

hw solutions
section 2.3

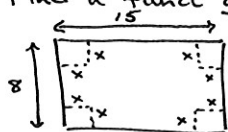
5. Is y a linear funct of x ?
If so, write it in form $y = mx + b$.
 $2x - 4y + 9 = 0$
yes.
 $4y = 2x + 9$
 $y = \frac{1}{2}x + \frac{9}{4}$

10. Is the funct poly, rational, or other.
state the degree of the poly.
 $f(x) = \frac{x^2 - 9}{x - 3}$
rational

15. Find m & b in $f(x) = mx + b$
so that $f(0) = 2$ & $f(3) = -1$.
 $2 = f(0) = b$
 $-1 = f(3) = m(3) + 2$
 $\rightarrow -3 = 3m, m = -1$
So $m = -1$ & $b = 2$

19. Find D where $D = (1 - r)T$
 $T = \$60,000$ & $r = .28$
 $D = (1 - .28) \cdot 60,000 = \$43,200$

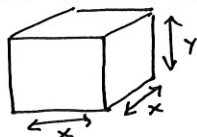
74. Find a funct giving the volume of the box.



$$V = lwh$$

$$V(x) = (8 - 2x)(15 - 2x)x$$

75. Find a funct giving the cost of the box.
base costs: $30¢/\text{ft}^2$
side costs: $10¢/\text{ft}^2$
top costs: $20¢/\text{ft}^2$



Cost = Cost of top + sides + bottom

$$C(x) = 20x^2 + 4(10xy) + 30x^2$$

$$C(x) = 50x^2 + 40xy$$

$$\text{Volume} = 20 = x^2 y \Rightarrow y = \frac{20}{x^2}$$

$$C(x) = 50x^2 + 40x\left(\frac{20}{x^2}\right)$$

$$= 50x^2 + \frac{800}{x}$$

8. Is y a linear funct of x ?
If so, write it in form $y = mx + b$.
 $3\sqrt{x} + 4y = 0$
No, b/c of the $\sqrt{x}$

11. Is the funct poly, rational, or other.
state the degree of the poly.
 $G(x) = 2(x^2 - 3)^3$

polynomial ; deg = 6
b/c $(x^2)^3 = x^6$

18. monthly fixed cost = \$100,000
production cost = \$14 per unit
product sells = \$20 per unit

(a) Cost function

$$C(x) = 14x + 100,000$$

(b) Revenue function

$$R(x) = 20x$$

(c) Profit function

$$P(x) = R(x) - C(x)$$

$$= 6x - 100,000$$

(d) Compute the profit (or loss) at production levels of 12,000 & 20,000 units.

$$P(12,000) = -28,000$$

loss of \$28,000

$$P(20,000) = 20,000$$

profit of \$20,000

77. yield: 36 bushels of apples per tree
when tree density: 22 trees/acre
for each extra tree, yield decreases by 2 bushels/tree

x = number of trees past 22

$$f(x) = \underbrace{(36 - 2x)}_{\substack{\uparrow \\ \text{yield} \\ \text{per} \\ \text{tree}}} \underbrace{(22 + x)}_{\substack{\uparrow \\ \text{\# of} \\ \text{trees}}}$$