightarrow \frac{1\cancel{7}}{2\cancel{4}} \cdot \frac{\cancel{6}^3}{\cancel{14}_2} = \frac{3}{4} \longrightarrow \text{answer: } (-\frac{3}{4})$$

- Dividing Fractions: Convert mixed numbers to improper fractions. Then flip the second fraction to its reciprocal and multiply the two fractions. Simplify if necessary.

$$\text{ex: } -\frac{1}{2} \div (-\frac{3}{8}) \longrightarrow \text{neg} \div \text{neg} = \text{pos} \longrightarrow \frac{1}{\cancel{2}} \cdot \frac{\cancel{8}^4}{3} = \frac{4}{3} \longrightarrow \text{answer: } (1\frac{1}{3})$$

Find the sum, difference, product, or quotient.

33.  $38.61 + 36.841$

34.  $1.755 - 1.23$

35.  $0.71 \cdot 9.2$

36.  $13.12 \div 0.1$

37.  $3.651 - (-12.63)$

38.  $-3.9 + (-7.6)$

39.  $17.6 \cdot 4.3$

40.  $6 \cdot (-16.7)$

41.  $26.474 - 14.527$

42.  $-2.1 + 3.78$

43.  $-6.15 \div (-8.2)$

44.  $-12.8 \cdot (-4.88)$

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Find the sum, difference, product, or quotient.

45.  $15 \frac{1}{2} + 15 \frac{1}{4}$

46.  $18 \frac{11}{20} - 17 \frac{1}{2}$

47.  $2 \frac{1}{4} \cdot 1 \frac{4}{5}$

48.  $3 \frac{1}{2} \div 1 \frac{3}{7}$

49.  $3 \frac{1}{3} - 5 \frac{1}{9}$

50.  $5 \cdot (-1 \frac{2}{5})$

51.  $-4 \frac{2}{3} + (-1 \frac{3}{4})$

52.  $-\frac{5}{6} \div (-2 \frac{1}{6})$

53.  $9 \div (-4 \frac{1}{2})$

54.  $-18 + 3 \frac{4}{5}$

55.  $-5 \frac{2}{3} \cdot (-2 \frac{5}{6})$

56.  $-5 \frac{3}{4} - (-3 \frac{7}{8})$

# Solving Equations

## Solving One-Step Equations

- Cancel out the number on the same side of the equation as the variable by using the inverse operation. (Addition/Subtraction; Multiplication/Division). Be sure to do the same thing to both sides of the equation!

$$\text{ex: } 6x = -18 \rightarrow \frac{\cancel{6}x}{\cancel{6}} = \frac{-18}{6} \rightarrow \text{answer: } (x = -3)$$

$$\text{ex: } y + 23 = -9 \rightarrow y + \cancel{23} = -9 \rightarrow \text{answer: } (y = -32)$$

$\quad \quad \quad -23 \quad -23$

$$\text{ex: } \frac{h}{3} = 4 \rightarrow \cancel{3} \cdot \frac{h}{\cancel{3}} = 4 \cdot 3 \rightarrow \text{answer: } (h = 12)$$

$$\text{ex: } w - 13 = -5 \rightarrow w - \cancel{13} = -5 \rightarrow \text{answer: } (w = 8)$$

$\quad \quad \quad +13 \quad +13$

## Solving Two-Step Equations

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

$$\text{ex: } 7x - 4 = -32 \rightarrow 7x - \cancel{4} = -32 \rightarrow \frac{\cancel{7}x}{\cancel{7}} = \frac{-28}{7} \rightarrow \text{answer: } (x = -4)$$

$\quad \quad \quad +4 \quad +4$

$$\text{ex: } \frac{j}{5} + 13 = 15 \rightarrow \frac{j}{5} + \cancel{13} = 15 \rightarrow \cancel{5} \cdot \frac{j}{\cancel{5}} = 2 \cdot 5 \rightarrow \text{answer: } (j = 10)$$

$\quad \quad \quad -13 \quad -13$

$$\text{ex: } \frac{b + 7}{3} = -2 \rightarrow \cancel{3} \cdot \frac{b + 7}{\cancel{3}} = -2 \cdot 3 \rightarrow b + \cancel{7} = -6 \rightarrow \text{answer: } (b = -13)$$

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



Solve the one-step equation.

57.  $19 + j = -34$

58.  $m - 26 = 13$

59.  $\frac{x}{5} = -3$

60.  $12f = 216$

61.  $g - (-3) = -7$

62.  $\frac{h}{9} = 13$

63.  $b + (-3) = -9$

64.  $-4w = -280$

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Solve the two-step equation.

65.  $5m - 3 = 27$

66.  $7 + \frac{y}{2} = -3$

67.  $4 + 3r = -8$

68.  $\frac{1}{2}p - 4 = 7$

69.  $\frac{k+8}{3} = -2$

70.  $\frac{f}{5} - (-13) = 12$

71.  $-15 - \frac{g}{3} = -5$

72.  $-8 + 4m = 2$

73.  $-18 - \frac{3}{4}v = 3$

74.  $\frac{-5+n}{4} = -1$

75.  $3.5m + 0.75 = -6.25$

76.  $2y + 3 = 19$

## Proportions and Percent

### Solving Proportions

- Set cross-products equal to each other and then solve the one-step equation for the given variable.

ex:  $\frac{5}{b} = \frac{4}{10} \rightarrow 5 \cdot 10 = 4b \rightarrow \frac{50}{4} = \frac{4b}{4} \rightarrow$  answer:  $b = 12.5$

### Solving Percent Problems with Proportions

- Set up and solve a proportion as follows:  $\frac{\%}{100} = \frac{\text{part}}{\text{whole}}$

ex: 25 is what percent of 500?  $\rightarrow \frac{x}{100} = \frac{25}{500} \rightarrow$  answer:  $x = 5\%$

ex: What is 15% of 88?  $\rightarrow \frac{15}{100} = \frac{x}{88} \rightarrow$  answer:  $x = 13.2$

ex: 18 is 30% of what number?  $\rightarrow \frac{30}{100} = \frac{18}{x} \rightarrow$  answer:  $x = 60$

### Solving Percent Problems with Equations

- Translate the question to an equation and then solve. (Be sure to convert percents to decimals or fractions.)

ex: 20 is 40% of what number?  $\rightarrow 20 = 0.4x \rightarrow$  answer:  $x = 50$

ex: 8 is what percent of 32?  $\rightarrow 8 = 32x \rightarrow x = 0.25 \rightarrow$  answer:  $25\%$

ex: What is 25% of 88?  $\rightarrow x = 0.25 \cdot 88 \rightarrow$  answer:  $x = 22$

### Real-World Percent Problems

*(This is just one way of many to solve real-world percent problems)*

- Tax:** Find the amount of tax using a proportion or equation. Then add the tax to the original amount to find the total cost.
- Discount:** Find the amount of the discount using a proportion or equation. Then subtract the amount of discount from the original price to find the sale price.

Solve the proportion.

77.  $\frac{h}{6} = \frac{20}{24}$

78.  $\frac{5}{7} = \frac{c}{14}$

79.  $\frac{6}{8} = \frac{21}{b}$

80.  $\frac{30}{j} = \frac{26}{39}$

81.  $\frac{5}{k} = \frac{15}{20}$

82.  $\frac{32}{112} = \frac{a}{14}$

83.  $\frac{16}{7} = \frac{16}{g}$

84.  $\frac{w}{60} = \frac{15}{200}$

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Solve the percent problem.

85. Find 15% of 85.

86. 6 is 75% of what number?

87. 40 is what percent of 320?

88. What is 20% of 45?

89. 70 is what percent of 350?

90. Find 33.3% of 81.

91. A \$58 camera is on sale for 20% off. Find the sale price.

92. Find the total price of a \$14.00 shirt including the 7% sales tax.

# Geometry

## Geometry Basics

- Perimeter is the distance around a polygon
- Circumference is the distance around a circle
- Area is the space inside a figure
- Volume is the capacity of a 3-dimensional figure
- Surface Area is the sum of the areas of all the faces on a 3-dimensional figure

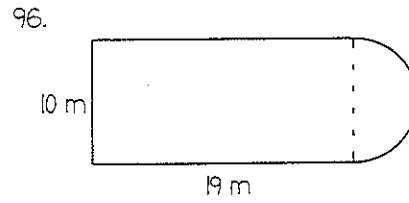
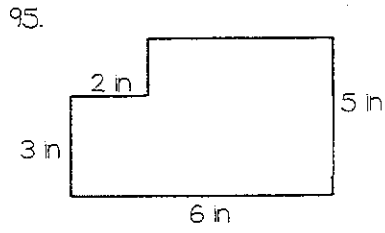
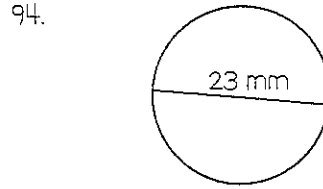
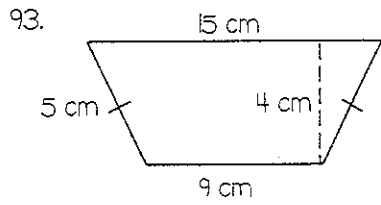
## 2-Dimensional Geometry Formulas

- Perimeter of Any Figure: sum of side lengths
- Circumference =  $\pi \cdot \text{diameter}$
- Area of Parallelogram =  $\text{base} \cdot \text{height}$
- Area of Triangle =  $\frac{1}{2} \cdot \text{base} \cdot \text{height}$
- Area of Trapezoid =  $\frac{1}{2} \cdot \text{height}(\text{base}_1 + \text{base}_2)$
- Area of Circle =  $\pi \cdot \text{radius}^2$

## 3-Dimensional Geometry Formulas

- Volume of Rectangular Prism =  $\text{length} \cdot \text{width} \cdot \text{height}$
- Volume of Cylinder =  $\pi \cdot \text{radius}^2 \cdot \text{height}$
- Surface Area of Rectangular Prism =  $2 \cdot \text{length} \cdot \text{width} + 2 \cdot \text{length} \cdot \text{height} + 2 \cdot \text{height} \cdot \text{width}$
- Surface Area of Cylinder =  $2 \cdot \pi \cdot \text{radius}^2 + 2 \cdot \pi \cdot \text{radius} \cdot \text{height}$

Find the perimeter (or circumference) and area. Use 3.14 for pi.



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Find the surface area and volume.

