

BE - Geometry 1 TUESDAY 4-5-11

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:

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

① $\boxed{-2}$

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

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

$$(13) \begin{bmatrix} 6 & -16 \\ 3 & 4 \end{bmatrix}$$

$$(15) \begin{bmatrix} 3 & -8 \\ 4 & 9 \end{bmatrix}$$

$$(17) \begin{bmatrix} -12 & 48 \\ -60 & -24 \end{bmatrix}$$

$$(19) \begin{bmatrix} 22 & -40 \\ -47 & 10 \end{bmatrix}$$

$$(21) \begin{bmatrix} -4 & 8 \\ 59 & -48 \end{bmatrix}$$

$$(23) \frac{1}{2} X Z$$

$$Z = \begin{bmatrix} 4 & -8 \\ -7 & 0 \end{bmatrix}$$

$$\overset{\text{OK}}{\cancel{[2 \times 2]}} \cdot \cancel{[2 \times 2]}$$

product is 2×2

$$\begin{array}{c|c} -8 & 0 \\ \hline 4 & -7 \end{array}$$

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

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

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

← **ANS**

1.
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 $y = \log_b x$
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

$$b^y = x$$

$$\textcircled{\text{Ex}} \quad \log_3 9 = 2 \quad \therefore 3^2 = 9$$

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

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

$$\boxed{X = 4}$$

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

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

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

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

If "ln" is used $\Rightarrow$ NATURAL logarithm
 (LATIN) $\Rightarrow$ logarithmus NATURALIS

the base is $e \approx 2.718281828 \dots$

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

$$\ln 50 = X \quad \therefore e^X = 50 \quad \boxed{X \approx 3.912}$$

* $\{\log_{10}\}$ AND $\{\ln\}$ ARE BUILT INTO ALL SCIENTIFIC CALCULATORS

Evaluate:

$$\textcircled{\text{Ex}} \log_4 64$$

$$4^x = 64$$

$$\boxed{x = 3}$$

$$\textcircled{\text{Ex}} \log_5 25$$

$$5^x = 25$$

$$\boxed{x = 2}$$

$$\textcircled{\text{Ex}} \log_{36} 6$$

$$36^x = 6$$

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

Rewrite in exponential form:

$$\textcircled{\text{Ex}} \log_5 25 = 2$$

$$\boxed{5^2 = 25}$$

$$\textcircled{\text{Ex}} \log_{81} \frac{1}{9} = -\frac{1}{2}$$

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

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

Rationalized:

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

Rewrite in logarithmic form:

$$\textcircled{\text{Ex}} \quad 8^{\frac{1}{3}} = 2$$

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

$$\textcircled{\text{Ex}} \quad 36^{-\frac{1}{2}} = \frac{1}{6}$$

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

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

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

$$\textcircled{\text{Ex}} \quad 2^6 = 64$$

$$\boxed{\log_2 64 = 6}$$

Use the definition of logarithms to
solve exponential equations (WITH SAME BASE)

$$\textcircled{\text{EX}} \quad \log_6 (3b-2) = \log_6 (-b+2)$$

$$\underbrace{\quad\quad\quad}_{6^?} = \underbrace{\quad\quad\quad}_{6^?}$$

$$\parallel \qquad \qquad \parallel$$

$$3b-2 \qquad \qquad -b+2$$

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

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

$$4b = 4$$

$$\boxed{b=1}$$

$$\textcircled{\text{CK}} \quad \log_6 (3(\quad)-2) \stackrel{?}{=} \log_6 (-(\quad)+2)$$

$$\log_6 1 \stackrel{?}{=} \log_6 1 \quad \checkmark$$

$$\text{NOTE: } 6^0 = 1$$

HW: Practice Worksheet (odds)

Practice Q4HW4 - All work on looseleaf.

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

5) $14^2 = 196$

9) $\log_7 49 = 2$

13) $\{3\}$

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

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

25) -16

2) 2

6) $6^3 = 216$

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

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

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

22) Undefined

26) -9

3) 2

7) $11^2 = 121$

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

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

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

23) Undefined

4) 3

8) $20^2 = 400$

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

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

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

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