

Math 100T Test II

KEY

Name _____
(pledged)

5/2/11

1. Sketch the graphs. (6 points each)

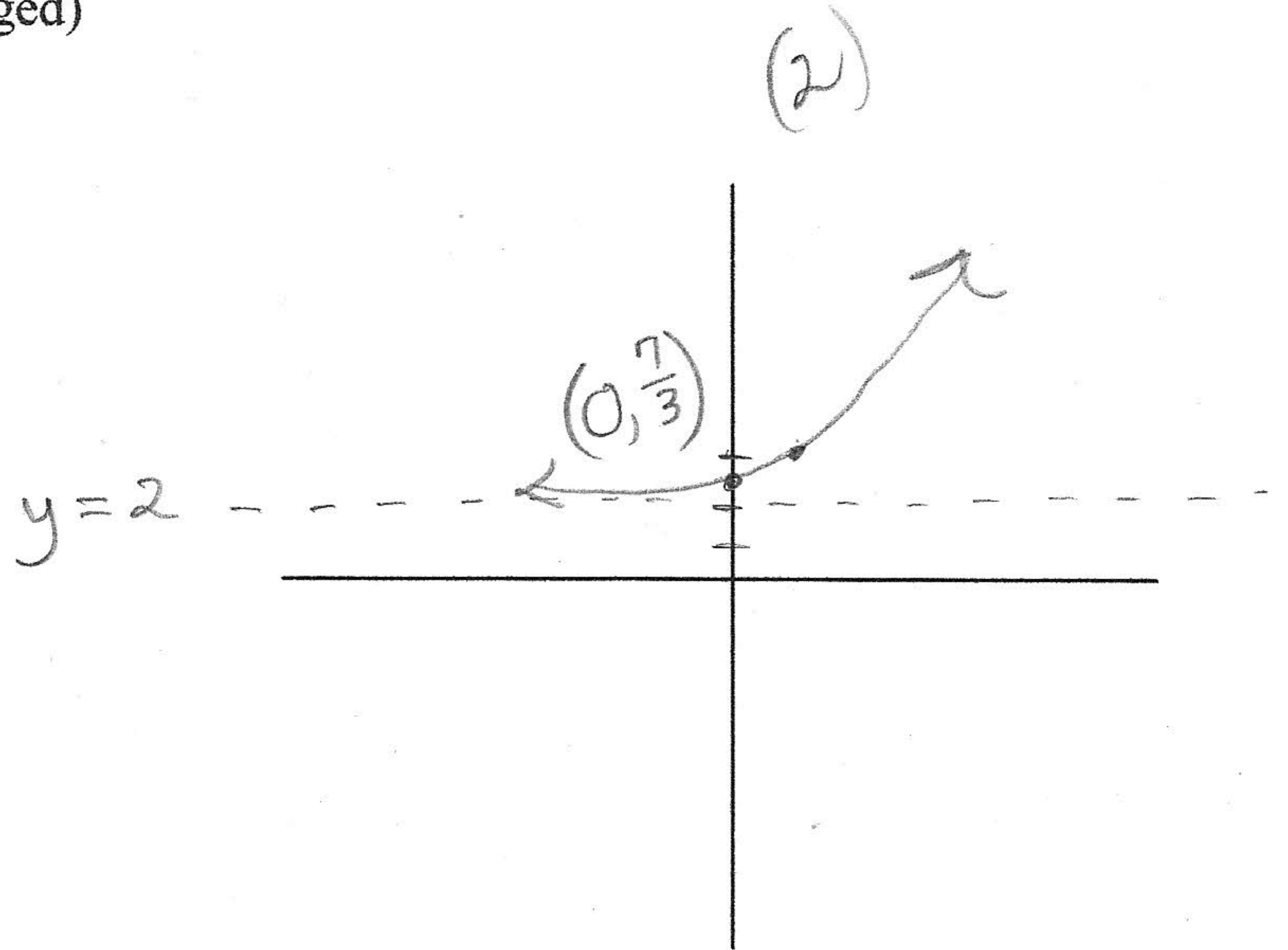
a) $y = 3^{x-1} + 2$

1 asymptote $y = 2$

1 y-intercept $(0, \frac{7}{3})$

1 domain \mathbb{R}

1 range $y > 2$



x	y
0	$2\frac{1}{3}$ or $\frac{7}{3}$
1	3

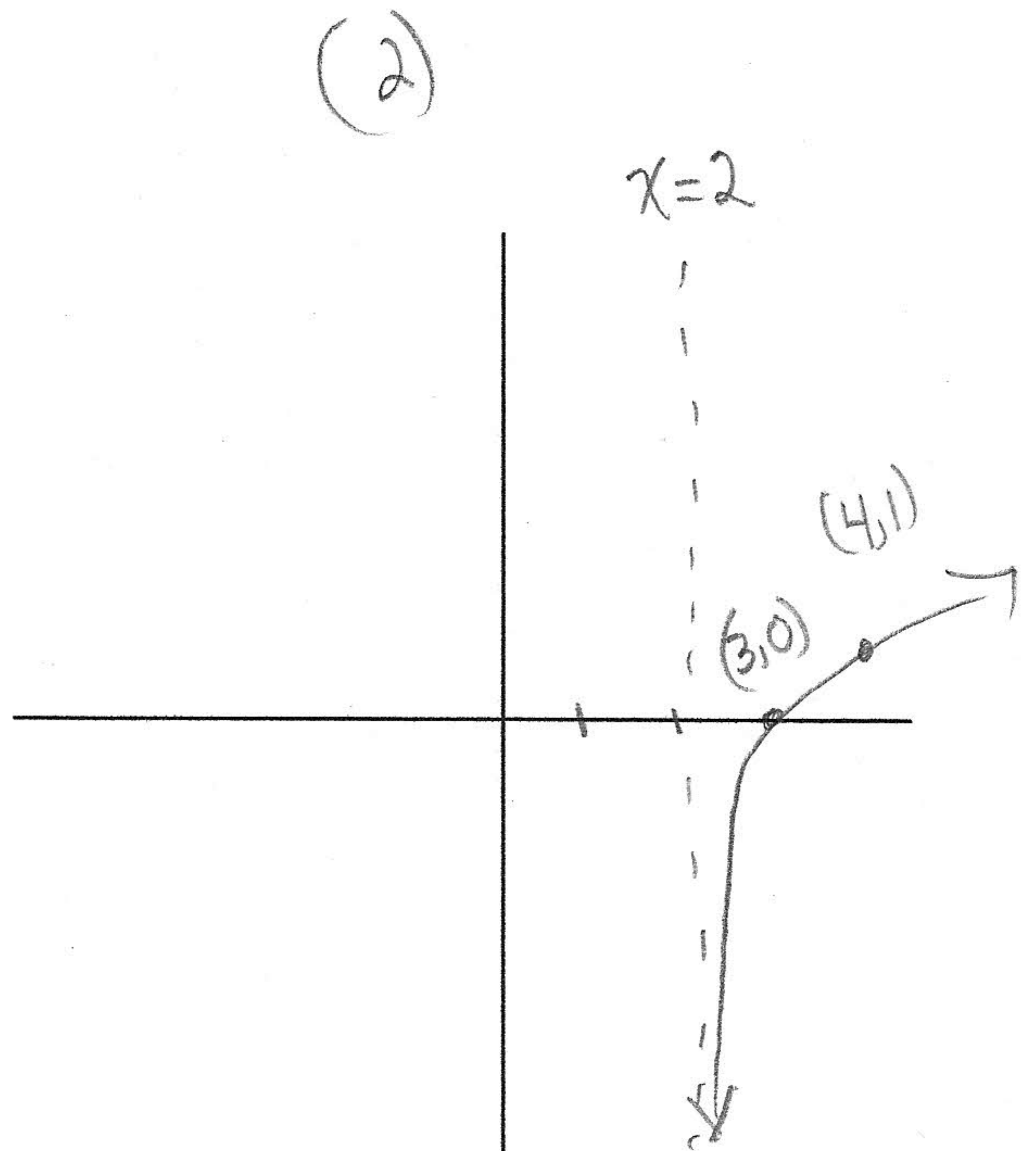
b) $y = \log_2(x-2)$

1 asymptote $x = 2$

1 x-intercept $(3, 0)$

1 domain $x > 2$

1 range \mathbb{R}



VA: $x-2=0$
 $x=2$

$\log_2(x-2)=0$
 $2^0=x-2$
 $1+2=x$
 $x=3$

$\log_2(x-2)=1$
 $2=x-2$
 $4=x$

x	y
3	0
4	1

2. Solve the following: (4 points each)

a) $2^{3-x} = 16^{3x}$

$$2^{3-x} = (2^4)^{3x}$$

$$2^{3-x} = 2^{12x}$$

$$3-x = 12x$$

$$3 = 13x$$

$$x = \frac{3}{13}$$

b) $\log_3 5x - \log_3 (x-2) = 2$

$$\log_3 \frac{5x}{x-2} = 2$$

$$\frac{5x}{x-2} = 3^2$$

$$9x - 18 = 5x$$

$$4x = 18$$

$$x = \frac{18}{4}$$

$$x = \frac{9}{2} \checkmark$$

c) $3^{2x+1} = 6^x$

$$\log 3^{2x+1} = \log 6^x$$

$$(2x+1) \log 3 = x \log 6$$

$$2x \log 3 + \log 3 = x \log 6$$

$$2x \log 3 - x \log 6 = -\log 3$$

$$x(2 \log 3 - \log 6) = -\log 3$$

$$x = \frac{-\log 3}{2 \log 3 - \log 6}$$

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

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

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

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

$$(x-6)(x+3) = 0$$

$$x = 6 \checkmark$$

$$x = -3$$

$$x = 6 \text{ only}$$

e) $\log_3 \frac{1}{27} = x$

$$3^x = \frac{1}{27}$$

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

$$x = -3$$

3. Sketch the graph of $y = 3\sin x - 2$ from -2π to 2π . Label the points on the axes.
(10 pts.)

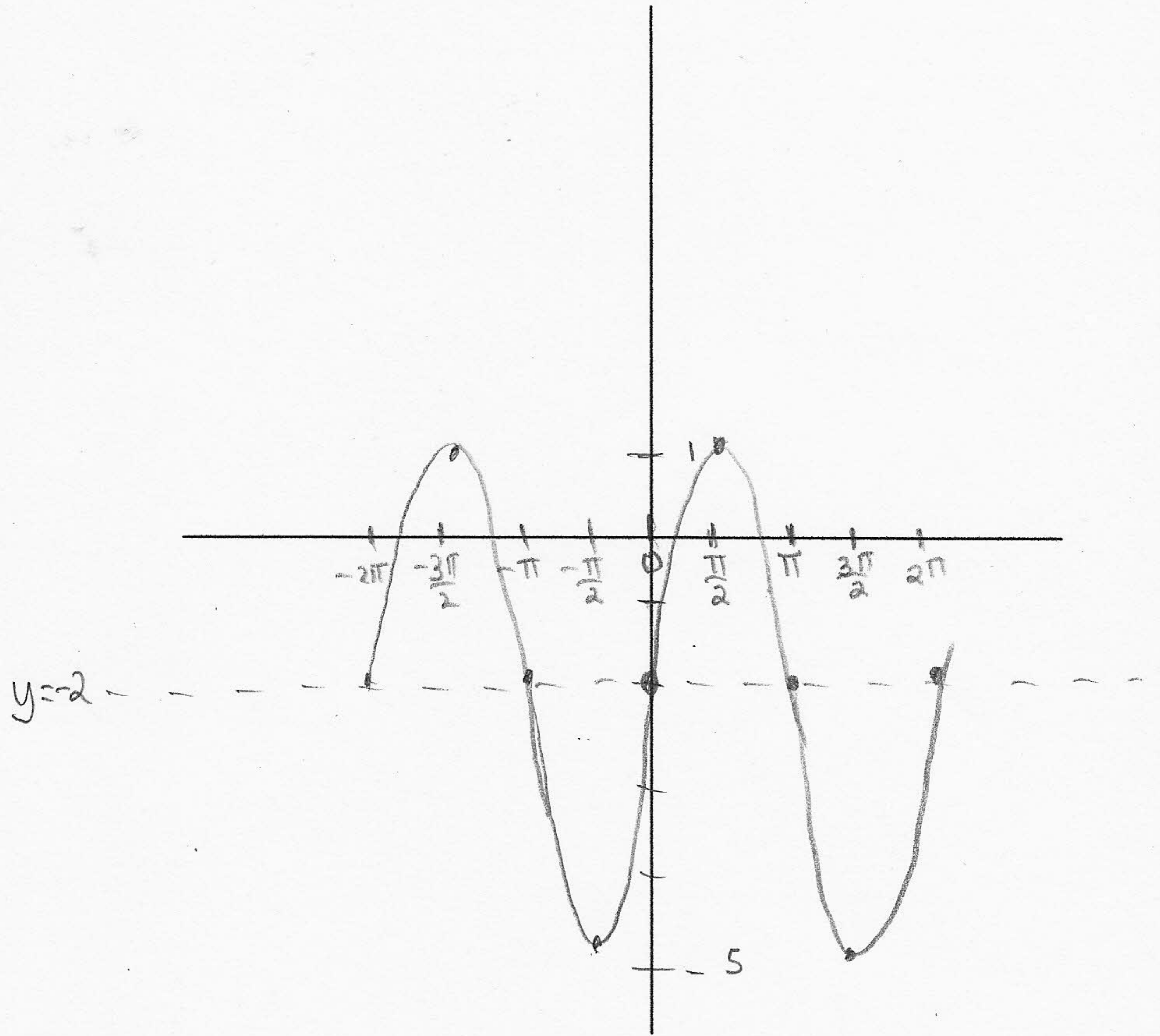
amplitude 3

y-intercept $(0, -2)$

range $[-5, 1]$

maximum points:

$(-\frac{3\pi}{2}, 1)$, $(\frac{\pi}{2}, 1)$



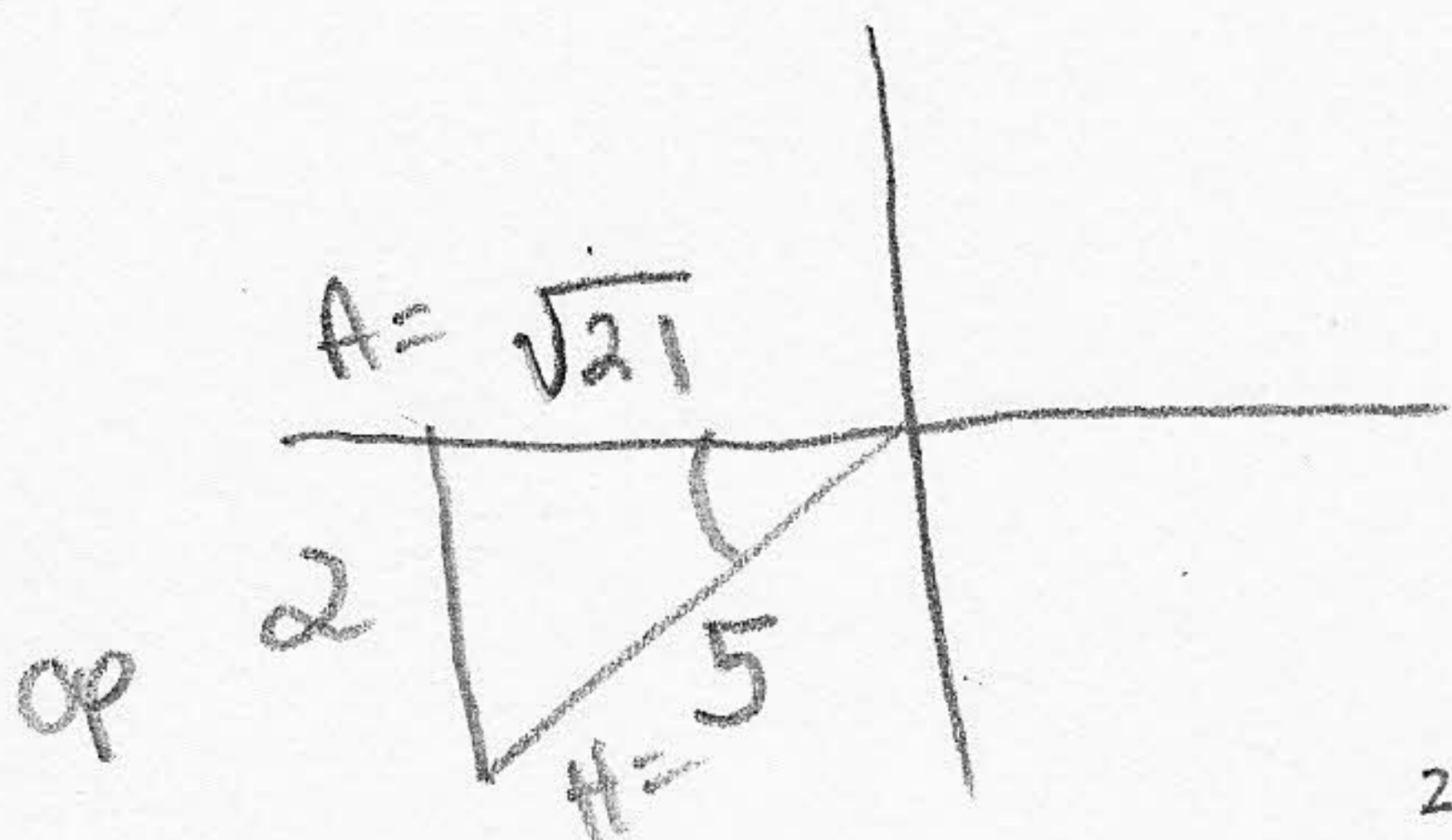
4. If $\csc \alpha = -\frac{5}{2}$ and α is in quadrant III, find

(3 pts. each)

$$\cos \alpha = -\frac{\sqrt{21}}{5}$$

$$\tan \alpha = \frac{2\sqrt{21}}{21}$$

$\frac{A}{H}$



$$\csc \alpha = \frac{1}{\sin \alpha} = \frac{H}{O}$$

$$2^2 + A^2 = 5^2$$

$$A^2 = 25 - 4 = 21 \quad A = \sqrt{21}$$

$$\frac{2\sqrt{21}}{\sqrt{21}\sqrt{21}}$$

