PANTHER
A L G E B R A

Chapter 6 Exponential & Log Functions

Sections:

6.1 Function Composition

Video 1

Find the following: $foy(3), yof(4), fof(2), gog(0)$

a) $f(x) = 2x + 3 \quad g(x) = 1 - 3x^2$

b) $f(x) = \sqrt{x+2} \quad g(x) = 2x$

Video 2

Find fog(x) and the domain of the composite function:

a) $f(x) = x^2 + 3x \qquad g(x) = 2x^2 - 1$

b) $f(x) = \dfrac{2x}{x+1} \qquad g(x) = \dfrac{1}{x}$

Video 3

Find gof(x) and the domain of the composite function:

a) $f(x) = 2 - 3x \qquad\qquad g(x) = \sqrt{x-3}$

b) $f(x) = \sqrt{x+2} \qquad\qquad g(x) = x^2 + 2x$

Video 4

Find fog(x) and the domain of the composite function:

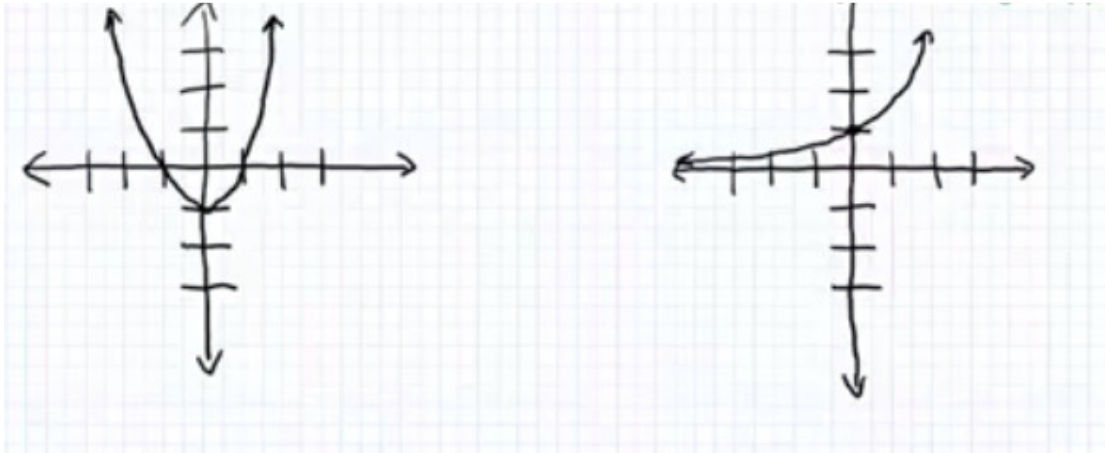a) $f(x) = \dfrac{2x-1}{x-3} \qquad\qquad g(x) = \dfrac{x+6}{2x-5}$

Video 5

Show that fog(x)=gof(x)=x:

a) $f(x) = 3x - 5 \qquad\qquad g(x) = \dfrac{1}{3} = (x+5)$

6.2 One-to-One Functions

Video 1

Are the functions graphed below one-to-one?

Video 2

Find the inverse of the function, then state its domain and range:
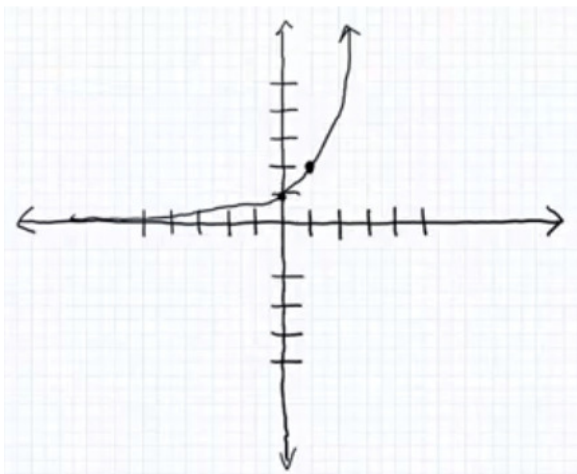$$f = \{(-2,5), (-1,3), (0,1), (1,-1), (2,-3)\}$$

Video 3

Show the functions are inverses of each other and discuss their domain and range:

a) $f(x) = (x-4)^2 + 1, x \geq 4$ $g(x) = 4 + \sqrt{x-1}$

Video 4

Graph the inverse of the following function:

Video 5

Find the inverse of the functions:

    a) $f(x) = 6x + 1$

    b) $f(x) = x^2 + 4, x \geq 0$

Video 6

Find the inverse of the functions:

    a) $f(x) = \dfrac{2x - 5}{x + 4}$

    b) $f(x) = \dfrac{x^2 - 9}{2x^2}, x > 0$

6.3 Exponential Functions

Video 1

Graph the following:

    a) $f(x) = 2^x - 1$

    b) $f(x) = 3^{x-2}$

Video 2

Graph the following:

    a) $f(x) = -2^x + 1$

    b) $f(x) = 3^{-x} - 1$

Video 3

Graph the following:

    a) $f(x) = 3 - e^{-x}$

    b) $f(x) = 1 - 2e^{3x}$

Video 4

Solve:

a) $3^x = 3^{-2}$

b) $5^{x^2} = \left(\dfrac{1}{25}\right)^{-8}$

c) $3^x = 9^{x-1} \cdot 27^{1-3x}$

Video 5

Solve:

a) $5^{x^2+8} = 125^{3x}$

b) $\left(e^5\right)^x \cdot e^{x^2} = e^{14}$

c) If $3^{-x} = \frac{1}{5}$, what is 3^{2x} ?

6.4 Logarithmic Functions

Video 1

Write in logarithmic form:

a) $8 = 2^3$
b) $b^4 = 3.9$
c) $4^x = 5.2$
d) $e^x = 9$

Video 2

Write in exponential form:

a) $\log_3 27 = 3$
b) $\log_4 64 = 3$
c) $\log_2 7 = x$
d) $\ln x = 6$

Video 3

Find the exact value:

    a) $\log_8 1 = 0$

    b) $\log_8 3$

    c) $\log_4 16$

    d) $\log_{\frac{1}{2}} 8$

    e) $\log_5 \sqrt[3]{5}$

    f) $\log_3 \sqrt{27}$

    g) $\ln \sqrt[3]{e}$

Video 4

Find the domain of each function:

    a) $f(x) = \ln(x + 7)$

    b) $g(x) = 3\log_5 x^4$

    c) $g(x) = 8 + 5\ln\left(\dfrac{x}{3} - 7\right)$

    d) $h(x) = \log_2\left(\dfrac{x}{x-2}\right)$

Video 5

Graph each function:

    a) $f(x) = 2x$

    b) $g(x) = \log_2 x$

6.5 Properties of Logs

Video 1

Evaluate each expression:

    a) $\log_3 3^{-7}$

    b) $\ln e^{\sqrt{3}}$

    c) $e^{\ln 15}$

    d) $\log_2 8 + \log_2 4$

Video 2

Evaluate each expression:

   a) $\log_9 36 - \log_9 4$

   b) $\log_7 2 \cdot \log_2 49$

   c) $4^{\log_4 11 + \log_4 7}$

   d) $e^{\log_{e^3} 27}$

Video 3

Let In5=x and In7=y, write each expression in terms of x and y:

   a) $\ln 35$

   b) $\ln 1.4$

   c) $\ln 49$

   d) $\ln \sqrt[3]{5/7}$

Video 4

   a) $\log_8 (64 y)$

   b) $\log_3 \left(\dfrac{x^2}{y^3} \right)$

   c) $\log \left[\dfrac{a^2 (a-2)^3}{\sqrt{a+1}} \right]$

   d) $\ln \left[\dfrac{3 y^4 \sqrt{1-y}}{4 (y+x)^3} \right]$

Video 5

Write each expression as a single logarithm:

   a) $\dfrac{1}{2} \log x - \log y + 10 g^z$

   b) $\log_5 (x^2 + 4x + 3) - 2 \log_5 (x+3)$

   c) $2 \ln \sqrt[3]{x} + \ln(ex^2) - \ln e^2$

Video 6

Write each expression as a single logarithm:

a) $2\log x - \dfrac{1}{2}\log(x^2 - 1) - \dfrac{1}{3}\log(x^2 + 1)$

b) $\ln\left(\dfrac{x^2 + 2x - 15}{x^2 - 1}\right) - \ln\left(\dfrac{x^2 + 6x + 5}{x - 1}\right)$

6.6 Exponential & Log Equations

Video 1

Solve:

a) $\log_2 x = 4$

b) $\log_7(3x + 6) = \log_7 33$

c) $3\log_5 x = -\log_5 8$

Video 2

Solve:

a) $3\log_3(x + 2) - \log_3 9 = 1$

b) $\log_6(x + 2) + \log_6(x - 3) = 1$

c) $\log(3x + 9) = 1 + \log(x - 4)$

Video 3

Solve:

a) $\log_7 3x + \log_7(2x - 1) = \log_7(16x - 10)$

b) $\log_3(x + 1) + l\,og_3\, 2x = \log_3(3x + 1)$

Video 4

Solve:

a) $3^x = 5$

b) $2^{-x} = 1.8$

c) $0.9\left(4^{0.3x}\right) = 0.6$

d) $5^{1-x} = 2$

Video 5

Solve:

a) $3^{2x-1} = 2^{x+1}$

b) $\left(\dfrac{5}{2}\right)^{1-x} = 4^x$

c) $0.4^{2+x} = 1.9^{3x-1}$

d) $e^{x+5} = \pi^x$

Video 6

Solve:

a) $2^{2x} - 4 \cdot 2^x = 21$

b) $4^x - 4^{-x} = 2$

c) $5 \cdot 9^x - 14 \cdot 3^x + 8 = 0$

d) $36^x - 6^{x+1} = 16$