# BE - Geometry 1 | Tuesday

4-17-12

ACT PRACTICE

① Find the determinant of the matrix A when $p = -2$ and $g = -1$

$$|A| = \begin{vmatrix} 4p & -3g \\ -3p & 2g \end{vmatrix}$$

② Find the product, if possible:

$$\begin{bmatrix} 6 & 8 \end{bmatrix} \cdot \begin{bmatrix} 1 & 5 & 3 \\ 4 & 6 & 2 \end{bmatrix}$$

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ANS

① $-2$

② $\begin{bmatrix} 38 & 78 & 34 \end{bmatrix}$

# Geometry 1 – HW Review Pg. 753 #13-23 ODD

(13) $\begin{bmatrix} 6 & -16 \\ 3 & 4 \end{bmatrix}$ (15) $\begin{bmatrix} 3 & -8 \\ 4 & 9 \end{bmatrix}$ (17) $\begin{bmatrix} -12 & 48 \\ -60 & -24 \end{bmatrix}$

(19) $\begin{bmatrix} 22 & -40 \\ -47 & 10 \end{bmatrix}$ (21) $\begin{bmatrix} -4 & 8 \\ 59 & -48 \end{bmatrix}$

(23) $\frac{1}{2} X Z$ $Z = \begin{bmatrix} 4 & -8 \\ -7 & 0 \end{bmatrix}$ $[2\times2] \cdot [2\times2]$ OK

product is 2×2

$$\begin{vmatrix} -8 & 0 \\ 4 & -7 \end{vmatrix}$$

$$X = \begin{bmatrix} 2 & -8 \\ 10 & 4 \end{bmatrix} \Rightarrow \frac{1}{2}\begin{bmatrix} 8+56 & -16+0 \\ 40-28 & -80+0 \end{bmatrix}$$

$$= \frac{1}{2}\begin{bmatrix} 64 & -16 \\ 12 & -80 \end{bmatrix}$$

$$\begin{bmatrix} 32 & -8 \\ 6 & -40 \end{bmatrix} \leftarrow Z_{ANS}$$

In the exponential function $y = b^x$ the independent variable is an exponent.

If the dependent variable is an exponent $\Rightarrow x = b^y$ there is no way to get $y$ "by itself" without defining a new function - this is the logarithmic function $\boxed{y = \log_b x}$

read "y equals the log to base b of x"

A logarithm is an exponent!!

A LOGARITHM IS AN EXPONENT!!

In $y = \log_b x$

$y$ is the exponent of base $b$ that equals $x$

$b^y = x$

(Ex) $\log_3 9 = 2 \quad \therefore 3^2 = 9$

$\log_5 125 = 3 \quad \therefore 5^2 = 125$

$\log_2 16 = x \quad \therefore 2^x = 16$

$\boxed{x = 4}$

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If no base is shown, it is assumed to be base 10

$\log 100 = x \quad \therefore 10^x = 100 \quad \boxed{x = 2}$

$\log 10 = x \quad \therefore 10^x = 10 \quad \boxed{x = 1}$

$\log 50 = x \quad \therefore 10^x = 50 \quad \boxed{x \approx 1.69897}$

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If "ln" is used ⇒ natural logarithm

(Latin) ⇒ logarithmus naturali

the base is $e \approx 2.718281828\ldots$

$\ln e = x \quad \therefore e^x = e \quad \boxed{x = 1}$

$\ln 50 = x \quad \therefore e^x = 50 \quad \approx 3.912$

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* $\log_{10}$ and ln are built into all scientific calculators

Evaluate:

(Ex) $\log_4 64$ $\quad 4^x = 64$

$\boxed{x = 3}$

(Ex) $\log_5 25$ $\quad 5^x = 25$

$\boxed{x = 2}$

(Ex) $\log_{36} 6$ $\quad 36^x = 6$

$\boxed{x = \frac{1}{2}}$

Rewrite in Exponential form:

(Ex) $\log_5 25 = 2$ $\quad \boxed{5^2 = 25}$

(Ex) $\log_{81} \frac{1}{9} = -\frac{1}{2}$ $\quad 81^{-\frac{1}{2}} = \frac{1}{9}$

$\boxed{\frac{1}{81^{\frac{1}{2}}} = \frac{1}{9}}$

RATIONALIZED:

$\frac{81^{\frac{1}{2}}}{81} = \frac{1}{9}$

Rewrite in logarithmic form:

(Ex) $8^{\frac{1}{3}} = 2$

$\log_8 2 = \frac{1}{3}$

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

$\log_{36}\left(\frac{1}{6}\right) = -\frac{1}{2}$

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

$\frac{1}{36^{\frac{1}{2}}} = \frac{1}{6}$ ✓

(Ex) $2^6 = 64$

$\log_2 64 = 6$

Use the definition of logarithms to solve exponential equations (with same base)

(Ex) $\log_6(3b-2) = \log_6(-b+2)$

$6^{?} = 6^{?}$

$3b-2 \quad -b+2$

The exponent of base 6 that produces $3b-2$ = The exponent of base 6 that produces $-b+2$

$\therefore 3b-2 = -b+2$

$4b = 4$ $\quad \boxed{b=1}$

CK $\log_6(3(\,)-2) \stackrel{?}{=} \log_6(-(\,)+2)$

$\log_6 1 \stackrel{?}{=} \log_6 1$ ✓

NOTE: $6^0 = 1$

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HW: Practice Worksheet (odds)

Geometry 1 - Mr. C. - No calculators. Name_____

Practice Q4OBQ4 All work on looseleaf. Date_____ Period____

**Evaluate each expression.**

1) $\log_4 \frac{1}{16}$

2) $\log_4 16$

3) $\log_3 9$

4) $\log_5 125$

**Rewrite each equation in exponential form.**

5) $\log_{14} 196 = 2$

6) $\log_6 216 = 3$

7) $\log_{11} 121 = 2$

8) $\log_{20} 400 = 2$

**Rewrite each equation in logarithmic form.**

9) $7^2 = 49$

10) $18^2 = 324$

11) $15^2 = 225$

12) $243^{\frac{1}{5}} = 3$

**Solve each equation.**

13) $\log_5 (4n + 3) = \log_5 5n$

14) $\log_2 (4 - a) = \log_2 (5a + 7)$

**Simplify. Write "undefined" for expressions that are undefined.**

15) $\begin{bmatrix} -2 & -2 \\ -6 & 6 \end{bmatrix} - \begin{bmatrix} -4 & -1 \\ -1 & -3 \end{bmatrix}$

16) $\begin{bmatrix} 4 & 5 \end{bmatrix} + \begin{bmatrix} 4 & -3 \end{bmatrix}$

17) $\begin{bmatrix} 6 \\ -6 \end{bmatrix} - \begin{bmatrix} -2 \\ 0 \end{bmatrix}$

18) $\begin{bmatrix} -3 & -3 & 6 \\ 1 & 4 & 5 \end{bmatrix} - \begin{bmatrix} 0 & -6 & -5 \\ -2 & -2 & 4 \end{bmatrix}$

19) $-4\begin{bmatrix} 6 & 1 \\ 5 & 2 \\ -5 & 3 \end{bmatrix}$

20) $-5\begin{bmatrix} -3 \\ -2 \\ -6 \end{bmatrix}$

21) $\begin{bmatrix} 0 & 3 \\ -2 & 0 \\ 5 & -5 \end{bmatrix} \cdot \begin{bmatrix} 6 & 5 \\ 3 & 1 \end{bmatrix}$

22) $\begin{bmatrix} 0 & 3 & 4 \\ 4 & -4 & -6 \end{bmatrix} \cdot \begin{bmatrix} -5 & -6 \\ 6 & 1 \end{bmatrix}$

23) $\begin{bmatrix} 1 \\ 3 \end{bmatrix} \cdot \begin{bmatrix} -3 & -6 \\ -3 & 0 \\ 3 & 2 \end{bmatrix}$

24) $\begin{bmatrix} 5 & 3 \end{bmatrix} \cdot \begin{bmatrix} -3 & -6 \\ -6 & -1 \end{bmatrix}$

**Evaluate each determinant.**

25) $\begin{vmatrix} 1 & 3 \\ 4 & -4 \end{vmatrix}$

26) $\begin{vmatrix} 4 & 5 \\ 5 & 4 \end{vmatrix}$

# Answers to Practice Q4HW4 - All work on looseleaf.

1) $-2$

2) $2$

3) $2$

4) $3$

5) $14^2 = 196$

6) $6^3 = 216$

7) $11^2 = 121$

8) $20^2 = 400$

9) $\log_7 49 = 2$

10) $\log_{18} 324 = 2$

11) $\log_{15} 225 = 2$

12) $\log_{243} 3 = \frac{1}{5}$

13) $\{3\}$

14) $\left\{-\frac{1}{2}\right\}$

15) $\begin{bmatrix} 2 & -1 \\ -5 & 9 \end{bmatrix}$

16) $\begin{bmatrix} 8 & 2 \end{bmatrix}$

17) $\begin{bmatrix} 8 \\ -6 \end{bmatrix}$

18) $\begin{bmatrix} -3 & 3 & 11 \\ 3 & 6 & 1 \end{bmatrix}$

19) $\begin{bmatrix} -24 & -4 \\ -20 & -8 \\ 20 & -12 \end{bmatrix}$

20) $\begin{bmatrix} 15 \\ 10 \\ 30 \end{bmatrix}$

21) $\begin{bmatrix} 9 & 3 \\ -12 & -10 \\ 15 & 20 \end{bmatrix}$

22) Undefined

23) Undefined

24) $\begin{bmatrix} -33 & -33 \end{bmatrix}$

25) $-16$

26) $-9$