

①

Assignment # 4
MATH 171
SOLUTIONS

SECTION 3.1

(13) $f(x) = 2x + 1$
 $f(1) = 2(1) + 1 = 3$
 $f(-1) = 2(-1) + 1 = -1$

(14) $f(x) = 5x - 9$
 $f(2) = 5(2) - 9 = 1$
 $f(-2) = 5(-2) - 9 = -19$

(15) $f(x) = 5$
 $f(-2) = 5$
 $f(0.4) = 5$
(in fact the function is constant so the answer will always be 5)

(16) $f(T) = 7.2 - 2.5|T|$
 $f(2.6) = 7.2 - 2.5(2.6) = 0.7$
 $f(-4) = 7.2 - 2.5|-4| = 7.2 - 2.5(4) = -2.8$

(17) $\phi(x) = \frac{6 - x^2}{2x}$
 $\phi(\pi) = \frac{6 - \pi^2}{2\pi} = \frac{6}{2\pi} - \frac{\pi^2}{2\pi} = \frac{3}{\pi} - \frac{\pi}{2}$

$\phi(-2) = \frac{6 - (-2)^2}{2(-2)} = \frac{2}{-4} = -\frac{1}{2}$

(18) $H(q) = \frac{8}{q} + 2\sqrt{q}$
 $H(4) = \frac{8}{4} + 2\sqrt{4} = 2 + 4 = 6$
 $H(0.16) = \frac{8}{0.16} + 2\sqrt{0.16} = 50 + 2(0.4) = 50.8$

(19) $g(t) = at^2 - a^2t$
 $g(-\frac{1}{2}) = a(-\frac{1}{2})^2 - a^2(-\frac{1}{2}) = \frac{a}{4} + \frac{a^2}{2}$

$g(a) = a(a)^2 - a^2(a) = a^3 - a^3 = 0$

(20) $s(y) = \sqrt{y+1} - 3$

$s(8) = \sqrt{8+1} - 3$
 $= 6(3) - 3 = 15$

$s(a^2) = 6\sqrt{a^2+1} - 3$

(21) $K(s) = 3s^2 - s + 6$

$K(-s) = 3(-s)^2 - (-s) + 6$
 $= 3s^2 + s + 6$

$K(2s) = 3(2s)^2 - 2s + 6$
 $= 3(4s^2) - 2s + 6$
 $= 12s^2 - 2s + 6$

(22) $T(t) = 5t + 7$

$T(-2t) = 5(-2t) + 7$
 $= -10t + 7$

$T(t+1) = 5(t+1) + 7$
 $= 5t + 5 + 7$
 $= 5t + 12$

(23) $f(x) = 2x + 4$

$f(3x) - 3f(x)$
 $= 2(3x) + 4 - 3(2x + 4)$
 $= 6x + 4 - 6x - 12 = -8$

(24) $f(x) = 2x^2 + 1$

$f(x+2) - [f(x)+2]$
 $= 2(x+2)^2 + 1 - [2x^2 + 1 + 2]$
 $= 2(x^2 + 4x + 4) + 1 - 2x^2 - 3$
 $= 2x^2 + 8x + 8 + 1 - 2x^2 - 3$
 $= 8x + 6$

(30) $f(x) = 2x - 6$

multiply value of variable by 2 then subtract 6 from the result

(32) $\phi(s) = 8 - 5s + s^2$

square the variable subtract 5 times the variable from the result then add 8 to that result

(34) $f(z) = \frac{4z}{5-z}$

multiply the variable by 4 then divide the result by ~~five~~ the variable subtracted from five

SECTION 3.2

(3)

#6 $g(u) = 3 - u^2$
domain: \mathbb{R}
range: $g(u) \leq 3$

#10 $T(t) = 2t^4 + t^2 - 1$
domain: \mathbb{R}
range: $T(t) \geq -1$

#13 $Y(y) = \frac{y+1}{\sqrt{y-2}}$

domain: $y > 2$

#14 $f(n) = \frac{n}{6-2n}$

domain: $\mathbb{R} \setminus \{3\}$
(everything except 3)

#15 $f(D) = \frac{D}{D-2} + \frac{4}{D+4} - \frac{D-3}{D-6}$

domain: $\mathbb{R} \setminus \{-4, 2, 6\}$
(or) everything but -4, 2 & 6
(or) $D \neq -4, 2, 6$

#16 $g(x) = \frac{\sqrt{x-2}}{x-3}$

domain: $x \neq 3$
 $x \geq 2$

#17 $F(t) = 3t - t^2$ ($t \leq 2$)

$F(2) = 6 - 4$
 $= 2$

$F(3)$ impossible
because $t=3$ is not
in domain

#18 $h(s) = \begin{cases} 2s & \text{for } s < -1 \\ s+1 & \text{for } s \geq -1 \end{cases}$

$h(-8) = 2(-8)$ because
 $= -16$ $-8 < -1$

$h(-0.5) = -0.5 + 1$ because
 $= 0.5$ $-0.5 \geq -1$

19 $f(x) = \begin{cases} x+1 & \text{for } x < 1 \\ \sqrt{x+3} & \text{for } x > 1 \end{cases}$

$f(1) = \sqrt{1+3} = \sqrt{4} = 2$

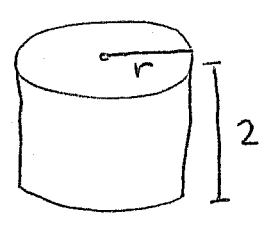
$f(-0.25) = -0.25 + 1 = 0.75$

20 $g(x) = \begin{cases} \frac{1}{x} & x \neq 0 \\ 0 & x = 0 \end{cases}$

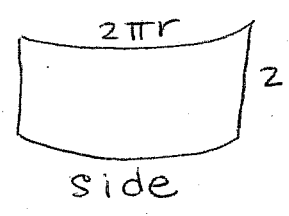
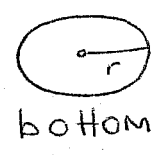
$g(0.2) = \frac{1}{0.2} = 5$

$g(0) = 0$

22



SURFACE AREA

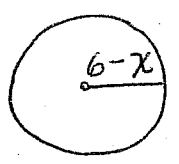


TOTAL AREA = $\pi r^2 + 4\pi r$
 $C(r) = 3(\pi r^2 + 4\pi r)$
 $= 3\pi r^2 + 12\pi r$

24

PROFIT = SALES - COST
 $P(c) = 100c - 300$

34



$A(x) = \pi(6-x)^2$

DOMAIN : $0 \leq x \leq 6$

RANGE : $0 \leq A(x) \leq 36\pi$