

Level 2

Decimals, Fractions, Ratios, Rates,
Percent, Comparing Integers, Coordinate
Plane, Perimeter, Area, Volume, Evaluating
Expressions, One-Step Equations, \$
Problem Solving

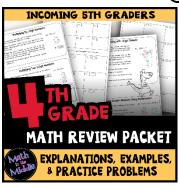
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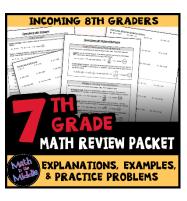
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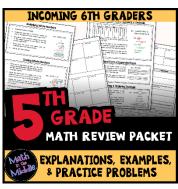
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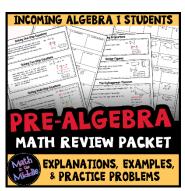
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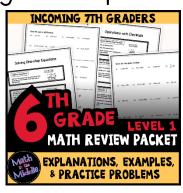
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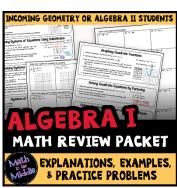












Adding & Subtracting Decimals

- I. Write the problem vertically, lining up the decimal points.
- 2. Add additional zeroes at the end, if necessary, to make the numbers have the same number of decimal places.
- 3. Add/subtract as if the numbers are whole numbers
- 4. Bring the decimal point straight down

ex: 14.2 - 7.934

14.2<mark>00</mark> 7.934 6:266

Multiplying Decimals

- I. Write the problem vertically with the numbers lined up to the right. The decimal points do NOT need to be lined up.
- 2. Ignore the decimals and multiply as if the numbers are whole numbers.
- 3. Count the total number of decimal places in the factors and put a decimal point in the product so that it has that same number of decimal places.

ex: 6.94 x 7.8

Dividing Decimals

- I. Write the dividend under the long division symbol and the divisor to the left of it.
- 2. Move the decimal point in the divisor after the number to turn it into a whole number and then move the decimal in the dividend the same number of places. Then bring it up.
- 3. Divide as if the numbers are both whole numbers.
- 4. Annex zeros in the dividend as needed until there is no remainder. If your answer is a repeating decimal, write the answer using bar notation.

ex: $25.3 \div 0.3$

Order of Operations

- I. Grouping Symbols (parentheses, brackets, etc.)
- 2. Exponents
- 3. Multiplication \mathcal{E} Division (left to right)
- 4. Addition ε Subtraction (left to right)

ex: 5 + 4(3 - 1.2)

5 + 4(1.8)

5 + 7.2

12.2

Evaluate each expression.

Evaluate each expression.				
I. 5.983 + 2.99	2. 224 - 56.73	3. 6.12 - 4.923		
4. 24.5 · 3.2	5. 0.23 · 7	6. 3.86 • 9.15		
7. I4.8 ÷ 5	8. 46.3 ÷ 1.5	9. 147 ÷ 2.25		
10. 24.33 - 2.5 - 7	II. 3.9 + 4.5 ²	12. 9.25(18.4 - 2 - 1.2)		

Solve each word problem, showing all work.

	13.	Jeff had \$46.18 in his wallet Monday morning.
l		He gave half of his money to his brother. He
		then bought two donuts for \$0.75 each and a
		cup of coffee for \$2.99. How much money did
		Jeff have left?

14. Five friends split a \$65.20 bill at a restaurant. They also each left \$2.75 for the tip. How much money did each person pay in all?

Adding Fractions & Mixed Numbers

I. Find a common denominator for the two fractions.

ex:
$$3\frac{3}{4} + 2\frac{1}{2}$$

2. Add the two numerators and keep the denominator the same.

 $3\frac{3}{4} = 3\frac{3}{4}$ $2\frac{1}{2} = 2\frac{2}{4}$

3. Add the whole numbers.

 $5\frac{5}{4} = 6\frac{1}{4}$

4. Simplify the answer and/or change improper fraction answers to mixed numbers.

Subtracting Fractions & Mixed Numbers

- I. Find a common denominator for the two fractions.
- 2. Subtract the two numerators and keep the denominators the same. If the top numerator is smaller than the bottom numerator, borrow from the whole number and rename the top fraction.
- 3. Subtract the whole numbers.
- 4. Simplify the answer.

ex:
$$5\frac{1}{4} - 1\frac{2}{3}$$

$$- 5\frac{1}{4} = 5\frac{3}{12} = 4\frac{15}{12}$$

$$- 1\frac{2}{3} = 1\frac{8}{12} = 1\frac{8}{12}$$

 $3\frac{7}{12}$

Multiplying Fractions & Mixed Numbers

1. Turn any mixed numbers and whole numbers into improper fractions.

ex:
$$2\frac{1}{6} \cdot \frac{4}{7}$$

- 2. Cross-simplify if possible.
- 3. Multiply the numerators and then multiply the denominators
- 4. Simplify the answer and/or change improper fraction answers to mixed numbers.

$$\frac{13}{3\%} \cdot \frac{\cancel{4}}{7} = \frac{26}{21} = \boxed{1\frac{5}{21}}$$

Dividing Fractions & Mixed Numbers

- 1. Turn any mixed numbers and whole numbers into improper fractions.
- ex: $7 \div 1\frac{3}{11}$
- 2. Keep the first fraction the same, change the division to multiplication, and flip the second fraction to its reciprocal.

 $\frac{7}{1} \div \frac{7}{4}$

3. Multiply the fractions.

- $\frac{1}{7} \cdot \frac{4}{7} = \frac{4}{1} = 4$
- 4. Simplify the answer and/or change improper fraction answers to mixed numbers.

Evaluate each expression.

Evaluate each expression.				
15. $\frac{4}{5} + \frac{3}{4}$	16.4 \frac{2}{7} + 2 \frac{9}{14}	17. 8 1 + 9 5 18		
18. $6 - \frac{3}{8}$	19. $8\frac{3}{5} - 2\frac{1}{3}$	20. $4\frac{1}{6} - \frac{8}{9}$		
21. 4/25 · 15/16	22. 2 ³ / ₄ · 8	23. 6 \frac{5}{8} \cdot 3 \frac{1}{2}		
$24.\frac{7}{9} \div \frac{2}{3}$	25. 4/5 ÷ 10	26. $5\frac{2}{3} \div 2\frac{5}{6}$		

Solve each word problem, showing all work.

27. Jaimie ran 3 ½ miles on Monday. She ran half as far on Tuesday as she did on Monday. How far did Jaimie run in all on Monday and Tuesday?	28. A $5\frac{1}{2}$ quart pot is filled $\frac{2}{3}$ of the way with water. How many more quarts of water can the pot hold?
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Ratios

Ratios are comparisons of two quantities. There are 3 different ways to write ratios:

- Fraction $\left(\frac{A}{B}\right)$
- Word Form (A to B)

- Colon (A:B)

ex: write the ratio of triangles to circles in 3 ways: $\triangle \triangle \triangle \triangle \bigcirc \bigcirc$

$$\frac{4}{2} = \frac{2}{1}$$
, 2:1, 2 to 1

Ratios can be simplified just like fractions.

Rates & Unit Rates

Rates are ratios that compare quantities measured in different units. A unit rate is a rate with a denominator of 1.

To convert a rate to a unit rate:

- 1. Divide the numerator by the denominator
- 2. Either write your answer as a fraction with a label for the both the numerator and denominator OR as one number labeled with the first unit "per" the second unit

ex: express as a unit rate: 125 miles in 4 hours

$$\frac{125 \text{ mi}}{4 \text{ hr}}$$
 $125 \div 4 = 31.25$

 $\frac{31.25 \text{ mi}}{1 \text{ hr}}$ or 31.25 miles per hr

Fractions, Decimals, & Percent

To convert a:

- Decimal to Percent: move the decimal point 2 places to the right
- Percent to Decimal: move the decimal point 2 places to the left
- Decimal to Fraction: write the decimal over the place value of the last digit and then simplify
- Fraction to Decimal: divide the numerator by the denominator
- Percent to Fraction: write the percent over 100 and then simplify
- Fraction to Percent: convert the fraction to a decimal and then convert the decimal to a percent

ex:
$$0.345 = 34.5\%$$

ex:
$$7\% = 0.07$$

ex:
$$0.008 = \frac{8}{1000} = \boxed{\frac{1}{125}}$$

ex:
$$\frac{1}{5} = 5$$
 1.0

ex:
$$45\% = \frac{45}{100} = \boxed{\frac{9}{20}}$$

ex:
$$\frac{3}{10} = 0.3 = \boxed{30\%}$$

Percent of a Number

- 1. Turn the percent to a fraction or decimal.
- 2. Multiply the fraction/decimal by the number.

$$0.18 \cdot 40 = 7.2$$

Write each ratio in 3 ways.					
29. A bank contains 15 pennies and 12 nickels. Write the ratio of nickels to pennies.		there are	ntains 6 apples and some bananas. If a total of 10 pieces of fruit, find the oples to bananas.		
Convert each rate to a unit ra	te.				
31. \$4.25 for 64 fluid ounces	32. 297 miles on 11 g	allons of gas	33. 124 feet in 10 seconds		
Complete the chart by conver	ting each number to	o a percent, fr	action, and/or decimal.		
Fraction	De	cimal	Percent		
$\frac{3}{8}$					
35.	0	.45			
36.			72%		
37.		0.1			
38. $\frac{3}{200}$					
Find each percent of a number.					
39. 30% of 90	40. 15% of 38		41. 50% of 86		

43. 24% of 35

44. 2% of 74

42. 75% of 160

Comparing Integers

Integers are numbers without fractional parts. They can be positive, negative, or zero. The further right a number is on the number line, the greater it is.

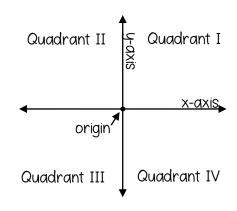


The absolute value of a number is the distance the number is from zero.

ex: compare with <, >, or =

-7
$$\bigcirc$$
 $|-q| \leftarrow$ The absolute value of $-q = q$

The Coordinate Plane

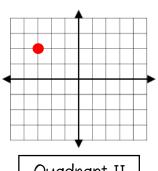


Ordered Pair: (x, y)

To graph a point on the coordinate plane, start at the origin. The first number in the ordered pair (the x-coordinate) tells you how far left (if negative) or right (if positive) to move. The second number (the y-coordinate) tells you how far up (if positive) or down (if negative) to move.

ex: Graph the point (-3, 2) and state the quadrant in which it is located.

Start at the origin, and move LEFT 3 and UP 2

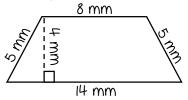


Quadrant II

Perimeter, Area and Volume

- Perimeter of Any Polygon: add all side lengths
- Area of a Rectangle: A = lw
- Area of Parallelogram: A = bh
- Area of Triangle: $A = \frac{1}{2}bh$
- Area of Trapezoid: $A = \frac{1}{2}h(b_1 + b_2)$
- Volume of Rectangular Prism: V = lwh

ex: Find the perimeter \mathcal{E} area:



Perimeter: P = 5 + 8 + 5 + 14 = 32 mm

Area: This is a trapezoid, so use the area of a trapezoid formula: $A = \frac{1}{2}h(b_1 + b_2)$

The bases are the sides that are parallel, and the height is perpendicular to the bases.

$$\Rightarrow$$
 A = $\frac{1}{2}$ (4)(8+14) = 44 mm²

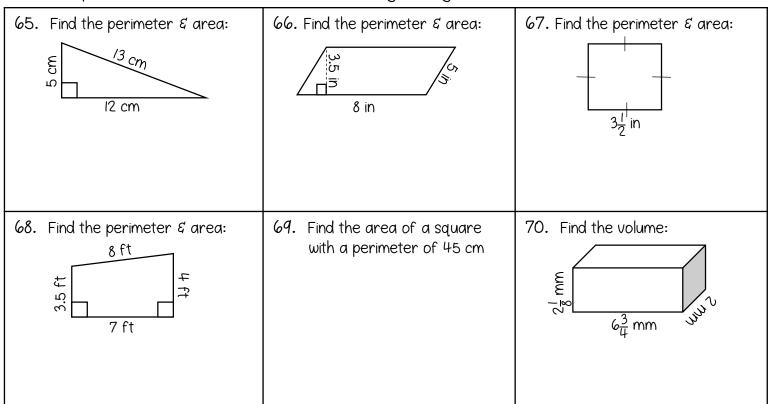
Compare the integers with <, >, or =.

454 -5	46. 2 -2	47. -5 5	487 () 6	4913 -9
50. -7 -6	5117 -14	52. -3 -2	53. 0 -6	54. -4 6

Graph and label each of the ordered pairs in the coordinate plane. Then state the quadrant or axis in/on which the point is located.

	en the point is located:					
55. A(2, 4)	56. B(0, -3)			_		
				$\top \mathbf{f}$		
57. C(I, -I)	58. D(3, 3)					
59. E(-4, I)	60. F(2,0)					•
		_				
61. G(-3, -2)	62. H(-2, 3)		\perp			
63. I(0, 2)	64. J(-1, -4)			$\perp \downarrow$		
				7		

Find the perimeter, area, and/or volume of the given figure.



Evaluating Algebraic Expressions

- 1. Substitute the given numbers for the variables
- 2. Evaluate the expression using the order of operations

ex: evaluate x + 4y for $x = 4 \ \xi \ y = 6$

$$4 + 4(6)$$

 $4 + 24 = 28$

One-Step Addition & Subtraction Equations

- <u>Addition Equations</u>: Subtract the number being added to the variable from both sides of the equation

$$ex: \frac{4}{4} + x = \frac{18}{4}$$
 $x = \frac{14}{4}$

- <u>Subtraction Equations</u>: Add the number being subtracted from the variable to both sides of the equation

ex:
$$20 = a - 5$$

 $+5$
 $25 = a \rightarrow a = 25$

One-Step Multiplication & Division Equations

- <u>Multiplication Equations</u>: Divide both sides of the equation by the number next to the variable

$$ex: \frac{7b}{7} = \frac{28}{7}$$

$$\boxed{b = 4}$$

- <u>Division Equations</u>: Multiply both sides of the equation by the number under the variable

ex:
$$\frac{n}{5} = 10 \cdot 5$$

Problem Solving

- 1. Read the problem. Identify the question that is being asked and the key information in the problem.
- 2. Plan how you are going to solve the problem and estimate the answer.
- 3. Solve the problem using the strategy of your choice.
- 4. Check your answer. Make sure your answer is reasonable and compare it to your estimate. Label your answer with appropriate units.

Evaluate each expression for a = 5, b = 12, c = 10, \mathcal{E} d = 2.

2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2				
71. 2b - a	72. d(ab – c)	73. $3 + \frac{b}{d}$		
4a	75. 2a ² – c	76. b – c + d		
74. 4a b+ 4d	73. 201 C	70. D C 1 Q		

Solve each one-step equation.

Solve each one-step equation.			
77. g + 3 = 17	78. r - 6 = 7	79. 6b = 18	80. $\frac{h}{q} = 3$
81. 5 = f - 8	82. 48 = 12b	83. a + 24 = 83	84. I7 + x = 23
85. $10 = \frac{m}{5}$	86. 86.5 = f - 7.63	87. ⁿ / ₆ = 11	88. $\frac{3}{4}$ h = 12

Solve each word problem using the method of your choice. 89. A fencing company charges \$22 per foot to install 90. A 6 inch-tall plant grew 34 of an inch one week a wood fence. How much will it cost to install a and twice as much the following week. How tall is wood fence around a rectangular pool area that is the plant now? 20 feet wide and 38 feet long? 91. Jack can read 45 pages of his book in one and a 92. Brian ordered 3 large cheese pizzas and a salad. half hours. At that rate, how long will it take him to The salad cost \$4.95. If he spent a total of \$47.60 including the \$5 tip, how much did each read the entire 300-page book? pizza cost? (Assume there is no tax). 93. A cookie recipe calls for $3\frac{1}{4}\,\mathrm{cups}$ of flour. The 94. Ella has a box of chocolate candies. She gives $\frac{1}{3}$ recipe makes 3 dozen cookies. How much four is of the candies to her sister, 4 to her brother, and needed to make 144 cookies? she eats the remaining 12 candies. How many chocolate candies were in the box originally?

Solve each word problem using the method of your choice. 96. A piggy bank contains some dimes and nickels. 95. 20% of the 520 students in Wendover Middle School were involved in school sports. Of those There are 8 more dimes than nickels in the bank. students, 12.5% were on the wrestling team. How There is a total of \$1.40. How many of each type many students were on the wrestling team? of coin are in the bank? 98. Jenna danced for 3 hours on Sunday, 2 hours on 97. An elevator in a tall building goes up 7 floors, then Monday and Tuesday, I hour on Thursday, 1.5 down 9 floors, down 4 floors, up 8 floors, and hours on Friday, and 2 hours on Saturday. She down 2 floors. Now it is on floor 14. On what did not dance at all on Wednesday. What is the floor did the elevator start? average number of hours she danced each day? Round your answer to the nearest tenth of an hour. 100. A box of 8 crayons costs \$0.96. How much does 99. Jackie makes \$15.25/hour babysitting. George makes \$18.50/hour mowing the lawn. If Jackie each crayon cost? At that unit price, how much babysits for 4 hours and George mows lawns for would a box of 30 crayons cost? 3 hours, who makes more money? How much more does he/she make?

Evaluate each expression.

Evaluate each expression		T
1. 5.983 + 2.99	2. 224 - 56.73	3. 6.12 - 4.923
8.973	167.27	1.197
4. 24.5 · 3.2	5. 0.23 · 7	6. 3.86 - 9.15
78.4	1.61	35.319
7. 14.8 ÷ 5	8. 46.3 ÷ 1.5	9. 147 ÷ 2.25
2.96	30.86	65.3
10. 24.33 - 2.5 - 7	11. 3.9 + 4.52	12. 9.25(18.4 - 2 · 1.2)
6.83	24.15	148

Solve each word problem, showing all work.

13. Jeff had \$46.18 in his wallet Monday morning. He gave half of his money to his brother. He then bought two donuts for \$0.75 each and a cup of coffee for \$2.99. How much money did Jeff have left?	14. Five friends split a \$65.20 bill at a restaurant. They also each left \$2.75 for the tip. How much money did each person pay in all?\$15.79
\$ 18.60	

Evaluate each expression.

Livalidate each expression.				
15. $\frac{4}{5} + \frac{3}{4}$	$16.4\frac{2}{7}+2\frac{9}{14}$	17. 8 $\frac{11}{12}$ + 9 $\frac{5}{18}$		
$1\frac{11}{20}$	6 3	18 7		
20	1-1	30		
$18.6 - \frac{3}{8}$	19. $8\frac{3}{5} - 2\frac{1}{3}$	20. $4\frac{1}{6} - \frac{8}{9}$		
$5\frac{5}{8}$	6 4 15	3 5 18		
$21. \frac{4}{25} \cdot \frac{15}{16}$	22. $2\frac{3}{4} \cdot 8$	23. $6\frac{5}{8} \cdot 3\frac{1}{2}$		
3 20	22	23 3		
20		16		
$24.\frac{7}{9} \div \frac{2}{3}$	25. 4/5 ÷ 10	$26.5\frac{2}{3} \div 2\frac{5}{6}$		
1 = 6	<u>2</u> 25	2		
6	25			

Solve each word problem, showing all work.

27. Jaimie ran $3\frac{1}{2}$ miles on Monday. She ran half as far on Tuesday as she did on Monday. How far did Jaimie run in all on Monday and Tuesday?

28. A $5\frac{1}{2}$ quart pot is filled $\frac{2}{3}$ of the way with water. How many more quarts of water can the pot hold?

15 quarts

16 quarts

Write each ratio in 3 ways.

29. A bank contains 15 pennies and 12 nickels. Write the ratio of nickels to pennies.

4:5, 4 to 5, $\frac{4}{5}$

30. A bowl contains 6 apples and some bananas. If there are a total of 10 pieces of fruit, find the ratio of apples to bananas.

3:2, 3 to 2, $\frac{3}{2}$

Convert each rate to a unit rate.

31. \$4.25 for 64 fluid ounces	32. 297 miles on 11 gallons of gas	33. 124 feet in 10 seconds
\$0.07 per floz	27 mi/gal	l2.4 ft/sec

Complete the chart by converting each number to a percent, fraction, and/or decimal.

Fraction	Decimal	Percent
$\frac{3}{8}$	0.375	37.5%
$\frac{9}{20}$	0.45	45%
36. <u>18</u> <u>25</u>	0.72	72%
37. <u>I</u> <u>IO</u>	0.1	10%
38. $\frac{3}{200}$	0.0 15	1.5%

Find each percent of a number.

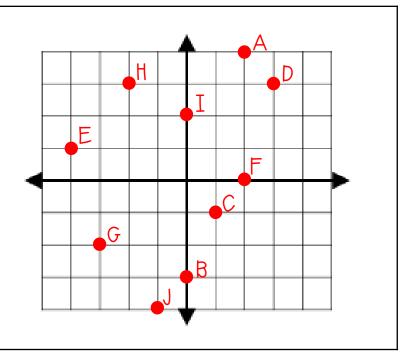
39. 30% of 90	40. 15% of 38	41. 50% of 86
27	5.7	43
42. 75% of 160	43. 24% of 35	44. 2% of 74
120	8.4	1.48

Compare the integers with <, >, or =.

454 > -5	46. 2 > -2	47. -5 = 5	487 🔇 6	4913 <
50. -7 > -6	5117 <	52. -3 > -2	53. 0 > -6	54. -4 < 6

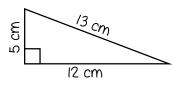
Graph and label each of the ordered pairs in the coordinate plane. Then state the quadrant or axis in/on which the point is located.

56. B(0, -3) y-axis
58. D(3, 3) Quadrant I
60. F(2, 0) X-axis
62. H(-2, 3) Quadrant II
64. J(-1, -4) Quadrant III



Find the perimeter, area, and/or volume of the given figure.

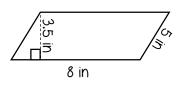
65. Find the perimeter ε area:



P = 30 cm

 $A = 30 \text{ cm}^2$

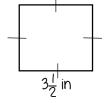
66. Find the perimeter ε area:



P = 26 in

 $A = 28 \text{ in}^2$

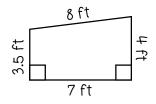
67. Find the perimeter ε area:



P = 14 in

 $A = 12\frac{1}{4} in^2$

68. Find the perimeter \mathcal{E} area:



P = 22.5 ft

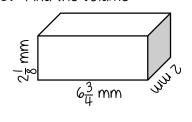
 $A = 26.25 ft^2$

69. Find the area of a square with a perimeter of 45 cm

$$A = 126 \frac{9}{16} \text{ cm}^2$$

(or 126.5625 cm²)

70. Find the volume:



 $V = 28 \frac{11}{16} \text{ mm}^3$

Answer Key Evaluate each expression for a = 5, b = 12, c = 10, $\mathcal{E} d = 2$.

·	1	
71. 2b — a	72. d(ab – c)	73. $3 + \frac{b}{d}$
19	100	9
74. 4a b+ 4d	75. 2a ² – c	76. b – c + d
	40	4
,		

Solve each one-step equation.

	· · · · · · · · · · · · · · · · · · ·		
77. g + 3 = 17	78. r – 6 = 7	79. 6b = 18	80. $\frac{h}{q} = 3$
g = 14	r = 13	b = 3	h = 27
81. $5 = f - 8$	82. 48 = 12b	83. a + 24 = 83	84. 17 + x = 23
f = 13	b = 4	a = 59	x = 6
		,	
85. $10 = \frac{m}{5}$	86. 86.5 = f - 7.63	87. ⁿ / ₆ = 11	88. $\frac{3}{4}$ h = 12
m = 50	f = 94.13	n = 66	h = 16

Solve each word problem using the method of yo	our choice.
89. A fencing company charges \$22 per foot to install a wood fence. How much will it cost to install a wood fence around a rectangular pool area that is 20 feet wide and 38 feet long?	90. A 6 inch-tall plant grew 3/4 of an inch one week and twice as much the following week. How tall is the plant now?
\$2,552	8 inches tall
91. Jack can read 45 pages of his book in one and a half hours. At that rate, how long will it take him to read the entire 300-page book?	92. Brian ordered 3 large cheese pizzas and a salad. The salad cost \$4.95. If he spent a total of \$47.60 including the \$5 tip, how much did each pizza cost? (Assume there is no tax).
10 hours	\$12.55
93. A cookie recipe calls for $3\frac{1}{4}$ cups of flour. The recipe makes 3 dozen cookies. How much four is needed to make 144 cookies?	94. Ella has a box of chocolate candies. She gives $\frac{1}{3}$ of the candies to her sister, 4 to her brother, and she eats the remaining 12 candies. How many chocolate candies were in the box originally?
13 cups of flour	24 chocolate candies

Solve each word problem using the method of your choice.

95.	20% of the 520 students in Wendover Middle		
	School were involved in school sports. Of those		
	students, 12.5% were on the wrestling team. How		
	many students were on the wrestling team?		

13 students

96. A piggy bank contains some dimes and nickels. There are 8 more dimes than nickels in the bank. There is a total of \$1.40. How many of each type of coin are in the bank?

4 nickels & 12 dimes

97. An elevator in a tall building goes up 7 floors, then down 9 floors, down 4 floors, up 8 floors, and down 2 floors. Now it is on floor 14. On what floor did the elevator start?

the 14th floor

98. Jenna danced for 3 hours on Sunday, 2 hours on Monday and Tuesday, 1 hour on Thursday, 1.5 hours on Friday, and 2 hours on Saturday. She did not dance at all on Wednesday. What is the average number of hours she danced each day? Round your answer to the nearest tenth of an hour.

about 1.6 hours

99. Jackie makes \$15.25/hour babysitting. George makes \$18.50/hour mowing the lawn. If Jackie babysits for 4 hours and George mows lawns for 3 hours, who makes more money? How much more does he/she make?

Jackie makes \$5.50 more than George.

100. A box of 8 crayons costs \$0.96. How much does each crayon cost? At that unit price, how much would a box of 30 crayons cost?

\$3.60