

Unit 5 Study Guide KEY

1

$$5^{3v} = 125$$

$$5^{3v} = 5^3$$

$$3v = 3$$

$$v = 1$$

2

$$16^{-2a-1} = 4$$

$$(4^2)^{-2a-1} = 4^1$$

$$2(-2a-1) = 1$$

$$-4a-2 = 1$$

$$-4a = 3$$

$$a = \frac{3}{-4}$$

3

$$16^x = 64$$

$$(4^2)^x = 4^3$$

$$2x = 3$$

$$x = \frac{3}{2}$$

4

$$216^{-n+3} = \frac{1}{6}$$

$$(6^3)^{-n+3} = 6^{-1}$$

$$3(-n+3) = -1$$

$$-3n+9 = -1$$

$$-3n = -10$$

$$n = \frac{-10}{-3}$$

5

$$-8 \cdot 3^{x-5} + 9 = -23$$

$$\frac{-8 \cdot 3^{x-5}}{-8} = \frac{-32}{-8}$$

$$3^{x-5} = 4$$

$$x-5 = \log_3 4$$

$$+5 \quad +5$$

$$x = 5 + \log_3 4$$

$$x \approx 6.262$$

6

$$-10 \cdot 3^{3n} + 8 = -22$$

$$\frac{-10 \cdot 3^{3n}}{-10} = \frac{-30}{-10}$$

$$3^{3n} = 3$$

$$\frac{3n}{3} = \frac{\log_3 3}{3}$$

$$n = \frac{\log_3 3}{3}$$

$$n \approx 0.333$$

7

$$8 \cdot 13^{x+7} + 5 = 93$$

$$\frac{8 \cdot 13^{x+7}}{8} = \frac{88}{8}$$

$$13^{x+7} = 11$$

$$x+7 = \log_{13} 11$$

$$-7 \quad -7$$

$$x = -7 + \log_{13} 11$$

$$x \approx -6.065$$

8

$$2 \cdot 5^{x-2} - 10 = 76$$

$$\frac{2 \cdot 5^{x-2}}{2} = \frac{86}{2}$$

$$5^{x-2} = 43$$

$$x-2 = \log_5 43$$

$$+2 \quad +2$$

$$x = 2 + \log_5 43$$

$$x \approx 4.337$$

9

$$—$$

10

$$2^3 = b$$

11

$$\left(\frac{9}{5}\right)^y = x$$

12

$$(81)^{\frac{1}{2}} = 9$$

13

$$x^y = 188$$

14

$$\log_m 144 = -10$$

15

$$\log_{18} 18 = x$$

16

$$\log_{11} x = y$$

17

$$\log_v 166 = 14$$

18

$$4$$

19

$$5$$

20

$$-3$$

21

$$1$$

all of these can be put into the calculator

22

$$\log_2 (12^4 \cdot 11^3)$$

$$\log_2 12^4 + \log_2 11^3$$

$$4 \log_2 12 + 3 \log_2 11$$

23

$$\log_4 \left(\frac{u^6}{v^2} \right)$$

$$\log_4 u^6 - \log_4 v^2$$

$$6 \log_4 u - 2 \log_4 v$$

24

$$25 \log_8 a + 5 \log_8 b$$

$$\log_8 a^{25} + \log_8 b^5$$

$$\log_8 (a^{25} b^5)$$

25

$$2 \log_9 8 - 2 \log_9 3$$

$$\log_9 8^2 - \log_9 3^2$$

$$\log_9 \left(\frac{8^2}{3^2} \right)$$

$$\text{or } \log_9 \left(\frac{64}{9} \right)$$

$$\boxed{26} \log_7(5m-7) = \log_7(3m+3)$$

"LOG = LOG"

$$5m-7 = 3m+3$$

$$\begin{array}{r} -3m \\ -3m \end{array}$$

$$2m-7 = 3$$

$$\begin{array}{r} +7 \\ +7 \end{array}$$

$$\frac{2m}{2} = \frac{10}{2}$$

$$m = 5$$

$$\boxed{27} \log_8(-x+4) = \log_8 -5x$$

"LOG = LOG"

$$-x+4 = -5x$$

$$\begin{array}{r} +5x \\ +5x \end{array}$$

$$4x+4 = 0$$

$$\frac{4x}{4} = \frac{-4}{4}$$

$$x = -1$$

$$\boxed{28} \log_9(x-6) + \log_9 10 = 2$$

$$\log_9 10(x-6) = 2$$

"LOG = #"

$$10(x-6) = 9^2$$

$$10x-60 = 81$$

$$\begin{array}{r} +60 \\ +60 \end{array}$$

$$\frac{10x}{10} = \frac{141}{10}$$

$$x = 14.1$$

$$\boxed{29} \log_3 2x - \log_3 4 = 4$$

$$\log_3 \left(\frac{2x}{4} \right) = 4$$

"LOG = #"

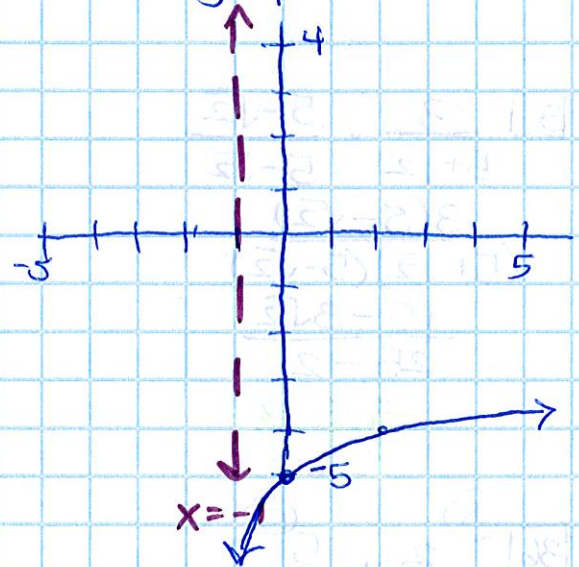
$$\frac{x}{2} = 3^4$$

$$2 \cdot \frac{x}{2} = 81 \cdot 2$$

$$x = 162$$

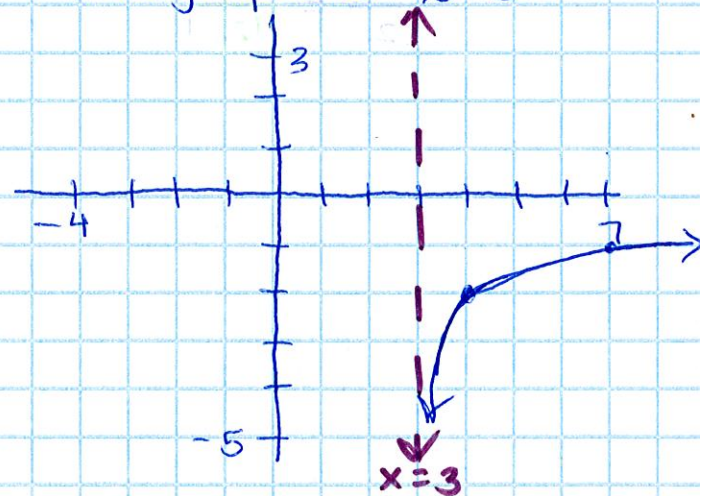
$$\boxed{30} y = \log_3(x+1) - 5$$

v. asymptote $x = -1$



$$\boxed{31} y = \log_4(x-3) - 2$$

v. asymptote $x = 3$



$$\boxed{32} x^2 + 2x - 15$$

$$\begin{array}{r} -15 \\ -3 \quad 5 \\ \hline 2 \quad 1 \end{array} \quad \begin{array}{r} 1-15 \\ 3-5 \\ \hline -3 \quad 5 \end{array}$$

$$(x-3)(x+5)$$

$$\boxed{33} 3x^2 + 4x = -5 \quad x = \frac{-4 \pm \sqrt{4^2 - 4(3)(-5)}}{2(3)}$$

$$3x^2 + 4x + 5 = 0$$

$$a = 3 \quad b = 4 \quad c = 5$$

$$x = \frac{-4 \pm \sqrt{44}}{6}$$

$$= \frac{-4 \pm 2\sqrt{11}}{6} = \frac{-2 \pm \sqrt{11}}{3}$$

34: Vertical stretch of 2
 left 2
 down 1

$$\frac{3}{5+\sqrt{2}} \cdot \frac{5-\sqrt{2}}{5-\sqrt{2}}$$

$$\frac{3(5-\sqrt{2})}{(5+\sqrt{2})(5-\sqrt{2})}$$

$$\frac{15-3\sqrt{2}}{25-2}$$

$$\frac{15-3\sqrt{2}}{23}$$

36

$$\frac{2}{3} \times \frac{5}{4}$$

(12)

$$\frac{8+15}{12} = \frac{23}{12}$$

$$(f+mg) \cdot (0,1) = (f-mg) \cdot (0,1) \quad | \cdot 1/2$$

$$f+mg = f-mg$$

$$mg = -mg$$

$$f = f - mg$$

$$(f+mg) \cdot (0,1) = (f-mg) \cdot (0,1) \quad | \cdot 1/2$$

$$f+mg = f-mg$$

$$mg = -mg$$

$$f = f - mg$$

$$f = 0, (0,1) + (1-x) \cdot (0,1) \quad | \cdot 1/2$$

$$f = (1-x) \cdot (0,1)$$

$$f = 0, (0,1) + (1-x) \cdot (0,1) \quad | \cdot 1/2$$

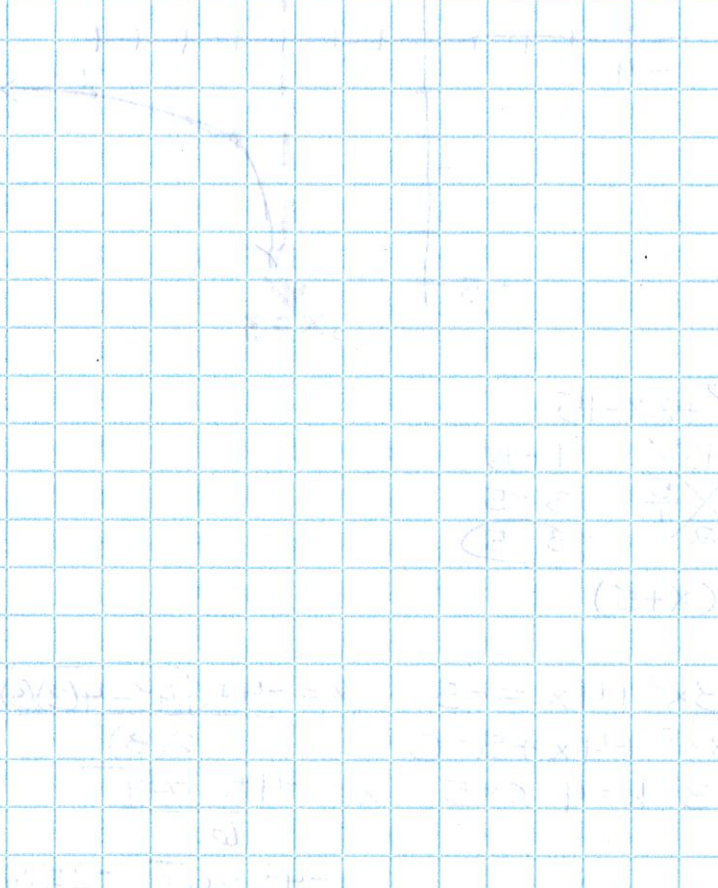
$$f = (1-x) \cdot (0,1)$$

$$H = f \cdot (0,1) - x \cdot (0,1) \quad | \cdot 1/2$$

$$H = (1-x) \cdot (0,1)$$

$$H = 0, (0,1) + (1-x) \cdot (0,1) \quad | \cdot 1/2$$

$$H = (1-x) \cdot (0,1)$$



Practice for Exam

① change to log form.

$$3^{x+3} = 91$$

$$\log_3 91 = x+3$$

② solve the equation.

$$\log_3(x+2) = \log_3(5x)$$

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

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

③ change to exponential form:

$$\log_7 25 = p$$

$$7^p = 25$$

$$\frac{2}{4} = \frac{4x}{4}$$

④ solve the equation:

$$\log_2(2x-5) = 3$$

$$x = \frac{13}{2}$$

⑤ solve: $\log_3(x-9) = 3$

$$x = 36$$

⑥ condense:
to a single log.

$$2\log_7 x + \log_7 13$$

$$\log_7(13x^2)$$

$$\log_7 x^2 + \log_7 13$$

⑦ Expand:

$$\log_3\left(\frac{m^4}{14}\right)$$

$$4\log_3 m - \log_3 14$$

⑧ solve:

$$4^{x+2} = 64$$

$$x = 1$$

$$\log_4 64 = x+2$$

$$4^{x+3} = 16^{2x}$$

⑨ ~~Add~~ Add. $\frac{3}{7} + \frac{2}{5} = \frac{29}{35}$

⑩ Rationalize.

$$\frac{2}{(4-\sqrt{3})} \cdot \frac{(4+\sqrt{3})}{(4+\sqrt{3})} = \frac{8+2\sqrt{3}}{16-3} = \frac{8+2\sqrt{3}}{13}$$

$$\frac{(a-b)(a+b)}{a^2-b^2}$$

$$\frac{4^2 - (\sqrt{3})^2}{16-3}$$

9) Add. $\frac{3}{7} + \frac{2}{5} = \frac{29}{35}$

10) Rationalize.

$$\frac{2}{(4-\sqrt{3})} \cdot \frac{(4+\sqrt{3})}{(4+\sqrt{3})} = \frac{8+2\sqrt{3}}{16-3} = \frac{8+2\sqrt{3}}{13}$$

$$\frac{(a-b)(a+b)}{a^2-b^2}$$

$$\frac{4^2 - (\sqrt{3})^2}{16-3}$$