20.) $g(x) = 2(x-2)^3$

$y = 2(x-2)^3$

$\frac{x}{2} = \frac{2(y-2)^3}{2}$

$\sqrt[3]{\frac{x}{2}} = \sqrt[3]{(y-2)^3}$

$\sqrt[3]{\frac{x}{2}} = y - 2$

$\sqrt[3]{\frac{x}{2}} + 2 = g^{-1}(x)$

21.) $g(x) = \frac{5}{x} - 3$

$x = \frac{5}{y} - 3$

$+3 \quad +3$

$\frac{x+3}{1} = \frac{5}{y}$

$5 \cdot \frac{1}{x+3} = \frac{y}{5} \cdot 5$

$g^{-1}(x) = \frac{5}{x+3}$

15.) $h(x) = -(x+2)^3$ $f(x) = (-\sqrt[3]{x} - 2)$

$(h \circ f)(x) = -(-\sqrt[3]{x} - 2 + 2)^3 = x$

$(f \circ h)(x) = -\sqrt[3]{-(x+2)^3} - 2$

$= x + 2 - 2$

$= x$

7.) $f(x)=\sqrt{x-4}$ $g(x)=x^2+4$

$(g\circ f)(x)=(\sqrt{x-4})^2+4=x$ not the same

$(f\circ g)(x)=\sqrt{x^2+4-4}=\sqrt{x^2}=|x|$

3.) $(f \circ g)(-2)$

-2

$+1$

27.) $x + 2y = 16$

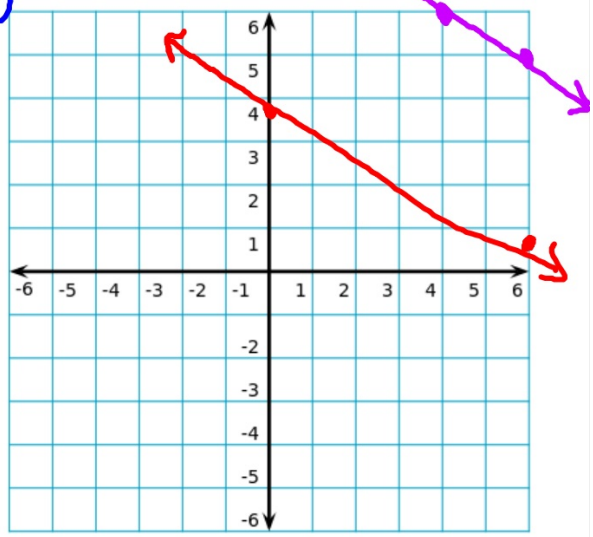
$2x + 4y = 15$

$y = -\frac{1}{2}x + 8$

$y = -\frac{1}{2}x + \frac{15}{4}$

$-3 + \frac{15}{4}$

$\frac{15}{4} = 3.75$



15.) $-x^2+4x-3-(x+3)$

$-x^2+4x-3-x-3$

$-x^2+3x-6$

25.) ① $(2x+y-z=5)2$

② $x+4y+2z=16$

③ $15x+6y-2z=12$

① + ②

$4x+2y-2z=10$

$x+4y+2z=16$

$5x+6y=26$

② + ③

$16x+10y=28$

$3(16x+10y=28)$

$-5(5x+6y=26)$

(mof 12)

$f(x) - x^2 + 4x - 3$

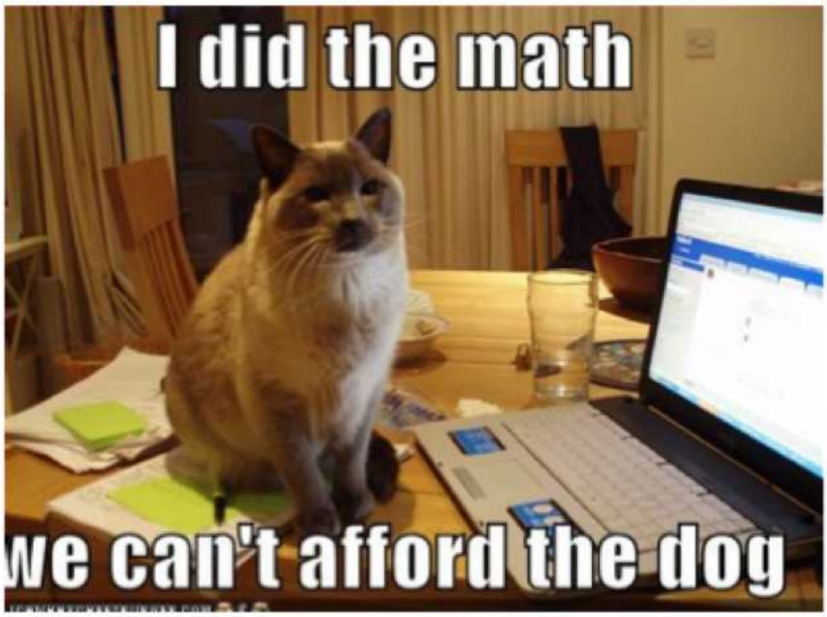
$f(+2) = -(+2)^2 + 4(+2) - 3$

$-4 + 8 - 3$

1

-1

A2: Evaluating Logarithms



HW:

We will be using scientific calculators later in this unit. Please bring your scientific calculator starting next week.

ex: Evaluate.

a) $2^5 = 32$

b) $81^{3/4} = \left(\sqrt[4]{81}\right)^3 = 3^3 = 27$

c) $9^{-5/2} = \frac{1}{9^{5/2}} = \frac{1}{(\sqrt{9})^5} = \frac{1}{243}$

d) $-16^{5/4} \quad -(16)^{5/4} = -\left(\sqrt[4]{16}\right)^5 = -2^5 = -32$

ex: Solve by guess and check.

a) $2^x = 16$

4

b) $3^x = \frac{1}{3}$

-1

c) $71^x = 1$

0

d) $25^x = 5$

$1/2$

e) $27^x = 9$

$27^{(2/3)} = 9$

Definition of a Logarithm

Let b and y be positive numbers with $b \neq 1$. The **logarithm of y with base b** is denoted by $\log_b y$ and is defined as follows:

$$\log_b y = x \quad \text{if and only if} \quad b^x = y$$

The expression $\log_b y$ is read as "log base b of y."

ex: Rewrite in exponential form.

a) $\log_3 9 = 2$

base ↑

$3^2 = 9$

b) $\log_{22} 1 = 0$

$22^0 = 1$

ex: Rewrite in logarithmic form.

a) $3^5 = 243$

$\log_3 243 = 5$

b) $27^{-2/3} = \frac{1}{9}$

$\log_{27} \frac{1}{9} = \frac{-2}{3}$

Answer for a log equals exponent

ex: Evaluate.

a) $\log_4 64 = \boxed{3}$

$4^{\boxed{3}} = 64$

C – 9

b) $\log_3 81 = \boxed{4}$

$3^{\square} = 81$

ex: Evaluate.

c) $\log_5 25 = 2$

d) $\log_7\left(\frac{1}{7}\right) = -1$

$7^{\square} = \frac{1}{7}$

ex: Evaluate.

e) $\log_{13} 1 = 0$

$13^{\square} = 1$

f) $\log_{25} 5 = \frac{1}{2}$

$25^{x} = 5$

ex: Evaluate.

g) $\log_5\left(\frac{1}{125}\right) = -3$

$5^{-3} = \frac{1}{125}$

h) $\log_{81} 27 = 3/4$

$81^{3/4}$

$81^{\square} = 27$

ex: Evaluate.

i) $\log_2(-4)$ undefined

$2^{\square} = -4$

j) $\log_{25}\left(\frac{1}{5}\right) = -\frac{1}{2}$

$25^{\square} = \frac{1}{5}$

Special Logarithms

SPECIAL LOGARITHMS A **common logarithm** is a logarithm with base 10. It is denoted by $\log_{10}$ or simply by log. A **natural logarithm** is a logarithm with base e. It can be denoted by $\log_e$, but is more often denoted by ln.

Common Logarithm	Natural Logarithm
$\log_{10} x = \log x$	$\log_e x = \ln x$

Most calculators have keys for evaluating common and natural logarithms.

ex: Evaluate.

a) $\log_{10} 100 = 2$

b) $\log_{10}\left(\frac{1}{10}\right) = -1$

ex: Evaluate.

c) log.001

$\log_{10} \frac{1}{1000} = -3$

d) ln1 = $\log_e 1 = 0$

$e^{\square} = 1$

ex: Evaluate.

e) $\ln\left(\frac{1}{e}\right) = -1$

$\log_e \frac{1}{e}$

f) $\ln e^2 = \log_e e^2 = 2$

$e^{\square} = e^2$

ex: Evaluate.

g) $\ln e = 1$

$\log_e e$

$e^{\square} = e$

ex: Evaluate on your calculator. Round to 3 decimal places.

a) $\log 16$ 1.204

b) $\ln 7$ 1.946