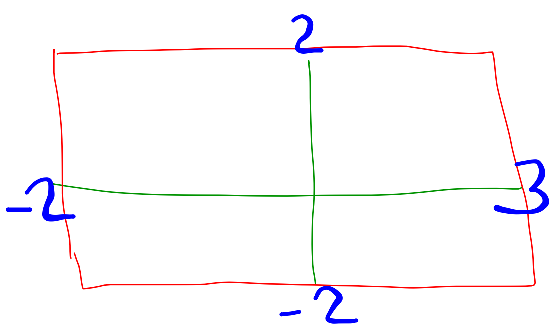
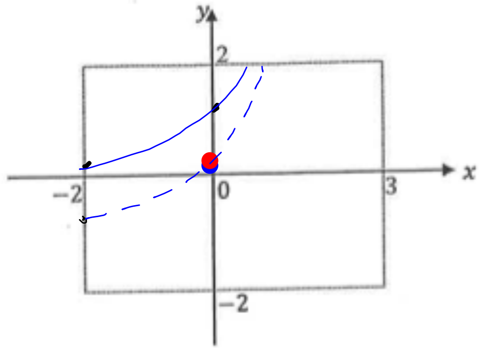
PICK UP THE WARM UP

HW Questions



1

etch and clearly label the graph of $f(x) = 1.3(2)^x$ for $-2 \le x \le 3$ on the
t of axes shown below.



b) sketch and label the graph of $f(x) - 1$

$y = \quad -1$

c) If $f(0) = \frac{n}{4}$ find n

$1.3 = \frac{n}{4}$

2 SIMPLIFY

$\left(\frac{x^5}{y^3}\right)^5$ $\qquad n^{-15}$ $\qquad 5n^{-3}$ $\qquad \frac{\cancel{28}\,2\,\cancel{n^3}}{\cancel{12}\,3 \cdot n^2 n^3}$ $\qquad \frac{6w^3 w^5}{\cancel{w^{-3}} z^2}$

$\boxed{\frac{x^{25}}{y^{15}}}$ $\qquad \boxed{\frac{1}{n^{15}}}$ $\qquad \boxed{\frac{5}{n^3}}$ $\qquad \boxed{\frac{2}{3n^5}}$ $\qquad \boxed{\frac{6w^8}{z^2}}$

$\boxed{3}$ $0 = x^2 + 4x - 11$ by Completing the Square

$\left(\frac{4}{2}\right)^2 = 4$

$0 + 4 = \underbrace{x^2 + 4x + 4} - 11$

$4 = (x+2)^2 - 11$

$\sqrt{(x+2)^2} = \sqrt{15}$

$x + 2 = \pm\sqrt{15}$

$-2 \qquad -2$

$x = -2 \pm \sqrt{15}$

Solve using Completing The Square

$\frac{27}{3} + \frac{7}{3}$

$\boxed{4}$ $\frac{0}{3} = \frac{3x^2}{3} + \frac{18x}{3} - \frac{7}{3}$

$0 + 9 = \underbrace{x^2 + 6x + 9} - \frac{7}{3}$

$\frac{9}{1} + \frac{7}{3} = (x+3)^2$

$\sqrt{(x+3)^2} = \sqrt{\frac{34}{3}}$

$x + 3 = \pm\sqrt{\frac{34}{3}}$

$x = -3 \pm \sqrt{\frac{34}{3}}$

$$0 = 3x^2 + 18x - 7$$

$$0 = 3\left[x^2 + 6x + 9\right] - 7 - 27$$

HW

Questions

$\boxed{6}$ - 80 - 83, 85b, 87bd

$\boxed{6\text{-}80}$

(A) $x + 2y - z = -1$

(B) $2x - y + 3z = 13$

(C) $x + y + 2z = 14$

I will Eliminate the y's !!

1st pair

(B) $2x - y + 3z = 13$

(C) $x + y + 2z = 14$

I. $3x + 5z = 27$

2nd pair

(A) $x + 2y - z = -1 \rightarrow x + 2y - z = -1$

(B) $2x - y + 3z = 13 \xrightarrow{②} 4x - 2y + 6z = 26$

II $5x + 5z = 25$

(I) $3x + 5z = 27 \xrightarrow{(-1)} -3x - 5z = -27$

(II) $5x + 5z = 25 \rightarrow 5x + 5z = 25$

$2x = -2$

$x = -1$

$3x + 5z = 27$

$3(-1) + 5z = 27$

$-3 + 5z = 27$
$+3 \qquad\quad +3$

$5z = 30$

$z = 6$

(A) $x + 2y - z = -1$

$-1 + 2y - (6) = -1$

$-7 + 2y = -1$
$+7 \qquad\quad +7$

$2y = 6$

$y = 3$

$x = -1 \quad y = 3 \quad z = 6$

or $(-1, 3, 6)$

$\boxed{6-81}$ $(-1,10)$ $(0,5)$ $(2,7)$

$y = ax^2 + bx + c$

I $10 = a(-1)^2 + b(-1) + c$

II $5 = a(0)^2 + b(0) + c$

III $7 = a(2)^2 + b(2) + c$

$(-1, 10)$ $(0,5)$ $(2,7)$

A $10 = a(-1)^2 + b(-1) + c$

B $5 = \cancel{a(0)^2} + \cancel{b(0)} + c$

C $7 = a(2)^2 + b(2) + c$

$10 = a - b + 5$
$-5 \qquad -5$

$5 = c$

$7 = 4a + 2b + 5$
$-5 \qquad -5$

A $10 = a - b + c \xrightarrow{-1} -10 = -a + b - c$

C $7 = 4a + 2b + c \rightarrow 7 = 4a + 2b + c$

I $-3 = 3a + 3b$

$$\boxed{y = 2x^2 - 3x + 5}$$

$\boxed{6\text{-}82}$

a) $a = \log_b(24) \rightsquigarrow 24 = b^a$

b) $3x = \log_{2y}(7) \rightsquigarrow 7 = (2y)^{3x}$

c) $3y = 2^{5x} \rightsquigarrow 5x = \log_2(5x)$

d) $4p = (2q)^6 \rightsquigarrow 6 = \log_{2q}(4p)$

$\boxed{6\text{-}83}$ a) $\frac{3x}{x^2+2x+1} + \frac{3}{x^2+2x+1} = \frac{3x+3}{x^2+2x+1} = \frac{3\cancel{(x+1)}}{(x+1)\cancel{(x+1)}}$

$= \boxed{\frac{3}{x+1}}$

b) $\frac{3}{x-1} - \frac{2}{x-2} \rightarrow \frac{3(x-2)}{(x-1)(x-2)} - \frac{2(x-1)}{(x-2)(x-1)}$

$\frac{3(x-2) - 2(x-1)}{(x-1)(x-2)} \rightarrow \frac{3x-6-2x+2}{(x-1)(x-2)}$

$\boxed{\frac{x-4}{(x-1)(x-2)}}$ or $\frac{x-4}{x^2-3x+2}$

$\boxed{6\text{-}85b}$

$$y = 5x^2 - 10x - 7$$

divide all by 5

$$\frac{y}{5} = x^2 - 2x \quad \frac{-7}{5}$$

Add $\left(\frac{-2}{2}\right)^2 = 1$
to complete the square

$$\frac{y}{5} + 1 = x^2 - 2x + 1 - \frac{7}{5}$$

$$\frac{y}{5} + 1 = (x-1)^2 - \frac{7}{5}$$

multiply by 5

$$y + 5 = 5(x-1)^2 - 7$$

$$-5 \qquad\qquad -5$$

$y = 5(x-1)^2 - 12 \longrightarrow$ vertex $(1, -12)$

$\boxed{6\text{-}87b}$

$$f(x) = 2x^2 - 4$$

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

$$= 2[9a^2] - 4$$

$$= 18a^2 - 4$$

$\boxed{6\text{-}87\,d}$ $f(x+7)$

$= 2[x+7]^2 - 4$

$= 2(x+7)(x+7) - 4$

$= (2x+14)(x+7) - 4$

$= 2x^2 + 14x + 14x + 98 - 4$

$= 2x^2 + 28x + 94$

Before we start today

Review 3 things about logs and log functions from Ch. 5

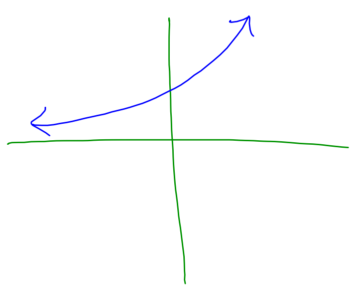
(1) Every log equation has an equivalent exponential equation (and vice versa)

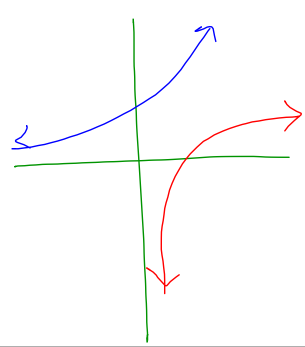
$$y = \log_8(x) \qquad 8^y = x$$

equivalent

(2) Log functions are the inverses of exponential functions (as long as x and y are reversed)

$$f(x) = 11^x \qquad f(x) = \log_{11}(x)$$





3 The $\boxed{\text{Log}}$ key on calculators is base 10 only.

$\log_7(6)$

$\log(x)$ is called a common log

it means $\log_{10}(x)$

Calculate $\log 7$ on GDC

Aim

Solve basic log properties

Aim

like $1.3^x = 17$

$\text{base}^{\text{exponent}} = \text{value}$

To be successful:

- You can show details of a process that leads to an answer.

You can produce both the exact answer and and answer rounded to 3 decimal places.

-

GDC

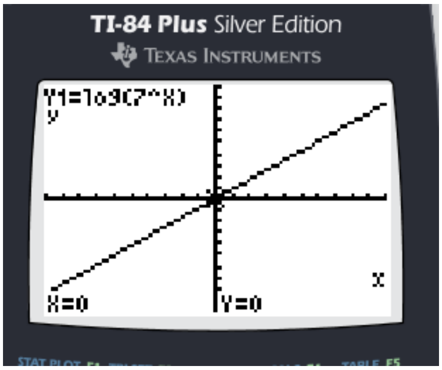
$y = \log(7^x)$

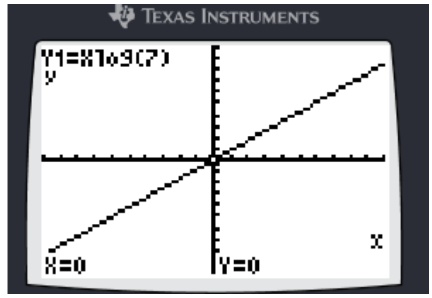
graph $Y_1 = \boxed{\log(7^x)}$

and

$Y_2 = \boxed{x \cdot \log(7)}$

c. $\log(7^x) \stackrel{?}{=} x\log(7)$





Same !!!

Power Property of Logarithms

$$\log(n^x) = x \cdot \log n$$

for <u>any</u> base

for example: $\log_3(t^n) = n \bullet \log_3(t)$

$$\log(xy^5) \neq 5\log(xy)$$

but $\log\left[(xy)^4\right] =$

$$\log(x^{n+2}) = (n+2)\log(x)$$

$$2^7 = 128$$

$$\log(2^7) = \log(128)$$

time to solve

$$1.04^x = 2$$

the challenge:

to isolate x

$$1.04^x = 2$$

not helpful yet

convert to log form

$$x = \log_{1.04}(2)$$

helpful

Take log of both sides

$$\log(1.04^x) = \log 2$$

Power Prop.

$$x \cdot \log(1.04) = \log(2)$$

$$x = \frac{\log(2)}{\log(1.04)}$$

exact answer in terms of common log

$$x \approx 17.673$$

$base^{exponent} = value$

Solve the four equations in 6-94

a, c, d

$\boxed{6-94}$

exact

round answers to 3 decimal places

(a) $5 = 2.25^x$

$\log 5 = \log(2.25^x)$

$\log 5 = x \cdot \log(2.25)$

$x = \dfrac{\log(5)}{\log(2.25)}$

$x \approx 1.985$

(b) $3.5^x = 10$

(c) $2(8^x) = 128$

$8^x = 64$

$\log(8^x) = \log(64)$

$x \cdot \log(8) = \log(64)$

$x = \dfrac{\log(64)}{\log(8)}$

$x = 2.$

(d) $2x^8 = 128$

$x^8 = 64$

$\sqrt[8]{} \quad \sqrt[8]{}$

$x = \sqrt[8]{64}$ exact

$x \approx 1.682$

B.B.

and then an exit ticket

Exit Ticket

- Exact answer

  and

- Approx. answer accurate to 3 decimal places

Assignment

6...72, 96-97, 99-100, 101b, 102, 103a

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