Mth 85 Exam 1 *Franz Helfenstein* **NAME**

Your work must be **clearly legible** with answers **simplified** and **boxed** in for full credit. For partial credit show your work/intermediate steps. Units required where applicable. 100 points

True/False: Circle T (true) if always true otherwise circle F (false). ($\frac{1}{2}$ pts ea)

1) (a) T F 10^{12} = 10 trillion (f) T F $x_2 = x^2$

(b) T F $8\frac{3}{4}'' = (8 + \frac{3}{4})/12$ ft (g) T F $\frac{7+5}{6} = 7 + 5/6$

(c) T F $3(4 + 5) = 3[4 + 5]$ (h) T F $2\{ 2 + 2[2 + (2)(2)] \} = 28$

(d) T F $6^3 = 666$ (i) T F $\pi > 3.14$

(e) T F 9/25 = 36% (j) T F $\frac{3^2 - 9}{4 - 2^2} = 0$

Order of Operations: Simplify to an integer or a reduced fraction. Write improper fractions as mixed numbers.

2) (a) $8 \times 20 - 10 \times 5 =$ (b) $60 - 10(9 - 17)5 - 12 =$

(c) $\frac{(-2)(3)(-4)}{12 + (4)(-3)} =$ (d) $\frac{8 - 6 \times 3}{5 - 4 \times 5} =$ (e) $\sqrt{3(11 - 5)4 + 9} =$

Absolute Values: Simplify to an integer or a reduced fraction. Write improper fractions as mixed numbers.

3) (a) $| -65 | =$ (b) $| 38 - 57 | =$ (c) $60 - 20 | 7 - 13 | =$

Exponents: Simplify to an integer or a reduced fraction. Write improper fractions as mixed numbers.

4) (a) $4^3 =$ (b) $-6^2 =$ (c) $\frac{(\frac{2}{3})^2}{2^3 - 3^2} =$

(d) $1763987425598^0 =$ (e) $7^{-2} =$

Fractions: Simplify to an integer or a reduced fraction. Write improper fractions as mixed numbers.

5) (a) $1\frac{1}{4} - 3\frac{5}{8} =$ (b) $4\frac{1}{3} \times 2\frac{2}{3} =$ (c) $\frac{250}{1\frac{7}{8}} =$

(d) $[8\frac{5}{8}]^2 =$ (e) $\sqrt{(\frac{1}{2})(12\frac{5}{8} + 2\frac{1}{2})} =$

Scientific Notation

6) Convert to a decimal number: (a) $1.7 \times 10^4 =$ _____ (b) $6.2 \times 10^{-3} =$ _____

Convert to scientific notation: (c) 12,300,000 = _____ (d) 0.00075 = _____

(e) 420 million people live in North America. Write that number in scientific notation.

Calculator Use: Simplify and round to a single number accurate to the **hundredths place** (#.##).

7) (a) $\frac{26 + 84}{(4.8)(3.8)} \approx$ (b) $\frac{26.7 + 11.5}{\sqrt{4.3} - 4.3} \approx$ (c) $\frac{\sqrt{86} + 14}{7.2\sqrt{2.56}} \approx$

(d) $\frac{2\ \frac{3}{8} + 8\ \frac{3}{4}}{(4\ \frac{2}{3})\pi} \approx$ (e) $\sqrt{(5.2 - 3.4)96 - 54} \approx$

Rounding Problems: Simplify to one decimal number **rounded according to our class rules**.

8) (a) 52,868 + 10,611 + 10,500 ≈ (*circle the most correct answer*)

A) 73979 B) 73980 C) 74000 D) 74000 E) None of these

(b) 106.657 × 125 × 1.875 ≈ (*circle the most correct answer*)

A) 24997.7 B) 24998 C) 25000 D) 25000 E) None of these

(c) $\frac{2.4 \times 1.6}{5.3 \times 9.5} \approx$ (d) 11.48 + 3.16 – 4.5 ≈

(e) A rectangular warehouse floor is approximately 60 ft × 90 ft. What accuracy should be used when measuring those dimensions so that the resulting area is accurate to the nearest square foot?

Place 0's in the required slots. 60.__ __ __ __ __ ft × 90.__ __ __ __ __ ft

Working with Measurements *Correct units required in answer.*

9) (a) Convert 737" to ft-in (b) Convert 17' 5" to ##.## ft (c) Convert 7' 7 $\frac{7}{8}$ " to #.### ft

_____ _____ _____

Round each measurement to feet-inches with the inches to the nearest 16th inch.

(d) 937.6982 in ≈ _____ ft _____ $\frac{\quad}{16}$ in

(e) A 37' 9 $\frac{5}{8}$" bar is cut into 3 equal pieces. Give the length of each piece to the nearest 16th inch.

_____ ft _____ $\frac{\quad}{16}$ in

Abbreviations and Prefixes

10) Write in an alternative form as indicated. Remove the original M, G, c , μ.

(a) 7 $\frac{1}{2}$ Mb = _____ b (b) 55 thousandths cm= _____ mm

(c) 400 Gw = _____ w (d) 75 μg = _____ mg

(e) $\frac{5.2\ Gv}{1.3\ Msec}$ = _____ v/sec

11) (a) A new 600 megawatt power plant is to be built. 600 megawatts = (*circle the correct answer*)

A) 6 billion watts B) 6×10^6 watts C) 600 million watts D) None of these

(b) A 200 mg once-a-week allergy pill has just been FDA approved. 200 mg =

A) 0.2 grams B) 2×10^3 grams C) 2 thousand grams D) None of these

(c) A 0.23μv setting must be made on a dial that only has mv. What setting should be used?

A) 230 mv B) 0.00023 mv C) 0.023 mv D) None of these

(d) A storage device has 5,500,000,000 KB. This is equivalent to:

A) 5.5 GB B) 5.5×10^3 MB C) 5,500 GB D) None of these

(e) There are about 8 billion people in the world. Assume each person (on average) is responsible for the consumption of 20 gallons of oil per month. How much total oil is consumed per year? Write your answer in scientific notation.

Use	5,280 ft = 1 mi	7.48 gal = 1 ft^3	2.54 cm = 1 in	1.61 km = 1 mi

Round to a whole number

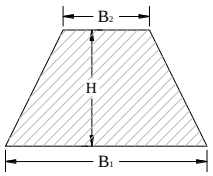
12) 0.1752 mi → ft

13) mach 2 = 2200 ft/sec → mph

14) 5 million gpm → cfs

15) 54,000 sq-in → sq-ft

16) What is the area (as sq-ft) of the trapezoid shown?
B_1 = 22' 8", B_2 = 15' 4", H = 18' 7"



Direct Proportions

18) (a) Solve for x: $\frac{32}{15} = \frac{x}{70}$ (b) Solve for x: $\frac{18.3}{1.5} = \frac{400}{x}$

Basic Geometries-

17) A circle has a 3' 5" radius.
(a) Give the Area to the nearest tenth sq-ft. (b) Give the Circumference to the nearest inch.

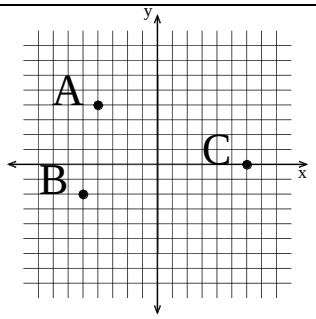
(c) A triangle has sides 28, 45, 53. Use Heron's formula to find its area.

A box is 18" × 23" × 50". Give the volume in cu-in and cu-ft.

(d) cu-in: _____ (e) cu-ft: _____

Graphs and their Interpretation:

19a) Write down the coordinates of the three points:

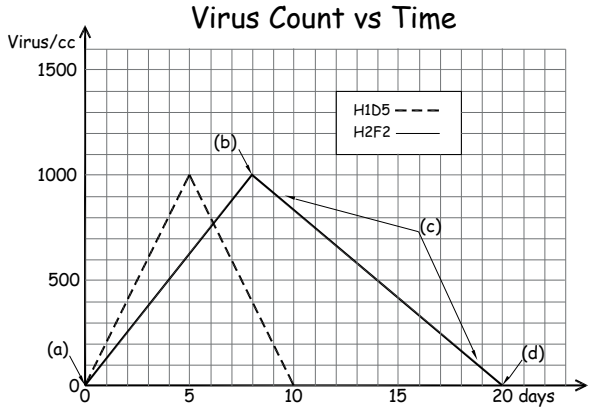


A = B = C =

19b) Plot and **label**:

P = (7, -7) Q = (0, 8)

20) The CDC (Center for Disease Control) conducted a study of a new antiviral treatment. Both groups were infected at the same time. H1D5 patients received the treatment and H2F2 patients did not receive the treatment. Based on the graph shown, briefly answer the following questions USING EVERYDAY LANGUAGE PERTAINING TO A PERSON'S HEALTH. Your answer must clearly demonstrate that you have interpreted the graph correctly.



(a) What occurred at point (a)?

(b) On what day are H2F2 patients sickest?

(c) What occurred during section (c)?

(d) What occurred at point(d)

(e) What was the overall outcome of the treatment vs. no treatment?

BONUS (5 points)
A rectangular pool is 50 yds × 42' 7 $\frac{1}{2}$" × 8' 6 $\frac{7}{8}$". How many gallons of water will that hold?

Mth 85 Exam 1 *Franz Helfenstein* **NAME** KEY

Your work must be **clearly legible** with answers **simplified** and **boxed** in for full credit. For partial credit show your work/intermediate steps. Units required where applicable. 100 points

True/False: Circle T (true) if always true otherwise circle F (false). (½ pts ea)

1) (a) T (F) 10^{12} = 10 trillion

(b) (T) F $8\frac{3}{4} = 8 + 3/4$

(c) (T) F $3(4 + 5) = 3[4 + 5]$

(d) T (F) $6^3 = 666$

(e) (T) F $9/25 = 36\%$

(f) T (F) $x_2 = x^2$

(g) T (F) $7 + 5/6 = \frac{7+5}{6}$

(h) (T) F $2\{ 2 + 2[2 + (2)(2)] \} = 28$

(i) (T) F $\pi > 3.14$

(j) T (F) $\frac{3^2 - 9}{4 - 2^2} = 0$

Order of Operations: Simplify to an integer or a reduced fraction. Write improper fractions as mixed numbers.

2) (a) $8 \times 20 - 10 \times 5 =$ 110 (b) $60 - 10(9 - 17)5 - 12 =$ 448

(c) $\frac{(-2)(3)(-4)}{12 + (4)(-3)} =$ undefined (d) $\frac{8 - 6 \times 3}{5 - 4 \times 5} = \frac{-10}{-15} = \frac{2}{3}$ (e) $\sqrt{3(11 - 5)4 + 9} = \sqrt{81} = 9$

Absolute Values: Simplify to an integer or a reduced fraction. Write improper fractions as mixed numbers.

3) (a) $|-65| =$ 65 (b) $|38 - 57| =$ 19 (c) $60 - 20|7 - 13| =$ −60

Exponents: Simplify to an integer or a reduced fraction. Write improper fractions as mixed numbers.

4) (a) $4^3 =$ 64 (b) $-6^2 =$ −36 (c) $\frac{(\frac{2}{3})^2}{2^3 - 3^2} =$ −4/9

(d) $1763987425598^0 =$ 1 (e) $7^{-2} =$ 1/49

Fractions: Simplify to an integer or a reduced fraction. Write improper fractions as mixed numbers.

5) (a) $1\frac{1}{4} - 3\frac{5}{8} =$ $-2\frac{3}{8}$ (b) $4\frac{1}{3} \times 2\frac{2}{3} =$ $11\frac{5}{9}$ (c) $\frac{250}{1\frac{7}{8}} =$ $133\frac{1}{3}$

(d) $[8\frac{5}{8}]^2 =$ $74\frac{25}{64}$ (e) $\sqrt{(\frac{1}{2})(12\frac{5}{8} + 2\frac{1}{2})} =$ $2\frac{3}{4}$

Scientific Notation

6) Convert to a decimal number: (a) $1.7 \times 10^4 =$ 17000 (b) $6.2 \times 10^{-3} =$ 0.0062

Convert to scientific notation: (c) 12,300,000 = 1.23×10^7 (d) 0.00070 = 7.0×10^{-4}

(e) 420 million people live in North America. Write that number in scientific notation.

4.2×10^8 people

Calculator Use: Simplify and round to a single number accurate to the **hundredths place** (#.##).

7) (a) $\frac{26 + 84}{(4.8)(3.8)} \approx 6.03$ (b) $\frac{26.7 + 11.5}{\sqrt{4.3 - 4.3}} \approx -17.16$ (c) $\frac{\sqrt{86 + 14}}{7.2\sqrt{2.56}} \approx 2.02$

(d) $\frac{2\frac{3}{8} + 8\frac{3}{4}}{(4\frac{2}{3})\pi} \approx 0.76$ (e) $\sqrt{(5.2 - 3.4)96 - 54} \approx 10.90$

Rounding Problems: Simplify to one decimal number **rounded according to our class rules.**

8) (a) 52,868 + 10,611 + 10,500 ≈ (*circle the most correct answer*)

A) 73979 B) 73980 C) 74000 D) 74000 E) None of these

(b) 106.657 × 125 × 1.875 ≈ (*circle the most correct answer*)

A) 24997.7 B) 24998 C) 25000 D) 25000 E) None of these

(c) $\frac{2.4 \times 1.6}{5.3 \times 9.5} \approx 0.076$ (d) 11.48 + 3.16 - 4.5 ≈ 10.1

(e) A rectangular warehouse floor is approximately 60 ft × 90 ft. What accuracy should be used when measuring those dimensions so that the resulting area is accurate to the nearest square foot?

Place 0's in the required slots. 60.00 ft × 90.00 = 5400

Working with Measurements *Correct units required in answer.*

9) (a) Convert 737" to ft-in (b) Convert 17' 5" to ##.## ft (c) Convert 7' 7 $\frac{7}{8}$ " to #.### ft

61'5" 17.42' 7.656'

Round each measurement to feet-inches with the inches to the nearest 16th inch.

(d) 937.6982 in ≈ 78 ft 1 $\frac{11}{16}$ in

(e) A 37' 9 $\frac{5}{8}$" bar is cut into 3 equal pieces. Give the length of each piece to the nearest 16th inch.

12 ft 7 $\frac{3}{16}$ in

Abbreviations and Prefixes

10) Write in an alternative form as indicated. Removing the original M, G, μ. Many possible answers

(a) 7 $\frac{1}{2}$ Mb = 7.5×10^6 b (b) 50 thousandths cm = 0.5 mm

(c) 400 Gw = 4×10^{11} w (d) 70 μg = 0.07 mg

(e) $\frac{5.2 \text{ Gv}}{1.3 \text{ Msec}}$ = 4,000 v/sec

11) (a) A new 600 megawatt power plant is to be built. 600 megawatts = *(circle the correct answer)*

A) 6 million watts B) 6×10^6 watts C) 600 million watts

D) 6 billion watts E) 60,000 watts F) None of these

(b) A 200 mg once-a-week allergy pill has just been FDA approved. 200 mg =

A) 2 grams B) 2×10^3 grams C) 2 thousand grams

D) 0.2 grams E) 0.002 grams F) None of these

(c) There are about 7 billion people in the world. Assume each person (on average) is responsible for the consumption of 20 gallons of oil per month. How much total oil is consumed per year? Write your answer in scientific notation.

$$7 \times 10^9 \text{ people} \frac{20 \text{ gal}}{\text{month-people}} \times \frac{12 \text{ mo}}{\text{yr}} = 1.68 \times 10^{12} \text{ gal/yr}$$

Use	5,280 ft = 1 mi	7.48 gal = 1 ft^3	2.54 cm = 1 in	1.61 km = 1 mi

Round to a whole number

12) 0.1752 mi → ft

$$0.1752 \text{ mi} \left[\frac{5280 \text{ ft}}{1 \text{ mi}}\right] \cong 925'$$

13) mach 2 = 2200 ft/sec → mph

$$2200 \frac{\text{ft}}{\text{sec}} \left[\frac{1 \text{ mi}}{5280 \text{ ft}}\right]\left[\frac{3600 \text{ sec}}{1 \text{ hr}}\right] = 1500 \text{ mph}$$

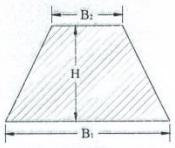
14) 5 million gpm → cfs

$$5 \times 10^6 \frac{\text{gal}}{\text{min}} \left[\frac{1 \text{ min}}{60 \text{ sec}}\right]\left[\frac{1 \text{ cuft}}{7.48 \text{ gal}}\right] = 11{,}141 \text{ cfs}$$

15) 54,000 sq-in → sq-ft

$$54000 \text{ in}^2 \left[\frac{1^2 \text{ ft}^2}{12^2 \text{ in}^2}\right] = 375 \text{ ft}^2$$

16) What is the area (as sq-ft) of the trapezoid shown?
B_1 = 22' 8", B_2 = 15' 4", H = 18' 7"



$$A \cong \frac{706.17}{2} \text{ ft}^2 = 353.08 \text{ ft}^2$$

Direct Proportions

18) (a) Solve for x: $\frac{32}{15} = \frac{x}{70}$ (b) Solve for x: $\frac{18.3}{1.5} = \frac{400}{x}$

$x = \frac{448}{3}$ $x \approx 32.8$

Basic Geometries-

17) A circle has a 3' 5" radius.
(a) Give the Area to the nearest tenth sq-ft. (b) Give the Circumference to the nearest inch.

$A \sim 36.7$ sf 258" or 21' 6"

(c) A triangle has sides 28, 45, 53. Use Heron's formula to find its area.

$S = 63$ $A = 630$

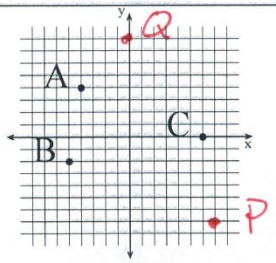
A box is 18" × 23" × 50". Give the volume in cu-in and cu-ft.

(d) cu-in: $20{,}700\ in^3$ (e) cu-ft: $11.98\ ft^3$

Graphs and their Interpretation:

19a) Write down the coordinates of the three points:

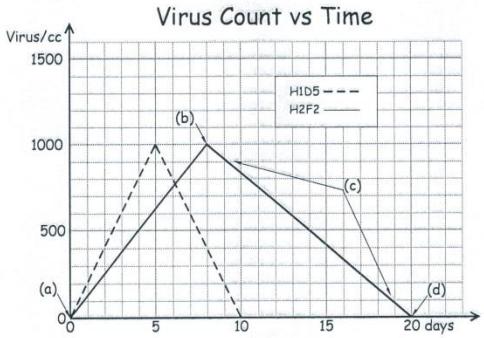
A = (-4, 4) B = (-5, -2) C = (6, 0)



19b) Plot and **label**:

P = (7, -7) Q = (0, 8)

20) The CDC (Center for Disease Control) conducted a study of a new antiviral treatment. Both groups were infected at the same time. H1D5 patients received the treatment and H2F2 patients did not receive the treatment. Based on the graph shown, briefly answer the following questions USING EVERYDAY LANGUAGE PERTAINING TO A PERSON'S HEALTH. Your answer must clearly demonstrate that you have interpreted the graph correctly.



(a) What occurred at point (a)? Infection

(b) On what day are H2F2 patients sickest? Day 8

(c) What occurred during section (c)?
Patients got better

(d) What occurred at point(d)
Patients were cured

(e) What was the overall outcome of the treatment vs. no treatment?
With treatment, patients got better in half the time. They got just as sick.

BONUS (5 points)
A rectangular pool is 50 yds × 42' 7 $\frac{1}{2}$" × 8' 6 $\frac{7}{8}$". How many gallons of water will that hold?

$54813\ ft^3 \left[\frac{7.41\ gal}{1\ ft^3}\right] \approx 410{,}002\ gal$