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/m160.fa07/handouts160/RevProbs/1Set/1Set826

- 1 (a) $f^{-1}(x) = \frac{-Dx + B}{Cx - A}$
- (b) $f(x^{-1}) = \frac{A + Bx}{C + Dx}$
- (c) $f(x)^{-1} = \frac{Cx + D}{Ax + B}$
- 2 (a) Left endpoint : **(1, 1.72)**
- (b) Right endpoint : **(3, -1.85)**
- (c) Leftmost x -intercept : **(2.72, 0)**
- (d) Rightmost x -intercept. : **(2.72, 0)**
- (e) Maximum point : **(2.72, 0)**
- (f) Minimum point : **(3, -1.85)**
- 3 (a) **$2500(1.08)^3 \approx \$3149.28$**
- (b) **$2500 \left(1 + \frac{0.08}{4}\right)^{12} \approx \3170.60**
- (c) **$2500 \left(1 + \frac{0.08}{12}\right)^{36} \approx \3175.59**
- (d) **$2500 \cdot e^{(0.08)(3)} \approx \3178.12**
- 4 (a) **\$403.51**
- (b) **\$4348.56**
- 5 **$\frac{3}{4}$**
- 6 (a) $f(x) = -\frac{1}{3}x + \frac{11}{3}$
- (b) $g(x) = 5 \cdot ()^{(x+4)/6}$
- (c) **$\mathcal{C} : (x - 2)^2 + (y - 3)^2 = 40$**
- (d) $h(x) = \frac{1}{18}(x - 2)^2 + 3$

(e) $(2 \pm \sqrt{31}, 0)$

(f) $(0, 3 \pm 6)$

(g) The graph of h has no x -intercepts.

(h) $x = 2 \pm i 3\sqrt{6}$

(i) $g^{-1}(x) = -4 + \log_{3/5} \left(\frac{x}{5} \right)$

(j) Halflife: $\frac{6 \log_{10}(2)}{\log_{10}(5/3)}$

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$$\frac{\ln(x+h) - \ln(x)}{h} = \frac{1}{h}(\ln(x+h) - \ln(x)) = \frac{1}{h} \ln \left(\frac{x+h}{x} \right) = \ln \left(\left[\frac{x+h}{x} \right]^{1/h} \right)$$

8 Answer:

$$g^{-1}(x) = 3 - \sqrt{\frac{x+125}{5}}$$

9 $f \circ g(x) = 5 - e^{2x}$

10 $(f \circ g)(x) = x^3$

11 Answer for Question A:

$$x = \frac{3}{10}(150 - p) \quad p = \frac{10}{3}(45 - x)$$

Answer Question B:

$$R = \frac{3}{10}p(150 - p) \quad R = \frac{10}{3}x(45 - x)$$

Answer for Question C:

$$C = 900 + 20x \quad C = 1800 - 6p$$

Answer for Question D:

$$P = -\frac{3}{10}p^2 + 51p - 1800 \quad P = -\frac{10}{3}x^2 + 130x - 900$$

Answer for Question E:

$$P = -\frac{3}{10}(p - 85)^2 + \frac{735}{2} \qquad P = -\frac{10}{3}\left(x - \frac{39}{2}\right)^2 + \frac{735}{2}$$

so that $P_{max} = \frac{735}{2}$ is attained either by setting the price at $p = 85$, or by making and selling $x = \frac{39}{2}$ Veeblefetzers.

This production level is not attainable in one week (a fraction of a Veeblefetzter doesn't fetz). Maybe Otto could set the price at \$85 for two weeks, and make and sell **39** Veeblefetzers.

Note also the break-even prices of \$50 and \$130 and break-even sales of **9** and **30**.

12 A table of functions and inverses:

Function	Inverse
$f(x) = \frac{3}{5}x - \frac{7}{10}$	$f^{-1}(x) = \frac{5}{3}x + \frac{7}{6}$
$f(x) = 3 + 2\sqrt{4 - 5x}$	$f^{-1}(x) = \frac{7 + 6x - x^2}{20}$
$f(x) = 3 + 2 \ln(4 - 5x)$	$f^{-1}(x) = \frac{4 - e^{(x-3)/2}}{5}$
$f(x) = 3 + \frac{2}{4 - 5x}$	$f^{-1}(x) = \frac{1}{5} \left(4 - \frac{2}{x - 3} \right)$
$f(x) = \frac{2 - 3x}{6x - 7}$	$f^{-1}(x) = \frac{7x + 2}{6x + 3}$
$f(x) = \frac{15}{x^{1/3} - 5}$	$f^{-1}(x) = 125 \left(1 + \frac{3}{x} \right)^3$