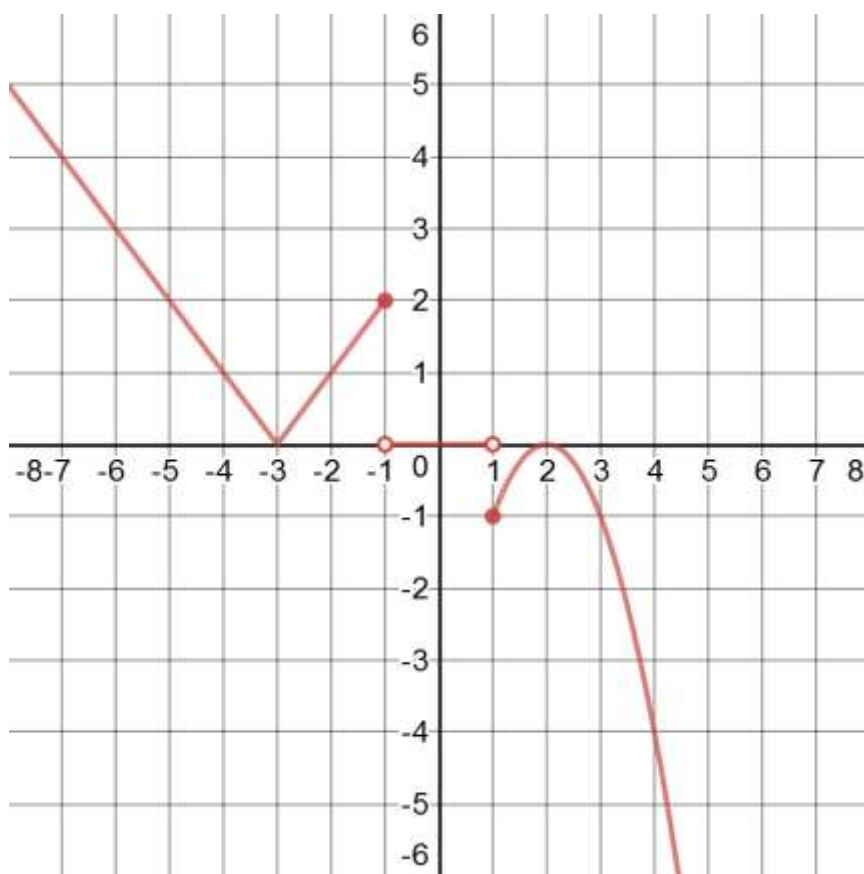# Fall 2017 Final Exam Answer Key

1) (a) $\dfrac{17x - 14}{4 - x}$

(b) $g^{-1}(x) = \dfrac{4x - 2}{4 + x}$

2)

3) $D = (-\infty, -7) \cup (0, 10)$
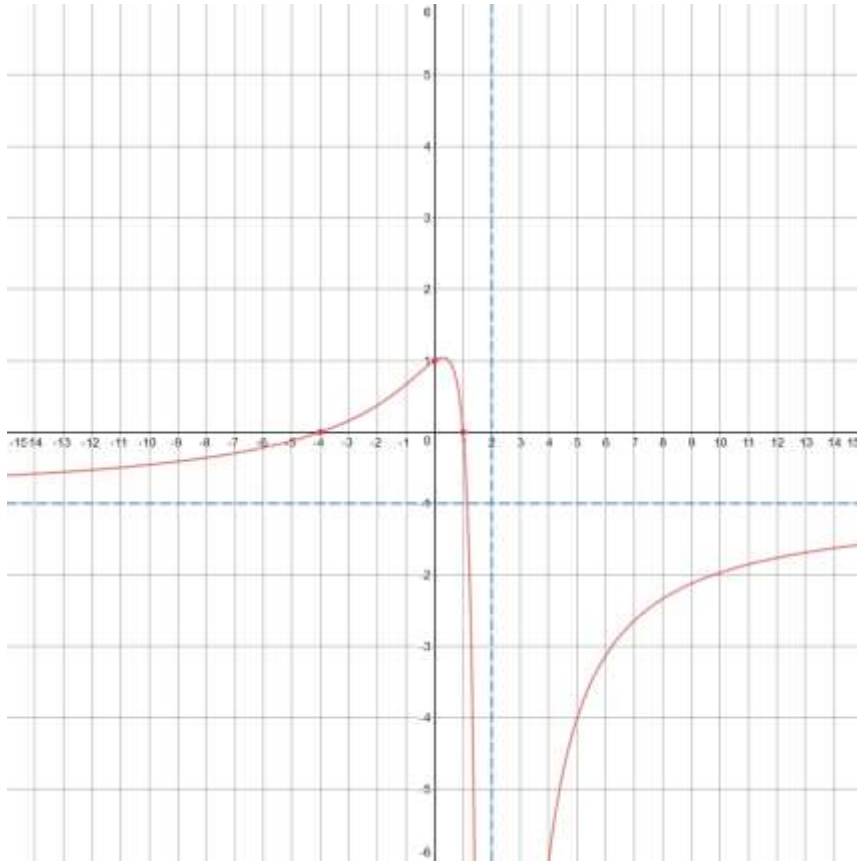
4) $\dfrac{-1}{\sqrt{h+1}\left(1 + \sqrt{h+1}\right)}$

5) (a) $\pm 1, \pm 2, \pm 5, \pm 10$

(b) $1 \pm \sqrt{6}, \pm i\sqrt{2}$
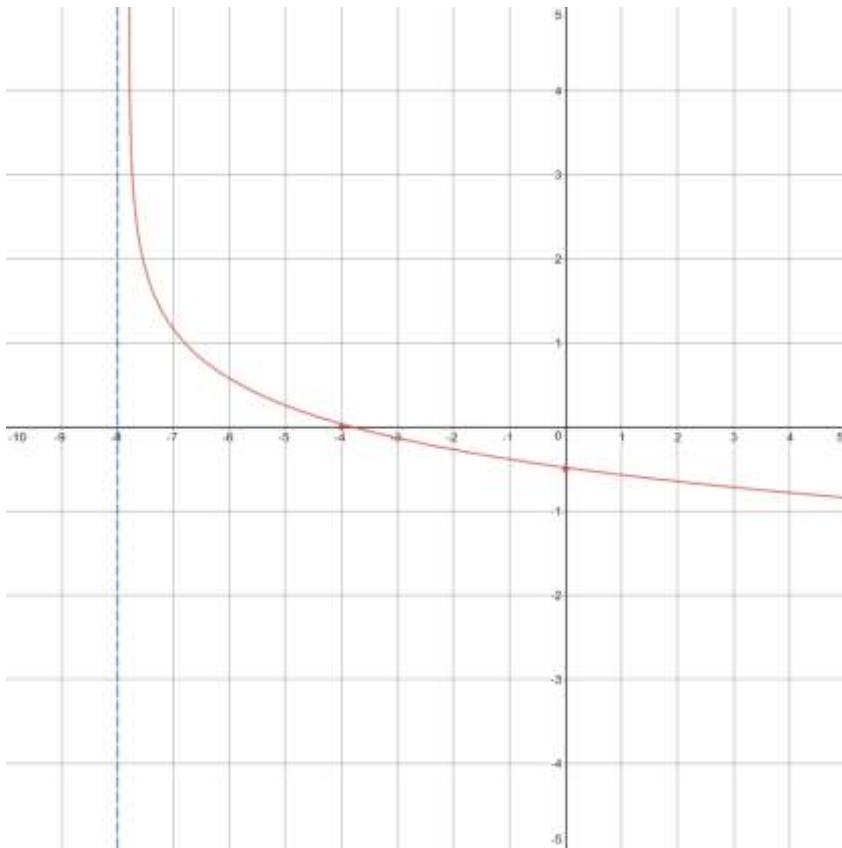
6) $h(x) = \dfrac{21 - 8x}{8 + x}$

7)

8) $x = \ln 3$

9)

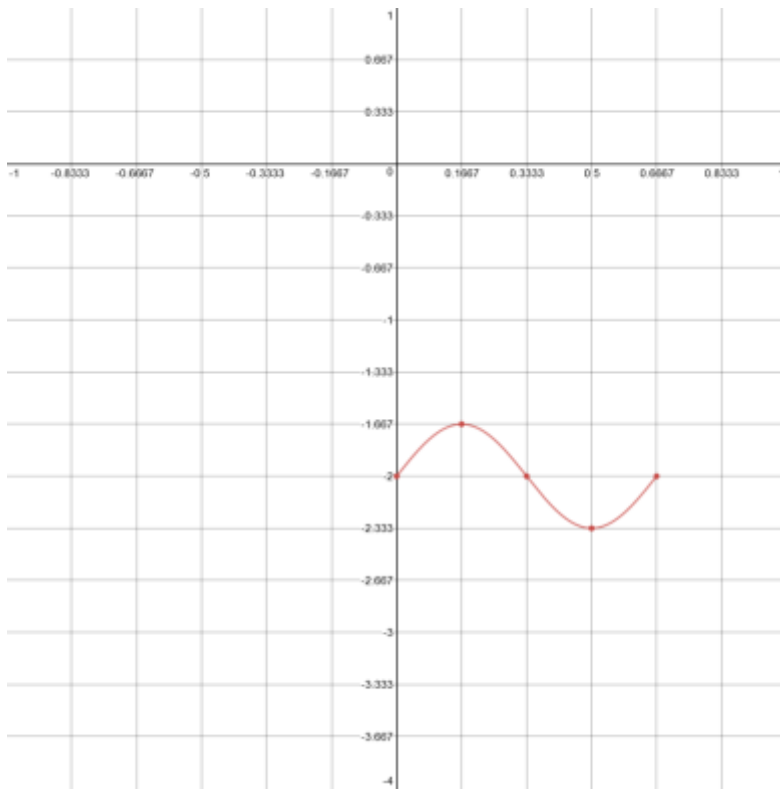

10) $P(24) = 405$ bacteria

11) (a) $-\frac{1}{\sqrt{3}}$

   (b) $\frac{5\pi}{6}$

12) $\dfrac{-88\sqrt{3} + 73}{169}$

13) The points plotted are $\left(0, -2\right), \left(\tfrac{1}{6}, -\tfrac{5}{3}\right), \left(\tfrac{1}{3}, -2\right), \left(\tfrac{1}{2}, -\tfrac{7}{3}\right), \left(\tfrac{2}{3}, -2\right)$

14)

$$LHS = \csc x - \cot x$$

$$= \frac{1}{\sin x} - \frac{\cos x}{\sin x}$$

$$= \frac{1 - \cos x}{\sin x} \cdot \frac{\sin x}{\sin x}$$

$$= \frac{(1 - \cos x)\sin x}{\sin^2 x}$$

$$= \frac{(1 - \cos x)\sin x}{1 - \cos^2 x}$$

$$= \frac{(1 - \cos x)\sin x}{(1 - \cos x)(1 + \cos x)}$$

$$= \frac{\sin x}{(1 + \cos x)} = RHS$$

15) $\dfrac{\pi}{2}, \dfrac{7\pi}{6}, \dfrac{11\pi}{6}$

16) $x = 450\sin\left(55°\right)$ feet