Instructor:	Frank Secretain
Course:	Math 150
Date:	May 26, 2025
Assessment:	Test 1
Time allowed:	110 minutes
Devices allowed:	Pencil, pen, eraser, calculator
Notes from instructor:	Be neat. Show your work where needed. Box final answers.
Marks allocated:	4 questions worth 25 marks
Percentage of final grade:	25% of final grade

Formula Sheet

Order of Operations

$$ac + bc = c(a + b)$$

exponents

$$a^n a^m = a^{n+m}$$

$$(a^n)^m = a^{nm}$$

$$(ab)^n = a^n b^n$$

$$a^0 = 1$$

$$a^{-n} = \frac{1}{a^n}$$

radicals

$$a^{\frac{n}{m}} = \sqrt[m]{a^n}$$

Relative Velocity

$$\vec{v}_{\frac{A}{C}} = \vec{v}_{\frac{A}{B}} + \vec{v}_{\frac{B}{C}}$$

Linear equations (Cramer's rule)

$$x_i = \frac{det(A_i)}{det(A)}$$

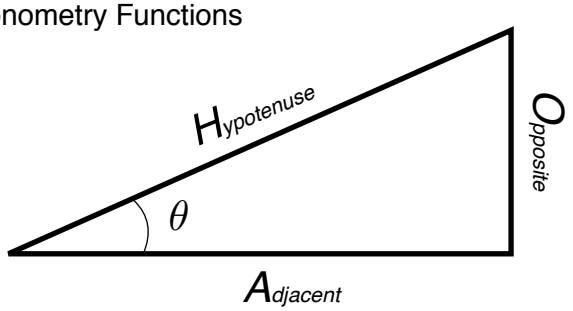
Forms of a 2nd order polynomial

$$y = ax^2 + bx + c$$

$$y = a(x - h)^2 + k$$

$$y = (x - m)(x - n)$$

Trigonometry Functions



$$sin(\theta) = \frac{O}{H} \qquad sin^{-1}\left(\frac{O}{H}\right) = \theta$$

$$cos(\theta) = \frac{A}{H} \qquad cos^{-1}\left(\frac{A}{H}\right) = \theta$$

$$tan(\theta) = \frac{O}{A} \qquad tan^{-1}\left(\frac{O}{A}\right) = \theta$$

Pythagoras Theorem

$$H^2 = O^2 + A^2$$

Unit Conversions

angles

$$2\pi = 6.28 \text{ rad} = 360^o$$

mass

$$1 \text{ kg} = 2.2 \text{ lbs.}$$

lengths

$$1 \text{ mile} = 1.6 \text{ km}$$

$$1 \text{ inch} = 2.54 \text{ cm}$$

$$1 \text{ m} = 3.3 \text{ ft}$$

volumes

$$1 \text{ gallon} = 3.78 \text{ Litres}$$

(4 marks) Match the “type of number” with the best “example number”. Draw a line to match the “type of number” to the “example number” to indicate your answer.

rational	$-\sqrt{2}$
integer	-2.2
natural	-2
irrational	$+2$

(3 marks) Determine
a) the total number of significant digits and
b) re-write the number in scientific notation

for the following number:

2030

a) significant digits = _____

b) scientific notation = _____

0.0002030

a) significant digits = _____

b) scientific notation = _____

0.2

a) significant digits = _____

b) scientific notation = _____

(6 marks) Given the standard unit conversion table on the formula sheet (1st page), convert each of the numbers to the stated units.

$$4.3 \ \frac{\text{lbs.}}{\text{minute}} \ \rightarrow \ \frac{\text{kg}}{\text{hour}}$$

$$0.0043 \ \frac{\text{mile}}{\text{hour}} \ \rightarrow \ \frac{\text{km}}{\text{second}}$$

$$8.34 \ \frac{\text{inch}}{\text{gallon}^2} \ \rightarrow \ \frac{\text{cm}}{\text{L}^2}$$

$$2.1 \ \frac{\text{kg}}{\text{L}} \ \rightarrow \ \frac{\text{lbs.}}{100 \ \text{mL}}$$

.(12 marks) Solve for x in the following equation.

$$2x - 6.2 = 5$$

$$4ax - b^a = c$$

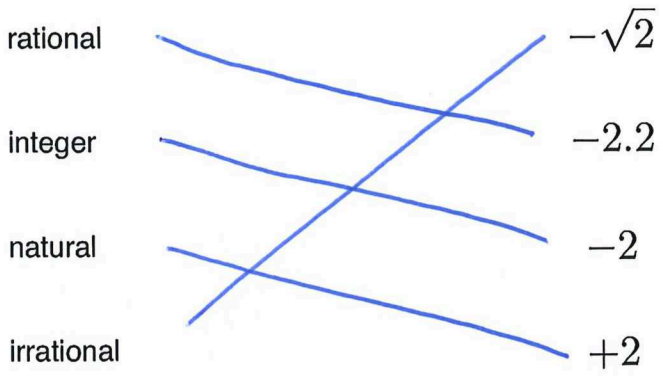
$$3x^2 + 1 = 13.1$$

$$\frac{1}{x} = \frac{a}{4b}$$

$$\log(x) - 1 = 1.2$$

$$10^x = 2385.4$$

(4 marks) Match the "type of number" with the best "example number". Draw a line to match the "type of number" to the "example number" to indicate your answer.



(3 marks) Determine

a) the total number of significant digits and

b) re-write the number in scientific notation

for the following number:

2030

a) significant digits = 3

b) scientific notation = 2.03×10^{3}

0.0002030

a) significant digits = 4

b) scientific notation = 2.030×10^{-4}

0.2

a) significant digits = 1

b) scientific notation = 2×10^{-1}

(6 marks) Given the standard unit conversion table on the formula sheet (1st page), convert each of the numbers to the stated units.

$$4.3 \ \frac{\text{lbs.}}{\text{minute}} \rightarrow \frac{\text{kg}}{\text{hour}}$$

$$4.3 \ \frac{\text{lbs}}{\text{min}} \left(\frac{1\text{ kg}}{2.2\text{ lbs}}\right)\left(\frac{60\text{ min}}{1\text{ hour}}\right) = 117.3 \ \frac{\text{kg}}{\text{hour}}$$

$$= \boxed{120 \ \frac{\text{kg}}{\text{hour}}}$$

$$0.0043 \ \frac{\text{mile}}{\text{hour}} \rightarrow \frac{\text{km}}{\text{second}}$$

$$0.0043 \ \frac{\text{mile}}{\text{hour}} \left(\frac{1.6\text{ km}}{1\text{ mile}}\right)\left(\frac{1\text{ hour}}{60\text{ min}}\right)\left(\frac{1\text{ min}}{60\text{ sec}}\right) = 1.91 \times 10^{-6} \ \frac{\text{km}}{\text{sec}}$$

$$= \boxed{1.9 \times 10^{-6} \ \frac{\text{km}}{\text{sec}}}$$

$$8.34 \ \frac{\text{inch}}{\text{gallon}^2} \rightarrow \frac{\text{cm}}{\text{L}^2}$$

$$8.34 \ \frac{\text{inch}}{\text{gallon}^2} \left(\frac{2.54\text{ cm}}{1\text{ inch}}\right)\left(\frac{1\text{ gallon}}{3.78\text{ L}}\right)\left(\frac{1\text{ gallon}}{3.78\text{ L}}\right) = 1.48 \ \frac{\text{cm}}{\text{L}^2}$$

$$= \boxed{1.48 \ \frac{\text{cm}}{\text{L}^2}}$$

$$2.1 \ \frac{\text{kg}}{\text{L}} \rightarrow \frac{\text{lbs.}}{100\text{ mL}}$$

$$2.1 \ \frac{\text{kg}}{\text{L}} \left(\frac{2.2\text{ lbs}}{1\text{ kg}}\right)\left(\frac{1\text{ L}}{1000\text{ mL}}\right)\left(\frac{100\text{ mL}}{100\text{ mL}}\right) = 0.462 \ \frac{\text{lbs}}{100\text{ mL}}$$

$$= \boxed{0.46 \ \frac{\text{lbs}}{100\text{ mL}}}$$

.(12 marks) Solve for x in the following equation.

$$2x - 6.2 = 5$$

$+6.2$ $+6.2$

$$\frac{2x}{2} = \frac{11.2}{2}$$

$$\boxed{x = 5.6}$$

$$4ax - b^a = c$$

$+b^a$ $+b^a$

$$\frac{4ax}{4a} = \frac{c + b^a}{4a}$$

$$\boxed{x = \frac{c+b^a}{4a}}$$

$$3x^2 + 1 = 13.1$$

-1 -1

$$\frac{3x^2}{3} = \frac{12.1}{3}$$

$$\sqrt{x^2} = \sqrt{4.0\bar{3}}$$

$$\boxed{x = 2.008}$$

$4bx\left(\frac{1}{x}\right)=\left(\frac{a}{4b}\right)4bx$

$\frac{4b}{a} = \frac{ax}{a}$

$$\boxed{x = \frac{4b}{a}}$$

$\log(x) - 1 = 1.2$ (+1 +1)

$\log(x) = 2.2$

$10^{\log(x)} = 10^{2.2}$

$$\boxed{x = 158.5}$$

$10^x = 2385.4$

$\log(10^x) = \log(2385.4)$

$$\boxed{x = 3.378}$$

Instructor:	Frank Secretain
Course:	Math 150
Date:	May 21, 2025
Assessment:	Test 1 (practice)
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Notes from instructor:	Be neat. Show your work where needed. Box final answers.
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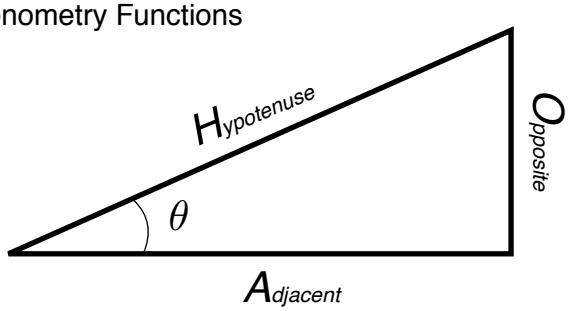

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$$H^2 = O^2 + A^2$$

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$$1 \text{ inch} = 2.54 \text{ cm}$$

$$1 \text{ m} = 3.3 \text{ ft}$$

volumes

$$1 \text{ gallon} = 3.78 \text{ Litres}$$

(4 marks) Match the “type of number” with the best “example number”. Draw a line to match the “type of number” to the “example number” to indicate your answer.

irrational	0
integer	$-\sqrt{1}$
rational	-2.1
whole	$\sqrt{3}$

(3 marks) Determine

a) the total number of significant digits and

b) re-write the number in scientific notation

for the following number:

50200

a) significant digits = _____

b) scientific notation = _____

0.020310

a) significant digits = _____

b) scientific notation = _____

0.70

a) significant digits = _____

b) scientific notation = _____

(6 marks) Given the standard unit conversion table on the formula sheet (1st page), convert each of the numbers to the stated units.

$$3.2\ \frac{\text{kg}}{\text{second}} \rightarrow \frac{\text{lbs.}}{\text{minute}}$$

$$0.0452\ \frac{\text{radians}}{\text{inch}} \rightarrow \frac{\text{degrees}}{\text{m}}$$

$$0.00873\ \frac{\text{gallon}^2}{\text{minute}} \rightarrow \frac{\text{Litres}^2}{\text{day}}$$

$$954 \frac{\text{kg}}{\text{L}} \rightarrow\ \frac{\text{lbs}}{100\ \text{mL}}$$

.(12 marks) Solve for x in the following equation.

$$4x - 8.3 = 2$$

$$4ax - c = b$$

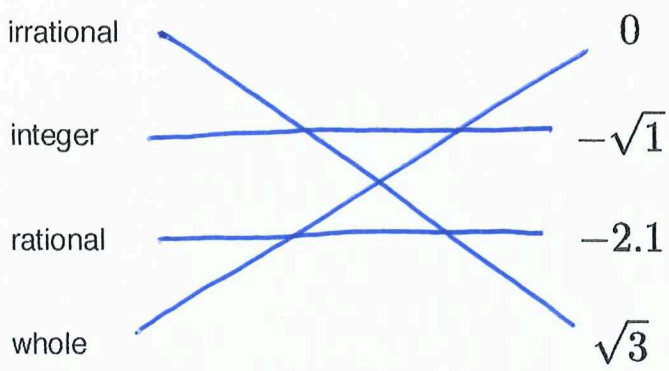
$$5x = \frac{a}{4b}$$

$$\frac{1}{3x} = \frac{a}{2c}$$

$$3x^2 - 1 = b + 2$$

$$\log(x) = 0.0342$$

(4 marks) Match the "type of number" with the best "example number". Draw a line to match the "type of number" to the "example number" to indicate your answer.



(3 marks) Determine

a) the total number of significant digits and

b) re-write the number in scientific notation

for the following number:

50200

a) significant digits = 3

b) scientific notation = 5.02×10^{4}

0.020310

a) significant digits = 5

b) scientific notation = 2.0310×10^{-2}

0.70

a) significant digits = 2

b) scientific notation = 7.0×10^{-1}

(6 marks) Given the standard unit conversion table on the formula sheet (1st page), convert each of the numbers to the stated units.

$$3.2\ \frac{\text{kg}}{\text{second}} \rightarrow \frac{\text{lbs.}}{\text{minute}}$$

$$3.2\ \frac{\text{kg}}{\text{s}}\left(\frac{2.2\ \text{lbs}}{1\ \text{kg}}\right)\left(\frac{60\ \text{s}}{1\ \text{min}}\right) = 422.4\ \frac{\text{lbs}}{\text{min}} = 420\ \frac{\text{lbs}}{\text{min}}$$

$$0.0452\ \frac{\text{radians}}{\text{inch}} \rightarrow \frac{\text{degrees}}{\text{m}}$$

$$0.0452\ \frac{\text{rads}}{\text{inch}}\left(\frac{360\ \text{deg}}{6.28\ \text{rad}}\right)\left(\frac{1\ \text{inch}}{2.54\ \text{cm}}\right)\left(\frac{100\ \text{cm}}{1\ \text{m}}\right) = 102.01\ \frac{\text{deg}}{\text{m}} = 102\ \frac{\text{deg}}{\text{m}}$$

$$0.00873\ \frac{\text{gallon}^2}{\text{minute}} \rightarrow \frac{\text{Litres}^2}{\text{day}}$$

$$0.00873\ \frac{\text{gallon}^2}{\text{minute}}\left(\frac{3.78\ \text{L}}{1\ \text{gal}}\right)\left(\frac{3.78\ \text{L}}{1\ \text{gal}}\right)\left(\frac{60\ \text{min}}{1\ \text{hour}}\right)\left(\frac{24\ \text{hour}}{1\ \text{day}}\right) = 179.62\ \frac{\text{L}^2}{\text{day}} = 1.80\ \frac{\text{L}^2}{\text{day}}$$

$$954\frac{\text{kg}}{\text{L}} \rightarrow \frac{\text{lbs}}{100\ \text{mL}}$$

$$954\ \frac{\text{kg}}{\text{L}}\left(\frac{2.2\ \text{lbs}}{1\ \text{kg}}\right)\left(\frac{1\ \text{L}}{1000\ \text{mL}}\right)\left(\frac{100\ \text{mL}}{100\ \text{mL}}\right) = 209.88\ \frac{\text{lbs}}{100\text{mL}} = 2.10\ \frac{\text{lbs}}{100\text{mL}}$$

.(12 marks) Solve for x in the following equation.

$$4x - 8.3 = 2$$

$\times 8.3$ $\times 8.3$

$$\frac{4x}{4} = \frac{10.3}{4}$$

$$\boxed{x = 2.575}$$

$$4ax - c = b$$

$+c$ $+c$

$$\frac{4ax}{4a} = \frac{b+c}{4a}$$

$$\boxed{x = \frac{b+c}{4a}}$$

$$\frac{1}{5}(5x) = \left(\frac{a}{4b}\right)\frac{1}{5}$$

$$\boxed{x = \frac{a}{20b}}$$

$$(2c)(3x)\left(\frac{1}{3x}\right)=\left(\frac{a}{2c}\right)(3x)(2c)$$

$$\frac{2c}{3a}=\frac{3ax}{3a}$$

$$\frac{2c}{3a}=x$$

$$\boxed{x=\frac{2c}{3a}}$$

$$3x^2-1=b+2 \qquad \begin{matrix}+1 & +1\end{matrix}$$

$$\frac{3x^2}{3}=\frac{b+3}{3}$$

$$\sqrt{x^2}=\sqrt{\frac{b+3}{3}}$$

$$\boxed{x=\sqrt{\frac{b+3}{3}}}$$

$$\log(x)=0.0342$$

$$10^{\log(x)}=10^{0.0342}$$

$$\boxed{x=1.082}$$