"I know what we're going to do today."

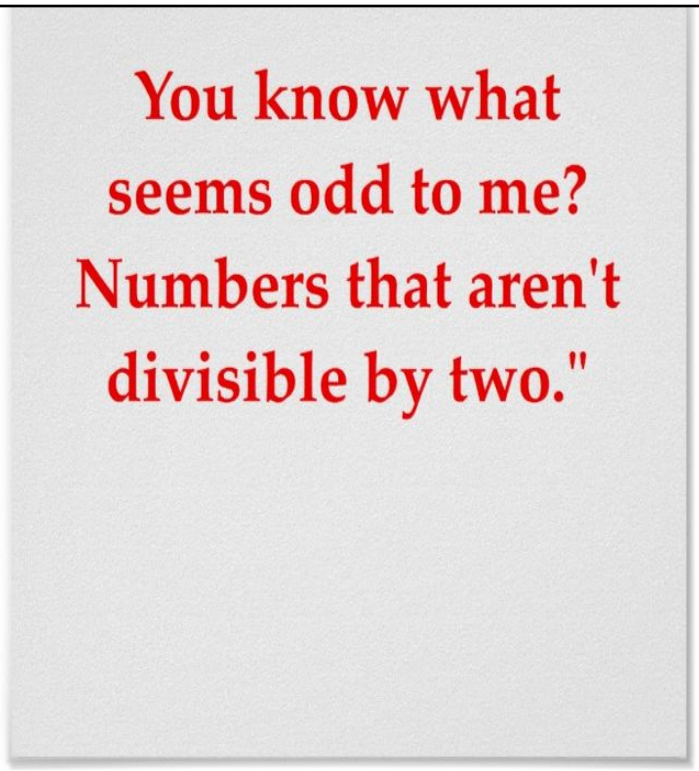
Agenda:

1) Bell: p. 95, Turn in p. 56

2) Lesson: dividing numbers in scientific notation (classwork p. 57)

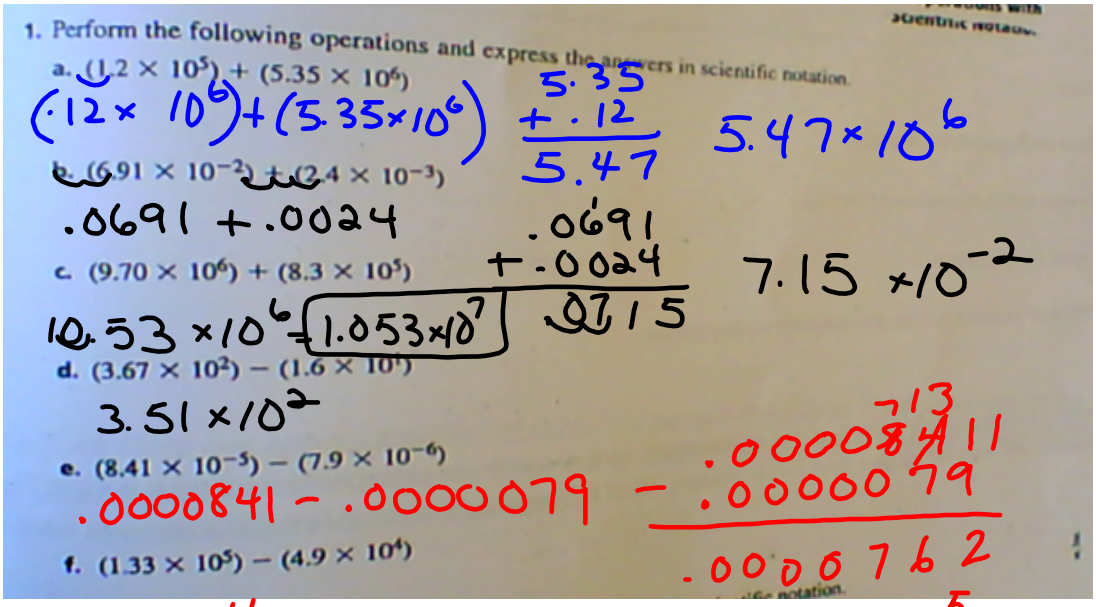
3) *Homework: p. 58-60*

Sep 15-10:44 PM



Math Joke of the Day

Oct 10-10:21 AM



Oct 6-11:37 AM

Student Task Sheet

In the powers and roots unit we have been studying, you have learned to convert between standard notation and scientific notation. You have also learned to compare numbers in scientific notation.

In this assignment I am asking you to create a poster to compare a measurement of six different items. You will choose what you are going to compare. You may use either the internet or a book. You must cite the source of your data. Your poster must include a title which clearly states what you are comparing. For each item you must include a picture, label, and proper scientific notation. The items must be placed on your poster from smallest to largest. The poster is due 2 on _____.

May 31-9:40 AM

You will be graded on:

Completion:

- Compare 6 different items

Mathematical Concepts:

- Measurements are in proper scientific notation
- Items are ordered correctly (placed from smallest to largest)

Presentation:

- Title states what you are comparing (i.e. mass, weight, volume, distance to the sun)
- Picture of each item
- Label for each item
- Source(s) is cited

Timeliness:

- Due date __/__/__

Please refer to the attached rubric as you complete your poster.

May 31-9:40 AM

Rubric for Scientific Notation Poster

	Outstanding 10	Acceptable 6	Needs Work 2
Completion	Poster includes measurements for 6 different items.	Poster includes measurements for 4-5 different items.	Poster includes measurements for 3 or less items.
Mathematical Concepts- Scientific Notation	All items are in proper scientific notation.	Poster contains 1-2 errors, either with scientific notation or placement of items.	Poster contains 3 or more errors, either with scientific notation or placement of items.
Mathematical Concepts- Comparing Numbers in Scientific Notation	All items are in correct order, from smallest scientific notation to largest.	One to two errors in ordering data.	Three or more errors in ordering data
Presentation	Poster contains title, pictures and label for all 6 items, and source is cited.	Poster is lacking 1-2 elements (title, pictures, labels, or source).	Poster is lacking 3 or more elements (title, pictures, labels, or source).
Timeliness	Poster is handed in on time.	Poster is handed in 1 class day late.	Poster is handed in more than 1 class day late.

Total possible points: 50

May 31-9:40 AM

Math 7H – Powers and Roots Name _____

Lesson– Multiplying Numbers in Scientific Notation

I can: ✓ Multiply numbers expressed in scientific notation (8.EE.4)

To multiply numbers in scientific notation:

1) Multiply the decimal factors.

2) Multiply the power of 10 factors. $10^3 \times 10^4 = 10^7$

3) Rewrite your answer in scientific notation.

Jun 3-9:40 AM

Example 1 : Multiply $(3.4 \times 10^2)(2.1 \times 10^3)$

$10^2 \cdot 10^3 = 10^5$

$$\begin{array}{r} 3.4 \\ \times 2.1 \\ \hline 34 \\ +\,680 \\ \hline 7.14 \end{array}$$

7.14×10^5

Jun 3-9:40 AM

Example 2: Multiply $(1.5\times10^{3})(5.6\times10^{-5})$

$$\begin{array}{r} {}^{3}{}^{2} \\ 1.5 \\ \times\ 5.6 \\ \hline 90 \\ +\ 750 \\ \hline 8.40 \end{array}$$

$10^{3}\cdot10^{-5}=10^{-2}$

8.40×10^{-2}

Jun 3-9:40 AM

Let's Practice!

Multiply

1) $(4.65\times10^{3})(8.9\times10^{5})$

$$\begin{array}{r} {}^{5}{}^{4} \\ 4.65 \\ \times\ 8.9 \\ \hline 4185 \\ +37200 \\ \hline 41.385 \end{array}$$

$10^{3}\times10^{5}=10^{8}$

$41.385\times10^{8+1}$

4.1385×10^{9}

2) $(7.2\times10^{1})(3.9\times10^{-4})$

$$\begin{array}{r} 7.2 \\ \times\ 3.9 \\ \hline 648 \\ 2160 \\ \hline 28.08 \end{array}$$

$10^{1}\times10^{-4}=10^{-3}$

$28.08\times10^{-3+1}$

2.808×10^{-2}

Jun 3-9:41 AM

Powers and Roots Homefun Name_____

Multiply

1) $(4.4\times10^{4})(2.5\times10^{2})$

Jun 3-9:41 AM

2) $(8.2\times10^{-2})(1.9\times10^{-3})$

3) $(3.65\times10^{2})(4.8\times10^{3})$

Jun 3-9:41 AM

4) In your own words explain how to multiply numbers written in scientific notation?

5) What is the usefulness of being able to multiply numbers in scientific notation?

Jun 3-9:41 AM

Lesson – Dividing Numbers in Scientific Notation

p. 54

I can: ✓ Divide numbers expressed in scientific notation (8.EE.4)

To divide numbers in scientific notation:

1) Divide the decimal factors.

2) Divide the power of 10 factors. Remember the quotient of powers rule. ÷

3) Rewrite your answer in scientific notation.

$$\frac{10^9}{10^2} = 10^7$$

Jun 3-10:03 AM

Example 1: Divide $\frac{6.3\times10^{6}}{1.2\times10^{2}}$

12
24
36
48
60
72

$$5.25$$
$$1.2\overline{)6.300}$$
$$-60\downarrow$$
$$30$$
$$-24\downarrow$$
$$60$$
$$-60$$
$$0$$

$$\frac{10^{6}}{10^{2}} = 10^{4}$$

$$5.25\times10^{4}$$

0

Jun 3-10:03 AM

$$1.83\times10^{-2}$$

Example 2: Divide $\frac{3.66\times10^{-5}}{2.0\times10^{-3}}$

$$1.83$$
$$2\overline{)3.66}$$
$$-2\downarrow$$
$$16$$
$$-16\downarrow$$
$$6$$
$$-6$$
$$0$$

$$\frac{10^{-5}}{10^{-3}} = 10^{-2}$$

$$-5-(-3)$$
$$-5+3=-2$$

Jun 3-10:03 AM

Let's Practice!

Divide

1) $\frac{8.2\times10^{6}}{2.0\times10^{2}}$ 4.1×10^{4}

$2\overline{)8.2}$ → 4.1

$\frac{10^{6}}{10^{2}}=10^{4}$

2) $\frac{1.512\times10^{5}}{3.6\times10^{1}}$

$3.6\overline{)1.512}$ → $.42\times10^{4}$ → 4.2×10^{3}

-144

72

-72

0

36
72
108
144
180

Jun 3-10:03 AM

Review

1) $(5.4\times10^{4})(1.5\times10^{8})$ 5.4×1.5 $10^{4}\times10^{8}=10^{12}$

2) $(4.2\times10^{0})(1.2\times10^{-3})$

3) $(8.65\times10^{-2})(4.8\times10^{3})$

Jun 3-10:03 AM

4) In your own words explain how to divide numbers written in scientific notation?

Jun 3-10:04 AM

$1 \div 10 = .1$

$10^{-1} = \frac{1}{10} = .1$

$10^{-2} = \frac{1}{10^2} = \frac{1}{100} = .01$

$10^{-6} = \frac{1}{10^6} = \frac{1}{1{,}000{,}000} = .000001$

$5^{-3} = \left(\frac{1}{5^3}\right) = \left(\frac{1}{125}\right)$

$3^{-4} = \frac{1}{3^4} = \frac{1}{81}$

3 y^x 4

May 28-9:56 AM

Name: _____ **Math 7H**

- **Exponents hw -2**

Rule: $a^s \times a^t = a^{s+t}$

This rule says to add the exponents when multiplying two numbers with the same base.

Problems:

Simplify

1) $3^2 \times 3^5$ 3^7

2) $-3x^5 \times 4x^6$ $-12x^{11}$

3) $xy^4 \times x^7$ x^8y^4

4) $(3x)(2x^2)$ $6x^3$

May 24-2:26 PM

5) $6^5 \times 6^8$ 6^{13}

6) $6x^{10} \times 2x$ $12x^{11}$

7) $(7x^2)(-3x^3)$ $-21x^5$

8) $(2a^4)(-4a^3)$ $-8a^7$

9) $(-9x^4)(-8x^4)$ $72x^8$

10) $(b^2)(-2b^3)$ $-2b^5$

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(1) $24x^6$
(2) $-450x^8$
(3) $-15x^{10}$
(4) $45x^{13}$
(5) $90x^5y^6$
(6) $-500x^{12}y^{13}$
(7) $40x^{12}y^{18}$
(8) $10x^{23}y^{91}$
(9) $72x^{12}y^{18}$
(10) $-121x^8y^{10}$
(11) $6x^7$
(12) $16x^2$
(13) $5x^4$
(14) $2y^2$
(15) $20x^3y^4$
(16) $-5x^5y^2$
(17) $-7x^5y^3$
(18) $15x^3y^1$
(19) $\frac{5}{2}x^6$
(20) $\frac{1}{2}xy^4$
(21) $\frac{2}{3}y$
$.6x^9y^1$
(22) $12x^1y^{16}$
(23) $56x^3y^3$
(24) $\frac{x^2}{x^2} = \frac{x \cdot x}{x \cdot x} = 1$
Let $x = 3$ $\frac{9}{9} = 1$
(25) $\frac{80x^9}{16x^4} = 5x^5$

May 28-9:44 AM

Name: _____ Exponents

Learning Objective:
Students will develop the laws of exponents for multiplication and division.

1. What is an exponent?

An exponent tells how many times to multiply a number by itself.

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Example: 2^4 stands for $2\times2\times2\times2$, or 2 is used as a

factor 4 times.

In the example, 2 is the base, and

the number 4 is the exponent.

In standard form, $2^4 = 16$.

calculator y^x $\wedge$

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Example: 4^3 stands for $4\times4\times4=64$.

4 is the base and 3 is the exponent.

Practice: Underline each base and circle each exponent.

1) 12^5

2) x^2

3) $4a^3$ $4\cdot a\cdot a\cdot a$ Coefficient

4) $(-5)^7$

5) $(3x)^4$ $3x\cdot3x\cdot3x\cdot3x$

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Rule 1: $a^s \times a^t = a^{s+t}$

This rule says to add the exponents when multiplying two numbers with the same base.

Why does this work?

To prove this rule, write out $3^3 \times 3^2$ using factors.
How many 3s are there? $3 \times 3 \times 3 \times 3 \times 3 = 3^5$

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Examples:

1) Simplify: $3^2 \times 3^5 = 3^7$

2) Simplify: $10^5 \times 10^6 = 10^{11}$

3) Simplify: $2x^4 \times 1x^8 = 2x^{12}$

4) Simplify: $(3a^5)(a^2) = 3a^7$

What did you notice about coefficients?

multiply coefficients

$(3x^4)(4x^5) = 12x^9$

$3 \cdot x \cdot x \cdot x \cdot x \cdot 4 \cdot x \cdot x \cdot x \cdot x \cdot x$

$3 \cdot 4 \; x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x$

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Practice: Simplify each expression below.

1) $4^3 \times 4^6$ $= 4^9$

2) $x^2 \bullet x^1$ $= x^3$

3) $(3a^2)(2a^4)$ $6a^6$

4) $(-3)^2 \times (-3)^2$ $(-3)^4$

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Rule 2: When you divide with the same base, Subtract the exponents.

Why does this work?

To prove this rule, write out $\frac{4^5}{4^2}$ using factors. $\frac{4 \times 4 \times 4 \times 4 \times 4}{4 \times 4}$

Simplify.

How many 4s are remaining? 4^3

May 23-9:32 AM

Examples:

1) Simplify: $6^5 \div 6^3 = 6^2 = 36$

2) Simplify: $6x^{10} \div 2x^1 = 3x^9$

3) Simplify: $\frac{16x^1}{4x^1} = 4x^0 = 4$

What did you notice about coefficients?

Divide coefficients

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Practice: Simplify each expression below.

1) $2^5 \div 2^4 = 2^1 = 2$

2) $x^3 \div x^5 = x^{-2}$

3) $\frac{14x^2}{7x^1} = 2x^1$

$2x$

4) $\frac{-12a^5}{3a^3} = -4a^2$

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More with Exponents

Rule #3: $(6^2)^4 = 6^8$

When you raise an exponent to a power, multiply the exponents.

Examples:

1) Solve for n: $(3^4)^3 = 3^n$

2) Solve: $(12^2)^3 = \underline{12^6} = 2{,}985{,}984$

3) Solve: $(2x^5)^3 = \underline{2^3x^{15}} = 8x^{15}$

$(2x^5)(2x^5)(2x^5)$

$\underbrace{2\cdot 2\cdot 2}_{8}\cdot\underbrace{x^5\cdot x^5\cdot x^5}_{x^{15}}$

May 23-9:32 AM

Powers of Ten

$10^3 = \underline{1000}$

$10^2 = \underline{100}$

$10^1 = \underline{10}$

$10^0 = \underline{1}$

$10^{-1} = \underline{\frac{1}{10}} = .1$

$10^{-2} = \underline{\frac{1}{100}} = .01$

$10^{-3} = \underline{\frac{1}{1000}} = .001$

$\frac{1}{1}$

$(-10)^3 = (-10)(-10)(-10)$

$= -1000$

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Rule #4: $a^0 =$ 1

Rule #5: $a^{-s} = \frac{1}{a^s}$

$10^{-2} = \frac{1}{10^2} = \frac{1}{100} = .01$

$3^{-3} = \frac{1}{3^3} = \frac{1}{27}$

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Examples:

1) $10^4 =$ 10,000

2) $10^{-5} = \frac{1}{10^5} = \frac{1}{100000} = .00001$

3) $10^{-3} = \frac{1}{10^3} = \frac{1}{1000} = .001$

4) $3^0 =$ 1

5) $6^{-2} = \frac{1}{6^2} = \frac{1}{36}$

6) $8^0 =$ 1

7) $x^0 =$ 1

8) $3x^0 = 3 \cdot 1 = 3$

9) $2^{-3} = \frac{1}{2^3} = \frac{1}{8}$

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Homework:

Simplify.

$\frac{x \cdot x}{x}$

1) $(7x^2)(-3x^3)$ $-21x^5$

2) $\frac{25x^2}{5x^1}$ $5x^1$

3) $\frac{27x^5}{-3x^2}$ $-9x^3$

4) $\frac{12x^2}{4x}$ $3x$

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5) $(2a^4)(-4a^3)$ $-8a^7$

6) $(-9x^4)(-8x^4)$ $72x^8$

7) $\frac{36x^4}{9x^1}$ $4x^3$

8) $\frac{28x^5}{7x^2}$ $4x^3$

9) $(b^2)(-2b^3)$ $-2b^5$

10) $\frac{15x^2}{3x^3}$ $5x^{-1}$ or $\frac{5}{x}$

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(13) $7v^3 \cdot 10u^3v^5 \cdot 8uv^3$

$7 \cdot 10 \cdot 8 = 560$

$v^3 \cdot v^5 \cdot v^3 = v^{11}$ $560u^4v^{11}$

$u^3 \cdot u = u^4$ $560v^{11}u^4$

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(1) $4^2 \cdot 4^2 =$ 16×16

$4 \cdot 4 \cdot 4 \cdot 4$

$16^2 = 256$

$4^4 = 256$

$7^2k^2 = 49k^2$

(12) $6x \cdot 6x^3$

6^2x^4

$36x^4$

$(2b^2)^4$

$2b^2 \cdot 2b^2 \cdot 2b^2 \cdot 2b^2$

$16b^8 = 2^4b^8$

May 24-10:03 AM

Scientific Notation

Scientific Notation: product of a number from 1 to 10 and a power of ten.

Standard Form:	Scientific Notation
1. 32,000	3.2 X 10^4

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2. 1,200,000	_____
3. 7,600	7.6 X 10^3
4. .0064	6.4 X 10^{-3}
5. _____	3.5 X 10^{-2}
6. 647,500	_____
7. .000465	_____
8) 6,425,000	_____
9) _____	3.4 X 10^6
10) _____	1.256 X 10^{-1}

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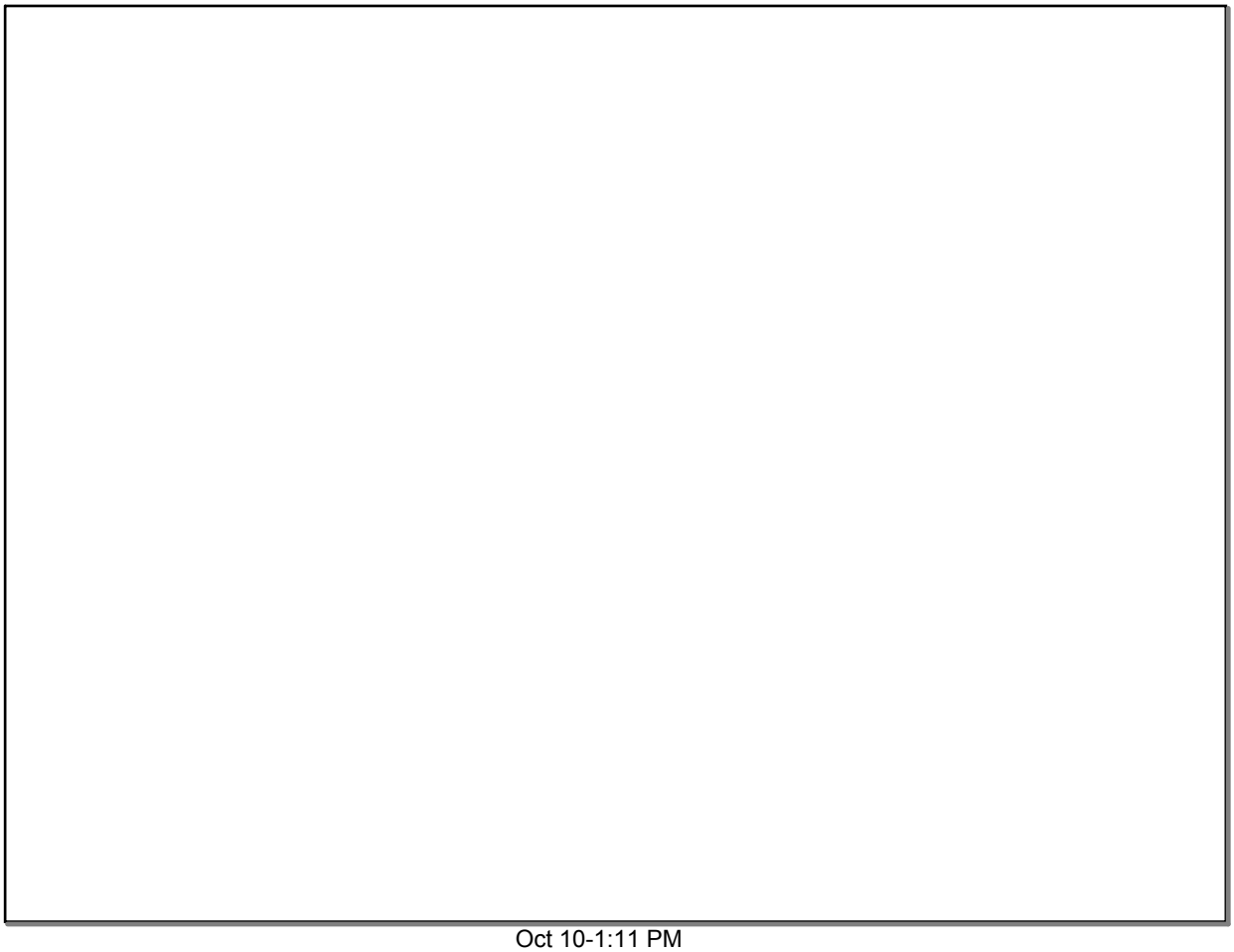

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