

- $t = \frac{2026}{-2017}$
 $t = 9 \text{ years}$
- 1) 2026 - 162,795 coyotes - end (A)
 (2017) - 45,000 coyotes - start (P)
 What is annual growth (r)?

$$A = P(1+r)^t$$

$$162,795 = 45,000(1+r)^9$$

$$\frac{162,795}{45,000} = (1+r)^9$$

$$3.6177 = (1+r)^9$$

$$1.1536 = 1+r$$

$$0.1536 = r$$

$$15.36\% = r$$

- 2) Find the Inverse of $f(x) = 2^{x+1} + 3$

$$x = 2^{y+1} + 3$$

① switch x & y

② Isolate function

$$x - 3 = 2^{y+1}$$

③ Do inverse function

$$\log_2(x-3) = y+1$$

④ Isolate y

$$\log_2(x-3) - 1 = y$$

3) Solve $12^{3x-2} = 7$

$$\log_{12}(7) = 3x - 2$$

$$+2 \qquad +2$$

$$\frac{2.783}{3} = \frac{3x}{3}$$

$$x = 0.9277$$

right 2 to left 7 is left 8
 4) $f(x) = 2^{x-1}$ and $g(x) = 2^{x+7}$
 can be written as $f(x-h)$
 $f(x+8)$ $h = -8$

5) Summer invested \$5,000 in 2005
 worth \$7,500 in 2015
 If withdrawn early incurs a 2.7%
 penalty if taken before 25 years
 Talia takes money out in 2026, what
 is the penalty.

Think (1) Need to know value in 2026
 (2) To know value I need rate

Find the rate: Start (P) = \$5,000 $t = \frac{2015 - 2005}{10 \text{ years}}$
 End (A) = \$7,500

$A = P(1+r)^t$ Now find value in 2026
 $\frac{7500}{5000} = \frac{5000(1+r)^{10}}{5000}$ $A = 5000(1.04138)^{\frac{2026-2005}{21}}$
 $1.5 = (1+r)^{10}$ $A = 11715.58$

$[1.5]^{1/10} = [(1+r)^{10}]^{1/10}$
 $1.04138 = 1+r$ Penalty 2.7%
 $0.04138 = r$ $11715.58(0.027) = 316.32$

$r = 0.04138$

(6) $4^{2x} = 32^{x-2}$ Need a common base

$2^{2x} = 2^5 \cdot 2^{x-2}$

$(2^2)^x = (2^5)^{x-2}$

$2^{4x} = 2^{5x-10}$ Since common base just set exponents equal

$4x = 5x - 10$

$+10 \quad +10$

$4x + 10 = 5x$
 $-4x \quad -4x$

$10 = x$

(7) Find the inverse of

~~$y = e^{5x} + 2$~~

$y = e^{5x} + 2$

$x = e^{5y} + 2$

$-2 \quad -2$

$x - 2 = e^{5y}$

$\frac{\ln(x-2)}{5} = \frac{5y}{5}$

$\frac{\ln(x-2)}{5} = y$

$f^{-1}(x) = \frac{\ln(x-2)}{5}$

① Switch x & y

② Isolate exponential

③ Remember $\ln = \log_e$
Do f^{-1}

④ Solve for y

8) What transformation = move
 $f(x) = \frac{1}{3}(4^{x+2}) - 3$ if parent
 function is $g(x) = 4^x$

start finish

$g(x)$ to $f(x)$

$$a = \frac{1}{3}$$

$$4^{(x+2)}$$

$$-3$$

compressed by a factor of 3

left 2

down 3

9) $11000 = 4000e^{.083t}$

$$2.75 = e^{.083t}$$

$$\ln 2.75 = \ln e^{.083t}$$

$$\ln 2.75 = .083t$$

$$\frac{\ln 2.75}{.083} = t$$

$$12.2 \approx t$$

Find Inverse

10) $y = \log_7(3x-6)$

$$x = \log_7(3y+6)$$

$$7^x = 3y+6$$

$$5 + 7^x + 6 = 3y$$

$$\frac{7^x + 6}{3} = y^{-1}$$

$$y^2 = (s-x)nl$$

$$y = \frac{(s-x)nl}{2}$$

$$\frac{(s-x)nl}{2} = (x)^{1/2}$$

$$11) f(x) = 2^{x-3} + 7$$

$$x = 2^{y-3} + 7$$

$$x - 7 = 2^{y-3}$$

$$\log_2(x-7) = y-3$$

$$\log_2(x-7) + 3 = f^{-1}(x)$$

$$f(x) = 2^{x-3} + 7$$

$$D: \mathbb{R} (-\infty, \infty)$$

$$R: y > 7 (7, \infty)$$

$$f^{-1}(x) = \log_2(x-7) + 3$$

$$D: x > 7 (7, \infty)$$

$$R: \mathbb{R} (-\infty, \infty)$$

$$12) \log_3 y = 5x - 2$$

exp. form

$$3^{5x-2} = y$$

13) Find Inverse

$$h(x) = 3 \ln(7x-2)$$

$$x = 3 \ln(7y-2)$$

$$\frac{x}{3} = \ln(7y-2)$$

$$e^{\frac{x}{3}} = 7y-2$$

$$e^{\frac{x}{3}} + 2 = 7y$$

$$h^{-1}(x) = \frac{e^{\frac{x}{3}} + 2}{7}$$

14) Monthly \rightarrow Yearly

.00325

Yearly

$$(1.00325)^{12t}$$

$$(1.0397)^t$$

is equivalent to

Monthly

$$(1.00325)^{12t}$$

Annual rate = .0397

3.97%

15) 6.2% compounded quarterly
8 years \rightarrow \$5000

What is P?

$$A = P \left(1 + \frac{r}{n}\right)^{nt}$$

$$5000 = P \left(1 + \frac{.062}{4}\right)^{(4)(8)}$$

$$5000 = P (1.0155)^{32}$$

$$\frac{5000}{(1.0155)^{32}} = P$$

$$\boxed{\$3056.41 = P}$$