

Math 150 Week-in-Review 6 Answer Key

1. (a) x -intercepts: $x = -2, 2$
 y -intercepts: $y = 4$
 Vertical Asymptote: $x = -\frac{3}{2}, \frac{1}{2}$
 Horizontal Asymptote: $y = \frac{3}{4}$

(b) x -intercepts: $x = -4, 0, 2$
 y -intercepts: $y = 0$
 Vertical Asymptote: $x = -1, 5$
 Horizontal Asymptote: None
 Slant Asymptote: $y = \frac{1}{2}x + 3$
2. x -intercepts: $x = -4, 2$
 y -intercepts: $y = -\frac{16}{75}$
 Vertical Asymptote: $x = -5, -1, 3$
 Horizontal Asymptote: $y = 0$
 Asymptotic Behavior:
 As $x \rightarrow -5^-$, $r(x) \rightarrow -\infty$; As $x \rightarrow -5^+$, $r(x) \rightarrow -\infty$
 As $x \rightarrow -1^-$, $r(x) \rightarrow \infty$; As $x \rightarrow -1^+$, $r(x) \rightarrow -\infty$
 As $x \rightarrow 3^-$, $r(x) \rightarrow -\infty$; As $x \rightarrow 3^+$, $r(x) \rightarrow \infty$
 As $x \rightarrow -\infty$, $r(x) \rightarrow 0$; As $x \rightarrow \infty$, $r(x) \rightarrow 0$
3. (a) Shift left 1, reflect across y -axis, shift up 2.
 Domain: $(-\infty, \infty)$
 Range: $(-\infty, 2)$
 Asymptote (horizontal): $y = 2$
 As $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$; As $x \rightarrow \infty$, $f(x) \rightarrow 2$

(b) Reflect across x -axis, shift down 1.
 Domain: $(-\infty, 0)$
 Range: $(-\infty, \infty)$
 Asymptote (vertical): $x = 0$
 As $x \rightarrow -\infty$, $f(x) \rightarrow \infty$; As $x \rightarrow 0^-$, $f(x) \rightarrow -\infty$
4. $(-\infty, 3) \cup (6, \infty)$
5. (a) $\ln 3 + 5 \ln x + 2 \ln(x + 2) - \frac{1}{4} \ln y$
 (b) $(\log 4 + \log(x + 2y))^2 = (\log 4)^2 + 2 \log 4 \log(x + 2y) + (\log(x + 2y))^2$
6. (a) $\log \frac{(x - 7)z^5}{\sqrt{y}}$
 (b) $\frac{\ln x \ln(\frac{y}{x})}{\ln(x^4y)}$
7. (a) $\frac{3}{2}$
 (b) 6
 (c) -2

(d) 4

8. (a) $x = 16$

(b) $x = \frac{1}{3} \left(\frac{\log 2}{\log 6} + 7 \right)$

(c) $x = 4e^3 - 1$

(d) $x = \frac{\ln(\frac{3}{2})}{-20} = \frac{\ln 3 - \ln 2}{-20}$

(e) $x = 7$; ($x = -3$ is extraneous)

(f) $x = \frac{\log(25 \cdot 64)}{\log(\frac{5}{16})} = \frac{\log 1600}{\log 5 - \log 16}$

(g) $x = 5$; ($x = 2$ is extraneous)

(h) $x = 7$; ($x = -6$ is extraneous)