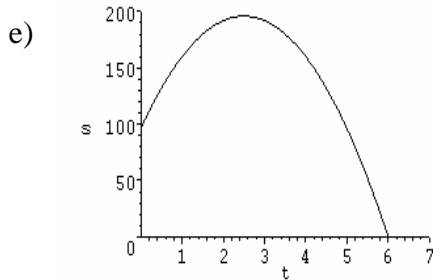


## ANSWERS

### REVIEW - UNIT 4

1. Vertex:  $(2, 0)$ ; Axis:  $x = 2$ ;  $x$ -intercept:  $x = 2$ ;  $y$ -intercept:  $y = -8$ ; open down;  
 D:  $(-\infty, +\infty)$ , R:  $(-\infty, 0]$ . 2. a)  $s(t) = -16t^2 + 80t + 96$  b) 196 ft c) 2.5 sec d) 6 sec



3. a)  $p(x) = -\frac{25}{4}x + 1100$  b) \$ 825 c)  $P(x) = -\frac{25}{4}x^2 + 600x - 7500$  d) 48 units

e) \$ 800 4. a) 45,000 ft<sup>2</sup>

5. Zeros:  $x = 0(1)$ ,  $x = 2(3)$ ,  $x = -2(1)$ ,  $x = 3(2)$ ,  $x = -2i(3)$ ,  $x = 2i(3)$

$x$ -intercepts:  $x = 0$ ,  $x = 2$ ,  $x = -2$ ,  $x = 3$

6. Zeros:  $x = 1(\text{mult } 1)$ ,  $x = -\frac{4}{3}(\text{mult } 2)$ ;  $f(x) \approx -18x^3$ , as  $x \rightarrow \infty$

7. Domain:  $\{x \mid x \text{ is real and } x \neq 1, 2, 4\}$ , Hole:  $(2, \frac{1}{2})$ , VA:  $x = 1$  and  $x = 4$

HA:  $y = 0$ ,  $x$ -intercept:  $x = 3$ ,  $y$ -intercept:  $y = -\frac{3}{4}$ , @  $(3, 0)$   $f$  crosses HA

8.  $f$  and  $h$  9. 2

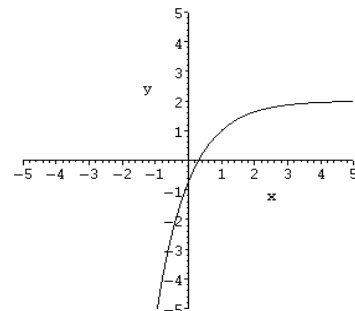
11. a)  $f^{-1}(x) = \frac{2x+5}{1-x}$ , Domain:  $(-\infty, 1) \cup (1, +\infty)$ , Range:  $(-\infty, -2) \cup (-2, +\infty)$

- b)  $f^{-1} = 4 + \frac{1}{9}(5-x)^2$ , Domain:  $(-\infty, 5]$ , Range:  $[4, +\infty)$  c)  $f^{-1}(x) = 1 + \sqrt{1+x}$ ,

Domain:  $[-1, +\infty)$ , Range:  $[1, +\infty)$

12. Domain:  $(-\infty, +\infty)$ , Range:  $(-\infty, 2)$ , HA:  $y = 2$ .

Increasing.



13. a)  $\{-4, 2\}$  b)  $\{1\}$  14. 3.6 %
15. a) Domain:  $(-1, +\infty)$ ; Range:  $(-\infty, +\infty)$ ; VA:  $x = -1$ ;  
 $x$ -intercept:  $x = e - 1$ ;  $y$ -intercept:  $y = 2$
16. a)  $125 = 5^3$  b)  $2 = e^x$  c)  $\frac{1}{1000} = 10^{-3}$
17. a)  $0 = \ln 1$  b)  $2x = \log 4$  c)  $-4 = \log_{\frac{1}{2}} 16$  d)  $\log_2 y = x - 1$
18. a)  $\frac{1}{2}$  b)  $-1$  c)  $2$  d)  $3$  e)  $-4$
19. a)  $1$  b)  $x^3$  ( $x > 0$ ) c)  $2x^2$  d)  $\frac{1}{2}x^2$  e), f) cannot be simplified
20.  $\log \frac{32y^2}{x^3}$  21.  $1 + \frac{1}{2} \log_6 x + \frac{3}{2} \log_6 y - 2 \log_6 z$
22. a)  $\frac{1}{\ln 2}$  b)  $\frac{1}{2} \log x$  c)  $\frac{3}{2}$  23.  $1$
24. a)  $\{\pm \sqrt{\log_2 33}\}$  b)  $\{\ln 5\}$  c)  $\left\{ \frac{\ln 5 + \ln 4}{\ln 5 - \ln 4} \right\}$  d)  $\left\{ \frac{3 \ln 6}{\ln 4} \right\}$
25. a)  $\{-1, 7\}$  b)  $\frac{10}{7}$  c)  $\{3\}$  d)  $\{87\}$
26. Domain:  $(-\infty, -3) \cup (3, +\infty)$
27. a)  $f^{-1}(x) = 2 - \ln(4 - x)$ ,  $D_{f^{-1}} = (-\infty, 4)$ ,  $R_{f^{-1}} = (-\infty, +\infty)$ ;  
b)  $f^{-1} = 2 + 3^{x-4}$ ,  $D_{f^{-1}} = (-\infty, +\infty)$ ,  $R_{f^{-1}} = (2, +\infty)$ .
28. (a), (b), and (c)
29. a)  $\frac{2}{3}$  hr = 40 minutes b) 200 years
30. a)  $y = 100e^{t(\ln 2)/3}$  b) 25,600
31. a)  $P = 227e^{t(\ln 250 - \ln 227)/10}$  b)  $\approx 286$  million c) in 2008