

Name \_\_\_\_\_  
Date \_\_\_\_\_

Introduction to Technical Mathematics  
Class #5.

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*Unit Test 1A*

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**Section 1. Technical Arithmetic:** In this section, do any and all work necessary to the answer. The calculator is a good double-check, but should not be the solution to each question. Showing work for each question will increase the chances your score will be higher.

1. Simplify:  $(-17) - (-5) + (-8) - 5$  1. -25  
 $= -17 + 5 - 8 - 5$   
 $= -17 - 8 - 5 + 5$

2. Simplify:  $\frac{(-3)(+6)(-5)}{(-1)(10)} = \frac{+90}{-10} = -9$  2. -9

3. Simplify:  $(-6)^2 + 9(3 + 2)$  3. 81  
 $= +36 + 9(5)$   
 $= +36 + 45 = 81$

4. Simplify:  $-5^2 + 4(3 - 7)$  4. -41  
 $= -25 + 4(-4)$   
 $= -25 - 16 = -41$

5. Simplify:  $3(4^2 + 1) - 30 \div 3$  5. 41  
 $= 3(16 + 1) - 10$   
 $= 3(17) - 10$   
 $= 51 - 10 = 41$

**Section 2. Scientific Notation:** Writing **VERY LARGE** and very small Numbers.

6. Write in Scientific Notation:

a.  $56,000 = 5.6 \times 10^4$  a. \_\_\_\_\_

b.  $0.000843 = 8.43 \times 10^{-4}$  b. \_\_\_\_\_

7. Write in Standard Form:

a.  $6.28 \times 10^5 = 628,000$  a. \_\_\_\_\_

b.  $4.652 \times 10^{-3} = .004652$  b. \_\_\_\_\_

8. Write in Proper Scientific Notation:

a.  $425.6 \times 10^1 = 4.256 \times 10^4$  a. \_\_\_\_\_

b.  $125.98 \times 10^{-5} = 1.2598 \times 10^{-3}$  b. \_\_\_\_\_

9. Multiply or Divide and Write the Answer in Scientific Notation.

a.  $(5.64 \times 10^4)(3.44 \times 10^5)$   
 $= 19.4016 \times 10^9$  Rewrite =  $1.94 \times 10^{10}$

b.  $\frac{14.5 \times 10^9}{1.25 \times 10^{-7}}$   
 $11.6 \times 10^{16}$

a.  $1.94 \times 10^{10}$

b.  $11.6 \times 10^{16}$   
 ~~$= 1.16 \times 10^{17}$~~   
 $1.16 \times 10^{17}$

**Section 3. Units of Measure – Conversions – Reductions**

10. Change 440 feet per second to miles per hour.

$$\frac{440 \text{ feet}}{\text{sec}} \times \frac{3600 \text{ sec}}{\text{hr}} \times \frac{1 \text{ mile}}{5280 \text{ feet}} = \frac{300 \text{ miles}}{\text{hour}}$$

10.  $300 \text{ miles / hour}$

11. Reduce: 55.6 mm = 5.56 cm      K H da M d c m

11. 5.56

12. Reduce 80 oz. = 5 lbs.       $80 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}}$

12. 5

13. Convert: 27 cm = 10.6 inches       $27 \text{ cm} \times \frac{1 \text{ in}}{2.54 \text{ cm}}$

13. 10.6

14. Convert: 8 kg = 16.2 lbs lbs.       $\frac{8 \text{ kg}}{1} \times \frac{2.205 \text{ lb}}{1 \text{ kg}}$

14. 16.2

15. A chemist has a container of 164.0 mL of sulfuric acid.  
 Convert this volume to quarts and use the same degree of accuracy.

15. 7033

$$\frac{164.0 \text{ mL}}{1} \times \frac{1 \text{ L}}{1000 \text{ mL}} \times \frac{1.057 \text{ quarts}}{1 \text{ liter}} = .7033 \text{ quarts}$$

**Section 4. Algebra**

16. Distribute and Combine Like Terms:

a.  $4a - (a - 3x + 2y) + (-4x + y)$   
 $4 - a + 3x - 2y - 4x + y$   
 $4 - a - x - y$

a. \_\_\_\_\_

b.  $3s - (2 - (4 - s))$   
 $3s - (2 - 4 + s)$   
 $3s - (-2 + s)$   
 $3s + 2 - s$

c.  $-4(x - 4)$   
 $-4x + 16$

d.  $3ab(2a - 5ac)$   
 $6a^2b - 15a^2c$

e.  $2ax(3ax^2 + 5x^3)$   
 $6a^2x^3 + 10ax^4$

b.  $2s + 2$

c.  $-4x + 16$

d.  $6a^2b - 15a^2c$

e.  $6a^2x^3 + 10ax^4$

17. Multiply:  $(x + 2)(3x - 5)$   
 $3x^2 - 5x + 6x - 10$   
 $3x^2 + x - 10$

17.  $3x^2 + x - 10$

18. Multiply:  $(2x^2 - 5x - 6)(3x - 2)$

$$\begin{array}{r} 2x^2 - 5x - 6 \\ 3x - 2 \\ \hline 6x^3 - 15x^2 - 18x \\ - 4x^2 - 10x + 12 \\ \hline 6x^3 - 19x^2 - 28x + 12 \end{array}$$

18.  $6x^3 - 19x^2 - 28x + 12$

19. Multiply:  $(x + 3)(x - 5)(x - 2)$

Foil      Pmtt  
 $(x + 3)(x - 5)$   
 $= x^2 - 5x + 3x - 15$   
 $= x^2 - 2x - 15$

$$\begin{array}{r} x^2 - 2x - 15 \\ x - 2 \\ \hline x^3 - 2x^2 - 15x \\ - 2x^2 + 4x + 30 \\ \hline x^3 - 4x^2 - 11x + 30 \end{array}$$

19.  $x^3 - 4x^2 - 11x + 30$

20. Divide:  $\frac{2x^2 - 5x - 3}{x - 3}$

$$\begin{array}{r} 2x + 1 \\ x - 3 \overline{) 2x^2 - 5x - 3} \\ \underline{2x^2 - 6x} \phantom{- 3} \\ + 1x - 3 \\ \underline{1x - 3} \\ 0 \end{array}$$

20.  $2x + 1$