Homework questions

Pick Up the WARM UP

(1) Use the recursive formula to list the first 5 terms

$$\begin{cases} t_1 = 10 \\ t_{n+1} = t_n + 20 \end{cases}$$

10, 30, 50, 70, 90

(2) Use the explicit formula,

$t_n = 2(3)^n$ to a) list the first 4 terms

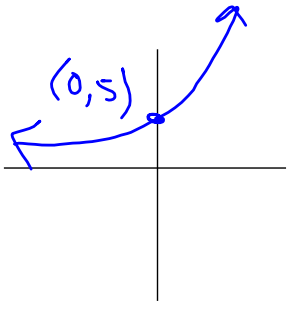
b) write its recursive formula.

$n=1$ 6
$n=2$ 18
$n=3$ 54
162

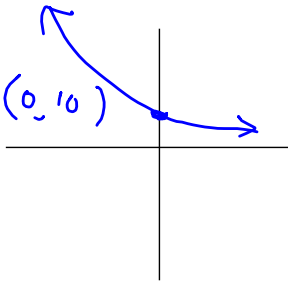
$$\begin{cases} t_1 = 6 \\ t_{n+1} = 3t_n \end{cases}$$

3 Without using any type of a calculator, make a quick **sketch** of each graph below. Label the y-intercept.

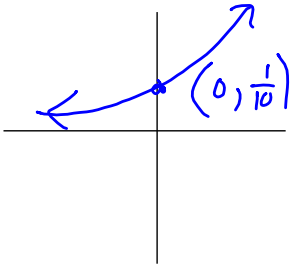
$y = 5(3)^x$



$y = 10\left(\frac{1}{2}\right)^x$



$y = \frac{1}{10}(5)^x$



102%

① Suppose $y = 200(1.02)^x$ represents a (a) population of ants growing by a constant percentage. What percent is the population growing by?

102%

2% growth

(b) What is the percent growth if the equation was $y = 50(1.26)^x$?

126%

so 26% growth

126%

c) What if it was $y = 10000(.7)^x$?

100% − 30% = 70%

70%

30% decay

4

(a) Suppose $y = 200(1.02)^x$ represents a population of ants growing by a constant percentage. What percent is the population growing by?

(b) What is the percent growth if the equation was $y = 50(1.26)^x$?

c) What if it was $y = 10000(.7)^x$?

5

Simplify without negative exponents

a) $10x^3 \cdot x^1y^2 = 10x^4y^2$

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

c) $(x^3y)^{-2} = \frac{1}{(x^3y)^2} = \boxed{\frac{1}{x^6y^2}}$

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

Questions on HW

ing sheet

A 56

d $(x^{-1} \cdot y^2)^3 = (x^{-1})^3 (y^2)^3 = x^{-3} y^6 = \frac{y^6}{x^3}$

e $(8 \times 10^5)(1.6 \times 10^{-2}) = 12.8 \times 10^3 = 1.28 \times 10^4$

$8 \cdot 10^5 \cdot 1.6 \cdot 10^{-2}$

f $\frac{4 \times 10^3}{5 \times 10^5} = 0.8 \cdot \frac{1}{10^2} = 0.8 \times 10^{-2}$

8×10^{-3}

$$\left(\frac{y^2}{x}\right)^3$$

Today's Aim

NOTES

TABES or Graphs → Write exponential functions

① Table to Equation

$y = ab^x$

x	y
1	3.2
2	8
3	20
4	50

$y = 3.2(2.5)^{x-1}$

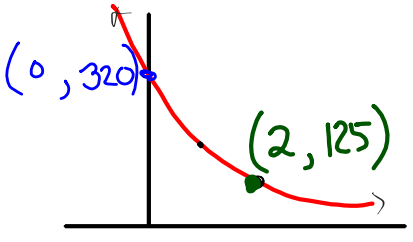
$y = 1.28(2.5)^x$

y-int

Very similar to their cousin, the Sequences

② Graphs to Equations

$y = ab^x$



$y = 320b^x$

$125 = 320b^2$

x	y
0	320
1	
2	125

b, b

.625

$y = 320(.625)^x$

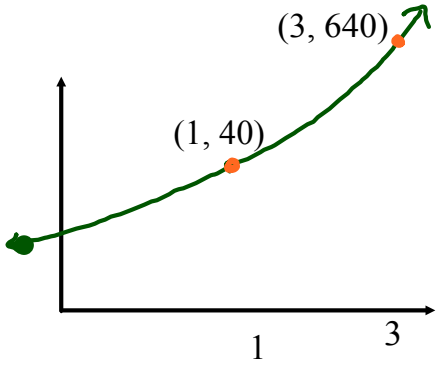
$320 \cdot b \cdot b = 125$

$320b^2 = 125$

$b^2 = \frac{125}{320}$

$b = .625$

(3) In this question you will expand your skills. Think of it as a puzzle in which you are using clues to create an exponential equation.



0	10
1	40
2	160
3	640

$40 \cdot b \cdot b = 640$

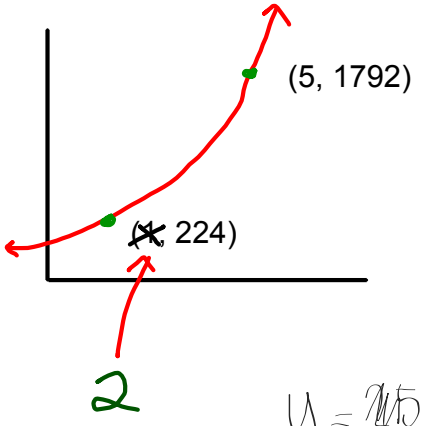
$40b^2 = 640$

$b^2 = \frac{640}{40}$

$b = 4$

$y = 10(4)^x$

(4)



256 224 1792

0 1 2 3 4 5

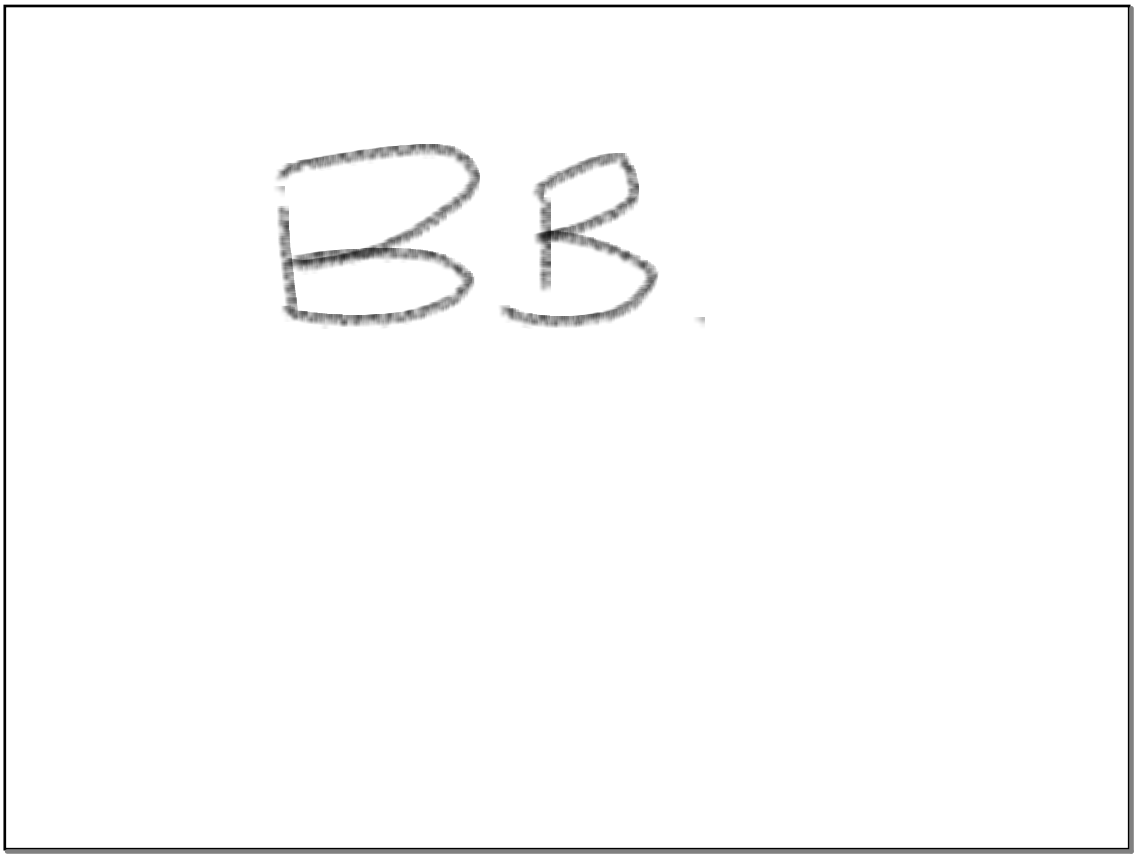
$224 \cdot b \cdot b \cdot b = 1792$

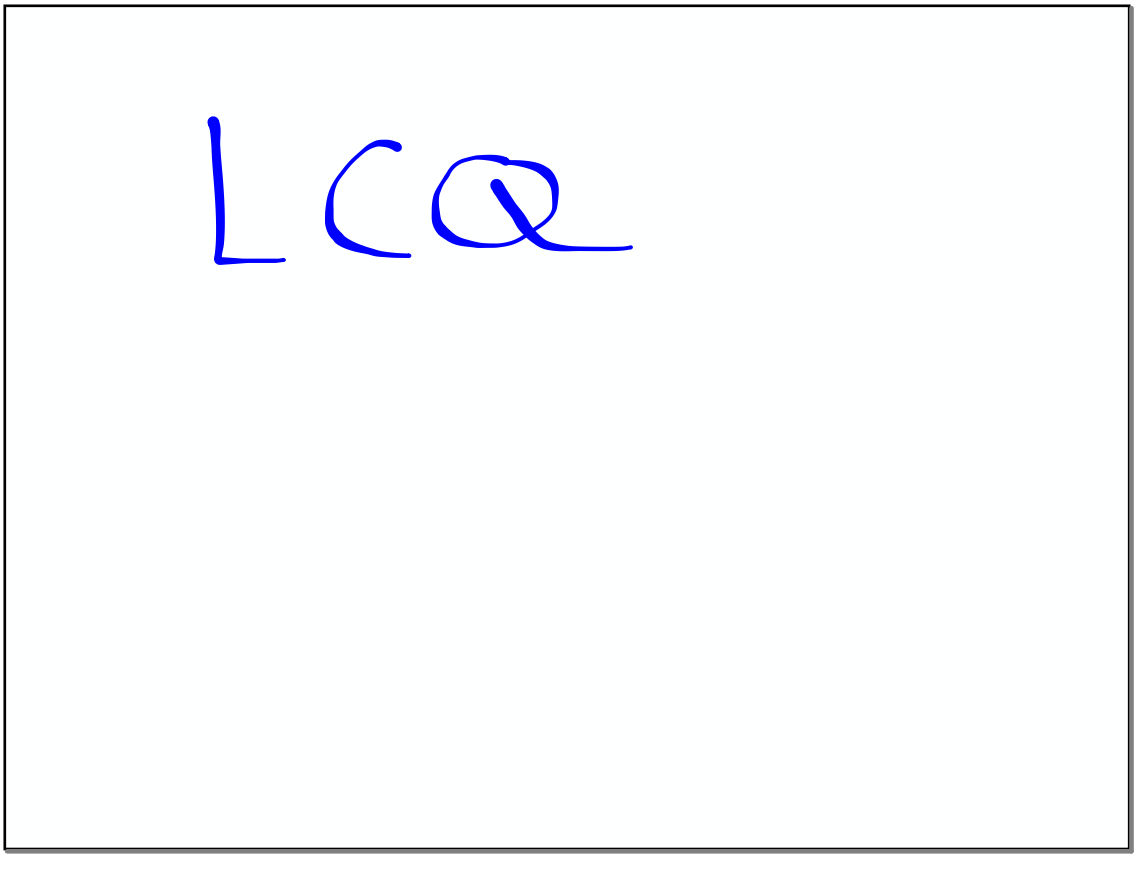
$224b^3 = 1792$

$b^3 = \frac{1792}{224}$

$b = 2$

$y = 256(2)^x$


BB


LCQ

Assignment

A...121b, 123, 125 ← end of Appendix A

B...35, 48, 61, 64 ← Appendix B

Alg 2A Appendix

Day 3 Assignment Solutions

A-14

Jackie and Alexa were working on homework together when Jackie said, *"I got $x = 5$ as the solution, but it looks like you got something different. Which solution is right?"*

"I think you made a mistake," said Alexa. Did Jackie make a mistake? Help Jackie figure out whether she made a mistake and, if she did, explain her mistake and show her how to solve the equation correctly. Jackie's work is shown above right.

$$(x+4)^2 - 2x - 5 = (x-1)^2$$
$$x^2 + 16 - 2x - 5 = x^2 + 1$$
$$16 - 2x - 5 = 1$$
$$11 - 2x = 1$$
$$-2x = -10$$
$$x = 5$$

Jackie squared the binomials incorrectly. It should be: $x^2 + 8x + 16 - 2x - 5 = x^2 - 2x + 1$, $6x + 11 = -2x + 1$, $8x = -10$, and $x = -1.25$.

A-39

a) $5 - (y - 2) = 3x$

$5 - y + 2 = 3x$

$-y + 7 = 3x$

$-7 \quad\quad -7$

$-y = 3x - 7$

$y = -3x + 7$

b) $5(x + y) = -2$

$5x + 5y = -2$

$-5x \quad\quad -5x$

$5y = -5x - 2$

divide

$y = -\frac{5}{5}x - \frac{2}{5}$

$y = -x - \frac{2}{5}$

A-54 a substition method work well here

$y + 3x = -10$ $\quad -3x \quad -3x$

$y = -3x - 10$

$5x - y = 2$

$5x - [-3x - 10] = 2$

$5x + 3x + 10 = 2$

$8x + 10 = 2$

$\quad -10 \quad -10$

$8x = -8$

$x = -1$

$y = -3(-1) - 10$

$y = 3 - 10 = -7$

Solution $(-1, -7)$

A-54 b

$6x = 7 - 2y$

$4x + y = 4$

$y = -4x + 4$

$6x = 7 - 2y$

$6x = 7 - 2[4x + 4]$

$6x = 7 + 8x - 8$

$6x = 8x - 1$

$-8x \quad -8x$

$-2x = -1$

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

$y = -4(\frac{1}{2}) + 4$

$y = -2 + 4 = 2$

Solution $(\frac{1}{2}, 2)$

A-89 Recursive Sequences

(a) $t_1 = -3$ ← sequence starts at -3
$t_{n+1} = -2 \cdot t_n$

$-3, 6, -12, 24, -48$

b) $t_1 = 8$
$t_{n+1} = t_n - 5$

$8, 3, -1, -7, -12$

c) $t_1 = 2$
$t_{n+1} = (t_n)^{-1}$
$= \frac{1}{t_n}$

$2, \frac{1}{2}, 2, \frac{1}{2}, 2$

A-102

(a) $(2m^3)(4m^2) = 8m^5$

(b) $\frac{6y^5}{3y^2 1} y^3 = 2y^3$

(c) $\frac{-4y^2}{6y^7} = -\frac{2}{3y^5}$

d) $(-2x^2)^3$
$= (-2)^3 (x^2)^3$
$-8x^6$

A-105

a) $(x+2)(x+3) = x^2 - 10$

$x^2 + 3x + 2x + 6 = x^2 - 10$

$5x + 6 = -10$

$-6 \quad -6$

$5x = -16$

$x = -\frac{16}{5}$

b) multiply all terms by 6

$\frac{1}{2}x + \frac{1}{3}x - 7 = \frac{5}{6}x$

$3x + 2x - 42 = 5x$

$5x - 42 = 5x$

$-5x \quad -5x$

$-42 = 0$

Never true

so there are NO solutions

c) $|2x - 1| = 9$

$2x - 1 = 9$ $\quad +1 \quad +1$

$2x = 10$

$x = 5$

$2x - 1 = -9$ $\quad +1 \quad +1$

$2x = -8$

$x = -4$

two solutions

d) Solutions

$\frac{x+1}{3} = \frac{x}{2}$ cross multiply

$2(x+1) = 3x$

$2x + 2 = 3x$

$-2x \quad -2x$

$2 = x$

$x = 2$!!!

NOT $2 = x$

A-112 $t_n = 5 \cdot 2^n$

$5 \cdot 2^n = 200$

divide by 5

$2^n = 40$

graph on GDC to find intersection

$n \approx 5.321$

so 200 is NOT one of the terms

Appendix B

B-11

a) $(3x^2y\,z^4)^2 = 9x^4y^2z^8$

b) $\left(\frac{r^8}{s^3t}\right)^3 = \left(\frac{r}{s^2t}\right)^3 = \frac{r^3}{s^6 \cdot t^3}$

c) $(3m+7)(2m-1) = 6m^2 - 3m + 14m - 7 = 6m^2 + 11m - 7$

d) $(x-3)^2 = (x-3)(x-3) = x^2 - 3x - 3x + 9 = x^2 - 6x + 9$

B-46 DVD loses 60% every year
start at ฿80

$100\% - 60\% = 40\%$

a) Multiplier 0.4

b) $y = 80(0.4)^1 =$ ฿32 after 1 year

$y = 80(0.4)^4 =$ ฿2.05 after 4 yrs

c) $V(t) = 80(0.4)^t$

d) In theary it will never go to 0