

Math Tech 1
Unit 3
Order of Operations
Estimating

Name _____

Pd _____


3-1 Order of Operations

Order of Operations: PEMDAS (Please Excuse My Dear Aunt Sally)

P – parenthesis

E – exponents

M - multiplication  Do whichever comes first

D - division 

A – addition  Do whichever comes first

S - subtraction 

Example 1: $8 \cdot 2 + 5 \cdot 2$

Example 2: $2 + 3(2^3 - 3)$

Example 3: $[384 - 3(7-2)^2] \div 3$

3-1 Order of Operations

Show all work.

Order of Operations.

1. $16 \div (2 + 6) \cdot 10$

2. $14 \cdot 3 - 2$

3. $6 \cdot 2 + 35 \div 5$

4. $6^2 + 3(3 + 7)$

5. $24 - 8 \cdot 12 \div 4$

6. $3 + 8(21 \div 7) \div 4$

7. $15 \div 3 \times 5 + 1$

8. $[(8 + 3) \times 4 - 2] \div 6$

9. $[12(77 \div 11)] \div 4$

10. $3 + [8 \div (9 - 8)]$

3-1 Order of Operations

Show all work!

1. $8 \cdot 7 + 12 \div 4$

2. $30(6 - 4)$

3. $7 + 36 \div 6 - 6$

4. $7 \cdot 4 + 6 \cdot 5$

5. $8 + 3(16 - 12)$

6. $6[4(72 - 63) \div 3]$

7. $3(9 - 3 \cdot 2)$

8. $14 \div 2 + 4 \cdot 3$

9. $\frac{14 + 4}{11 - 2}$

10. $9(12 - 5) - 11(21 - 8 \cdot 2)$

3-1 Order of Operations

Show all work!

1. $(8 - 4) \cdot 2$

2. $(12 + 4) \cdot 6$

3. $10 + 2 \cdot 3$

4. $10 + 8 \cdot 1$

5. $15 - 12 \div 4$

6. $\frac{15 + 60}{30 - 5}$

7. $12(20 - 17) - 3 \cdot 6$

8. $24 \div 3 \cdot 2 - 3^2$

9. $8^2 \div (2 \cdot 8) + 2$

10. $3^2 \div 3 + 2^2 \cdot 7 - 20 \div 5$

11. $\frac{4 + 3(3)}{12 + 1}$

12. $\frac{8(2) - 4}{8 \div 4}$

3-1 Order of Operations

Show all work!

Evaluate:

1. $6 + 3 \cdot 5$

2. $4 \cdot (8 + 4)$

3. $(6 - 2) \cdot 5$

4. $(3 + 2) \cdot (3 - 2)$

5. $5 \cdot 3 + 7 \cdot 4$

6. $18 - 15 \div 3$

7. $(16 - 4) \cdot 2$

8. $16 - (4 \cdot 2)$

9. $9 \div 1 + 3$

10. $3 \cdot (5 + 7)$

11. $(16 - 4) \div (3 + 1)$

12. $(8 + 4) \div (4 + 2)$

13. $3 \cdot 4 + 5$

14. $6 + 8 \cdot 4$

15. $(8 + 6) \div (7 - 5)$

16. $2 \cdot 2 - 1$

17. $3 + 7 \cdot 4$

18. $8 \cdot 2 + 5 \cdot 4$

19. $8 + (2 \cdot 3)$

20. $(2 + 3) \cdot (4 + 1)$

21. $4 \cdot 4 + 4 \div 2$

22. $4 + 8 \div 2$

23. $6 + 2 \div 2 + 2$

24. $(3 - 2) \cdot (9 - 3)$

3-1 Order of Operations

$$25. 4 + 9 - 1$$

$$26. 3 \cdot 2 + 15 \div 5$$

$$27. 6 \div 3 + 2 \cdot 7$$

$$28. 5 + 8 \cdot 2 - 4$$

$$29. 16 \div 8 \cdot 2^2$$

$$30. 2 \cdot 3^2 \div 7$$

$$31. 10 \div (3 + 2) + 9$$

$$32. 7[(18-6) - 6]$$

$$33. (7 - 4)^2 + 3 \cdot 15$$

$$34. 3(27 \div 9) - 5$$

$$35. 6(5 - 3)^2 + 3$$

$$36. 9 \cdot 3 + 18$$

$$37. [10 + (5^2 \cdot 2)] \cdot 6$$

$$38. 15 \cdot 2 \div 6$$

$$39. 16 \div 4 \div 2 - 3$$

$$40. 4 + 21 \div 3 - 3^2$$

$$41. (14 \div 7)^2 + 5$$

$$42. 3^3 - 12 \div 4$$

$$43. 10^3 \div 4 + 6$$

$$44. 10^2 \div (4 + 6)$$

$$45. 3 + 7(15 \div 5)$$

$$46. 2 + 21 \div 3 - 6$$

$$47. 50 \div (6^2 - 11) - 2$$

$$48. [(5 \cdot 2) + 8] \div 16$$

3-2 Evaluating Expressions

A. Definitions

Variable: A letter that used to represent an unknown

Ex. x , y , n , a

Algebraic Expressions: An expression that contains at least one variable and one operation (+, -, \times , \div)

Ex. $x + 4$, $5 - y$, $7n$, $8a - 5$

B. Evaluating Expressions

1. Substitute the value of the variable into the expression
2. Follow the order of operations to simplify.

Example 1: Evaluate $x + y - 2m$ if $x = 7$, $y = 3$ and $m = 2$

Example 2: Evaluate $s - t (s^2 - t)$ if $s = 2$ and $t = 3$

Example 3: Evaluate the expression $8xy + z^3$ if $x = 5$,

$y = 2$, and $z = 1$

3-2 Evaluating Expressions

Exercises

Evaluate each expression if $x = 2$, $y = 3$, $z = 4$, $a = 5$, and $b = 6$. Show all work!

1. $x + 7$

2. $x^3 + y + z^2$

3. $\frac{y^2}{x^2}$

4. $(10x)^2 + 100a$

5. $\frac{z^2 - y^2}{x^2}$

6. $\frac{25ab + y}{xz}$

7. $\left(\frac{x}{z}\right)^2 + \left(\frac{y}{z}\right)^2$

3-2 Evaluating Expressions

Show all work!

Evaluate each expression.

1. $(5 + 4) \cdot 7$

2. $(9 - 2) \cdot 3$

3. $4 + 6 \cdot 3$

4. $28 - 5 \cdot 4$

5. $12 + 2 \cdot 2$

6. $(3 + 5) \cdot 5 + 1$

7. $9 + 4(3 + 1)$

8. $2 + 3 \cdot 5 + 4$

9. $30 - 5 \cdot 4 + 2$

10. $10 + 2 \cdot 6 + 4$

11. $14 \div 7 \cdot 5 - 3^2$

12. $6 \div 3 \cdot 7 + 2^3$

13. $4[30 - (10 - 2) \cdot 3]$

14. $5 + [30 - (6 - 1)^2]$

15. $2[12 + (5 - 2)^2]$

16. $[8 \cdot 2 - (3 + 9)] + [8 - 2 \cdot 3]$

Evaluate each expression if $x = 6$, $y = 8$, and $z = 3$.

17. $xy + z$

18. $yz - x$

19. $2x + 3y - z$

20. $2(x + z) - y$

21. $5x + (y - x)$

22. $5x - (y + 2z)$

23. $x^2 + y^2 - 10x$

24. $x^3 + (y^2 - 4x)$

25. $\frac{y + xz}{2}$

26. $\frac{3y + x^2}{x}$

3-3 Rounding and Estimating

A. Rounding

Rules:

If the number you are rounding is followed by 5, 6, 7, 8, or 9, round the number up. Example: 38 rounded to the nearest ten is 40

If the number you are rounding is followed by 0, 1, 2, 3, or 4, round the number down. Example: 33 rounded to the nearest ten is 30

426.7134

Place Value

Hundreds
Tens
Ones
Tenth
Hundredth
Thousandth
Ten Thousandth

B. Estimating

Steps:

1. Round the numbers to the specified place value
2. Perform the given operation

Example: Estimate each problem by rounding to the nearest hundred

$$429 + 138 =$$

$$578 - 234 =$$

$$210 \times 309 =$$

$$387 \div 89 =$$

3-3 Rounding and Estimating

Why Are Elephants Poor Dancers?

Round each number below as indicated. Circle the letter of each correct answer. Then rearrange the circled letters in each grid to make a word. Write the words in order in the boxes at the bottom of the page.

WHEN YOU FINISH, YOU WILL KNOW WHY ELEPHANTS ARE SUCH POOR DANCERS!

0.37 to the nearest tenth	L 0.3	M 76.08
-2.474 to the nearest hundredth	O 5.9001	E 0.4
76.0835 to the nearest thousandth	H -2.47	S -2.48
5.90019 to the nearest ten thousandth	Y 5.9002	T 76.084
-4.0822 to the nearest tenth	P 98.501	E -4.1
98.500296 to the nearest thousandth	I 7.79	A 7.80
-0.7608 to the nearest hundredth	D -4.08	H 98.500
7.796 to the nearest hundredth	V -0.76	L -0.761
55.95 to the nearest tenth	N 0.7477	E -0.049
-0.0499 to the nearest thousandth	O 56.0	W 0.7476
0.747608 to the nearest ten thousandth	H 55.9	T -0.050
8.999 to the nearest hundredth	L 1.00	F -60.009
-39.95 to the nearest tenth	T -40.0	I 8.99
-60.00905 to the nearest thousandth	E 9.00	M -39.0
0.9971 to the nearest hundredth	B -60.01	A 0.90
75.180763 to the nearest hundredth	F 10.0	T -60.000
-59.9999 to the nearest thousandth	L 75.19	Y 75.2
9.9955 to the nearest hundredth	G -59.999	E 10.00
9.9955 to the nearest tenth	E 75.18	S 9.90
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>

3-3 Rounding and Estimating

???? Trivia Question ???? Autos
 How many years ago was the first automobile invented?

To check your answer:

- Use a ruler to match each exercise with its answer.
- Each line you draw will cross a letter.
- Write each crossed letter over its matching exercise number in the Decoder.

Round to the nearest ten.	1. 84	(A)	(E)	520
	2. 65		(W)	3750
	3. 521	(L)		3740
	4. 3743	(I)		80
	5. 3745			3700
Round to the nearest hundred.	6. 489	(B)	(O)	70
	7. 3735			500
	8. 8050	(V)		8100
	9. 36,820	(T)		44,000
Round to the nearest thousand.	10. 43,938		(R)	1000
	11. 1843		(P)	36,800
	12. 981		(N)	2000
	13. 44,693	(C)	(S)	295,000
	14. 294,500			10,000
	15. 9999	(U)		45,000
Round to the nearest ten thousand.	16. 46,279			330,000
	17. 19,812	(Y)	(M)	20,000
	18. 329,126		(D)	210,000
	19. 209,879	(X)		50,000

DECODER

1	14	9	3	1	16	12	6	5	3	10	3	17							
9	10	4	13	18	13	2	3	5	1	14	7	15	4	2	8				
4	11	14	3	8	3	10	9	3	3	11	14	4	19	9	18	11	4	11	3

3-3 Rounding and Estimating

Use rounding to estimate each problem. Round either to the tens for two digit numbers and round to the hundredths for three or four digit numbers.

1. $4,782 + 632 =$	2. $\begin{array}{r} 578 \\ - 65 \\ \hline \end{array}$	3. $351 \times 78 =$
4. $23 \overline{)5,789}$	5. $\begin{array}{r} 961 \\ + 325 \\ \hline \end{array}$	6. $1,845 - 763 =$
7. $\begin{array}{r} 8,602 \\ \times 28 \\ \hline \end{array}$	8. $4,192 \div 5 =$	9. $2,892 + 96 =$
10. $\begin{array}{r} 3,891 \\ - 1,436 \\ \hline \end{array}$	11. $637 \times 7 =$	12. $64 \overline{)8,956}$
13. $\begin{array}{r} 564 \\ + 2,579 \\ \hline \end{array}$	14. $7,206 - 7,001 =$	15. $\begin{array}{r} 4,210 \\ \times 34 \\ \hline \end{array}$
16. $387 \div 8 =$	17. $1,568 + 85 =$	18. $\begin{array}{r} 678 \\ - 89 \\ \hline \end{array}$
19. $2,874 \times 9 =$	20. $23 \overline{)5,279}$	21. $98 + 3,978 =$

3-3 Rounding and Estimating

Use rounding to estimate each problem. Round to the nearest tens or hundreds.

1. $728 - 689 =$	2. $\begin{array}{r} 851 \\ \times 47 \\ \hline \end{array}$	3. $1,896 + 8,732 =$
4. $42 \overline{)7,257}$	5. $\begin{array}{r} 2,762 \\ - 2,146 \\ \hline \end{array}$	6. $485 \times 3 =$
7. $\begin{array}{r} 5,973 \\ + 2,858 \\ \hline \end{array}$	8. $8,887 \div 94 =$	9. $7,219 - 1,579 =$
10. $\begin{array}{r} 3,845 \\ \times 61 \\ \hline \end{array}$	11. $4,862 \div 989 =$	12. $43 \overline{)6,497}$
13. $\begin{array}{r} 4,564 \\ - 279 \\ \hline \end{array}$	14. $3,506 \times 16 =$	15. $\begin{array}{r} 740 \\ + 87 \\ \hline \end{array}$
16. $574 \div 3 =$	17. $6,350 - 76 =$	18. $\begin{array}{r} 934 \\ \times 26 \\ \hline \end{array}$
19. $821 + 1,289 =$	20. $78 \overline{)481}$	21. $7,938 - 543 =$

3-3 Rounding and Estimating

Round 7549.2808 as directed.

1. To the hundredths place.
2. To the thousands place.

Round 445228.097232 as directed.

3. To the thousandths place.
4. To the hundreds place.

Estimate each sum by rounding to the nearest hundred.

5. $481 + 1532 + 89 + 21 =$ _____
6. $235 + 497 + 2381 + 19 =$ _____
7. $55 + 119 + 232 + 678 =$ _____
8. $35 + 421 + 341 + 555 =$ _____

Estimate each sum by rounding to the nearest ten.

9. $18 + 151 + 3 + 113 =$ _____
10. $4 + 3 + 6 + 2 =$ _____
11. $1234 + 12 + 125 =$ _____
12. $126 + 34 + 16 =$ _____

Round each of the numbers below as directed, then complete the computation.

13. Round each number to the hundreds place then calculate.

$$1,391 + 607 + 11,740 + 39 + 80 = \underline{\hspace{2cm}}$$

14. Round each number to the tenths and then calculate.

$$6.19 + 9.31 - 1.05 = \underline{\hspace{2cm}}$$

15. Round each number to the thousands and then calculate.

$$764 + 455 + 3,592 - 1,985 = \underline{\hspace{2cm}}$$

16. Round each number to the ones place then calculate.

$$(54.7 \div 6.4) + 10.2 * 4.8 = \underline{\hspace{2cm}}$$

3-3 Rounding and Estimating

17. Round each number to the tens place then calculate.

$$42 + 169 + 4 + 18.4 = \underline{\hspace{2cm}}$$

18. Round each number to the hundredths place then calculate.

$$7.559 + .86 + .074 = \underline{\hspace{2cm}}$$

Calculate the answer then, Round each of the numbers below as directed

19. Calculate then round answer to the hundredths place.

$$7.62 - 4.639 + 3.174 = \underline{\hspace{2cm}}$$

20. Calculate then round answer to the hundredths place.

$$0.7654 + 1.5555 = \underline{\hspace{2cm}}$$

3.1-3.3 Review

Name: _____

Read all directions. Show all work!

#1-9 No Calculator

1. $6 + 7 * 4$

2. $8 \div (2 + 2) * 5$

3. $5^2 + 2 * 7 - 8$

4. $2 + 4(6 - 2)$

5. $\frac{7 + 3^2}{4^2 * 2}$

6. $3 + 2[2 + (6 - 2)^2]$

Evaluate each expression if a =9, b = 8 and c = 2

7. $a^2 + b - c^2$

8. $(a^2 \div 4) + c$

9. $\frac{bc^2 + a}{c}$

Round 2578.2451 as directed.

10. To the hundredths place. _____

11. To the thousands place. _____

Round 334572.08156 as directed.

12. To the thousandths place. _____

13. To the hundreds place. _____

Estimate each sum by rounding to the nearest hundred.

14. $381 + 1432 + 79 + 11 =$ _____

15. $135 + 397 + 1281 + 29 =$ _____

16. $46 + 109 + 132 + 648 =$ _____

17. $25 + 311 + 131 + 45 =$ _____

Estimate each sum by rounding to the nearest ten.

18. $21 + 142 + 2 + 125 =$ _____

19. $5 + 1 + 9 + 3 =$ _____

20. $1114 + 32 + 185 =$ _____

21. $156 + 24 + 36 =$ _____

Round each of the numbers below as directed, then complete the computation.

22. Round each number to the hundreds place then calculate. $1,491 + 807 + 11,890 + 29 + 90 =$ _____

23. Round each number to the tenths and then calculate. $6.29 + 9.41 - 1.07 =$ _____

24. Round each number to the thousands and then calculate. $824 + 325 + 3,282 - 1,875 =$ _____

25. Round each number to the ones place then calculate. $(54.9 \div 6.3) + 10.5 * 4.1 =$ _____

26. Round each number to the tens place then calculate. $22 + 219 + 3 + 12.4 =$ _____

27. Round each number to the hundredths place then calculate. $7.579 + .79 + .088 =$ _____

Calculate the answer then, **Round each of the numbers below as directed**

28. Calculate then round answer to the hundredths place. $78.52 - 3.539 + 3.234 =$ _____

29. Calculate then round answer to the hundredths place. $0.7564 + 1.4444 =$ _____

