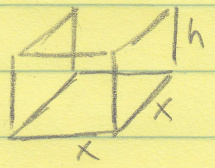
Worksheet 4-7

① 

Area of base $= x^2$

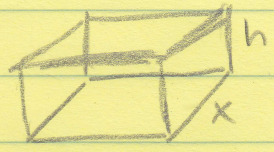
Area of 4 sides $= 4xh$.

Surface area $= x^2 + 4xh = 10m^2$

$$h = \frac{10 - x^2}{4x}$$

Volume: area of base × height

$$V(x) = \frac{x^2}{1} \cdot \frac{10 - x^2}{4x} = \frac{x(10 - x^2)}{4}$$

2. 

Area of base & top $= 2(3x^2) = 6x^2$

Area of 4 sides $= xh + xh + 3xh + 3xh$

Surface area $= 300 = 6x^2 + 8xh \rightarrow h = \frac{300 - 6x^2}{8x}$

V = area of base × ht

$$= 3x^2 \cdot \frac{300 - 6x^2}{8x} = \frac{3x(300 - 6x^2)}{8} = \frac{3x \cdot 2(150 - 3x^2)}{8}$$

$$V(x) = \frac{3x(150 - 3x^2)}{4}$$

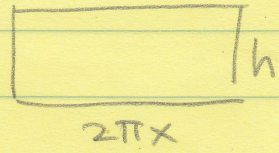
3. 

area of base & top $= \pi x^2 + \pi x^2 = 2\pi x^2$

lateral area $= 2\pi x \cdot h$

$S.A = 2\pi x^2 + 2\pi xh = 50$

$$h = \frac{50 - 2\pi x^2}{2\pi x}$$



Vol = area of base × height

$$V(x) = \pi x^2 \cdot \frac{50 - 2\pi x^2}{2\pi x} = \frac{x(50 - 2\pi x^2)}{2}$$

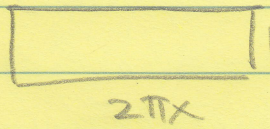
$$V(x) = \frac{2x(25 - \pi x^2)}{2} = x(25 - \pi x^2)$$

4 Vol of cylinder $= \pi x^2 h = 50$

$$h = \frac{50}{\pi x^2}$$

Area of 2 bases $= 2\pi x^2$

Lateral area $= 2\pi x h$



$SA = 2\pi x^2 + 2\pi x h$

$$= 2\pi x^2 + \frac{2\pi x}{1} \cdot \frac{50}{\pi x^2}$$

$$A(x) = 2\pi x^2 + \frac{100}{x}$$

5 $Vol = \pi x^2 h = 400\pi \longrightarrow h = \frac{400\pi}{\pi x^2} = \frac{400}{x^2}$

Area of 2 bases $= 2\pi x^2$

Lateral area $= 2\pi x h$

$$SA = 2\pi x^2 + 2\pi x h = 2\pi x^2 + \frac{2\pi x}{1} \cdot \frac{400}{x^2}$$

$$A(x) = 2\pi x^2 + \frac{800\pi}{x}$$

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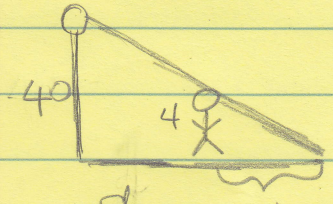


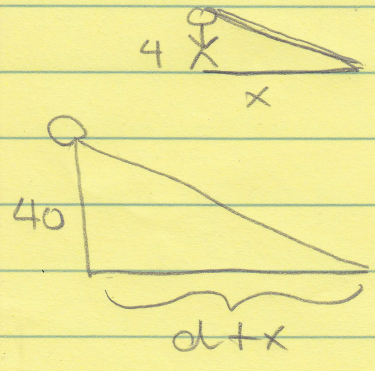
$$\frac{x}{4} = \frac{d+x}{40}$$

$$x(40) = 4(d+x)$$

$$40x = 4d + 4x$$

$$36x = 4d$$

$$x(d) = \frac{4d}{36} = \frac{d}{9}$$



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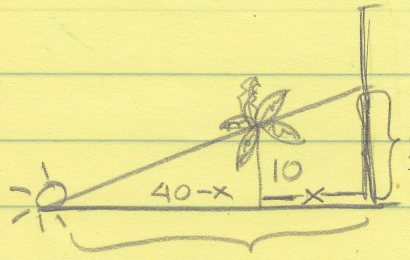
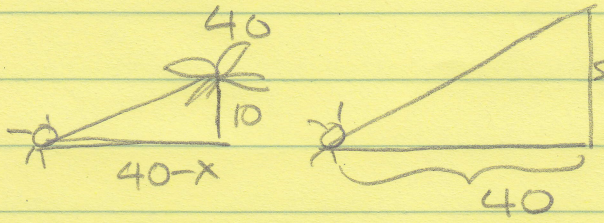


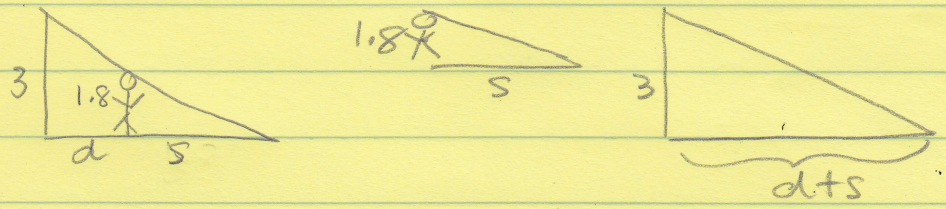
$$\frac{40-x}{10} = \frac{40}{h}$$

$$h(40-x) = 400$$

$$h(x) = \frac{400}{40-x}$$



p161 (9)



$$\frac{1.8}{s} = \frac{3}{d+s} \rightarrow 1.8(d+s) = 3s$$

$$1.8d + 1.8s = 3s$$

$$1.8d = 1.2s$$

$$s(d) = \frac{1.8d}{1.2} = \frac{18d}{12} = \frac{3d}{2}$$

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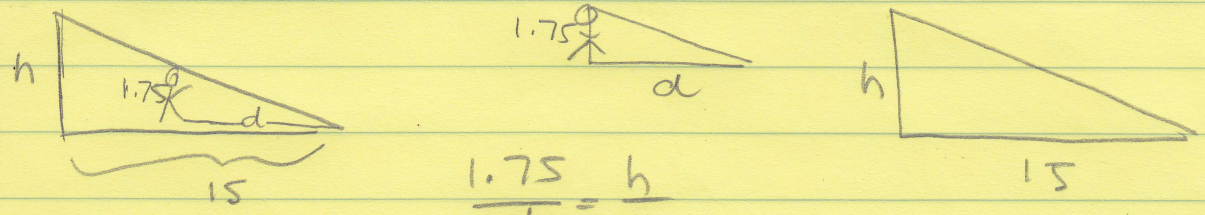


$$\frac{1.75}{d} = \frac{h}{15}$$

$$hd = 15(1.75)$$

$$h(d) = \frac{15(1.75)}{d} = \frac{26.25}{d} = \frac{2625}{100d} = \frac{105}{4d}$$

p150 #23

$g(x) = (x-4)^2 - 1 \; ; x \geq 4$

Vertex $(4, -1)$

$y = (x-4)^2 - 1$

$x = (y-4)^2 - 1$

$(y-4)^2 = x+1$

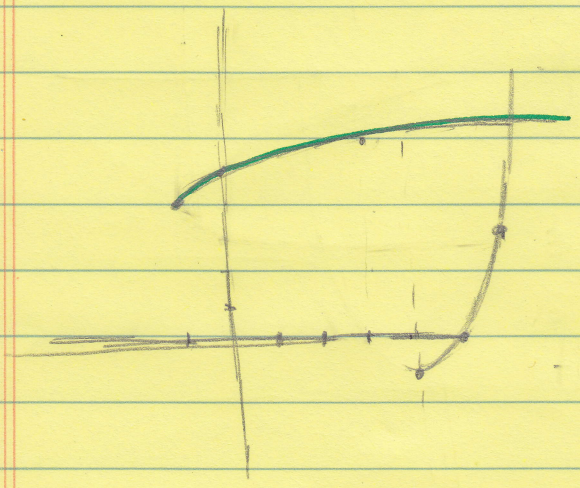
$y - 4 = \sqrt{x+1}$

$y = 4 + \sqrt{x+1}$

$g^{-1}(x) = 4 + \sqrt{x+1}$

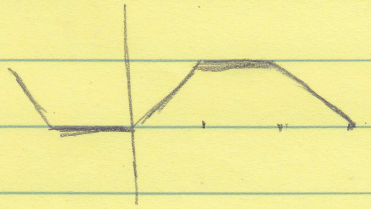
$x \geq -1$

x	y
4	-1
5	0
6	3



x	y
-1	4
0	5
3	6

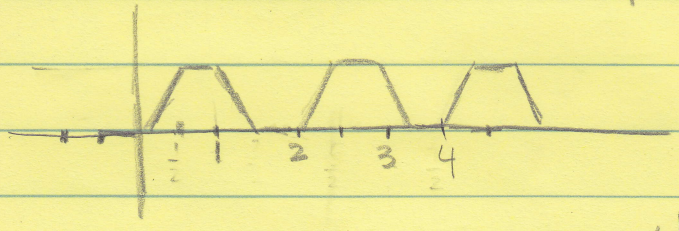
p142 CE # 3.



x	-1	0	1	2	3
y	0	0	1	1	0

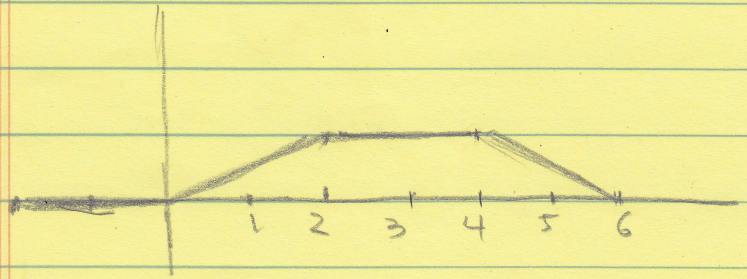
$f(2x) \rightarrow$ half the x

$-\frac{1}{2}$	0	$\frac{1}{2}$	1	$\frac{3}{2}$
0	0	1	1	0



$\frac{1}{2} f(\frac{1}{2}x)$ dbl the x

x	-2	0	2	4	6
y	0	0	1	1	0



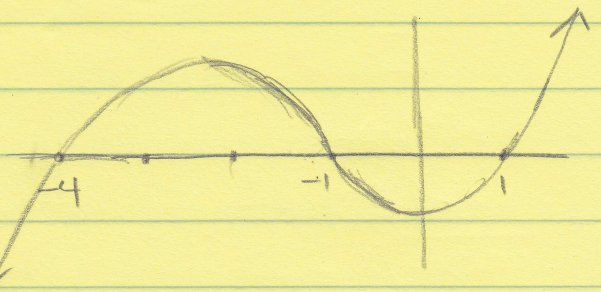
p122 (16)

$g(t) = t^3 + 4t^2 - t - 4$

$= t^2(t+4) - 1(t+4)$

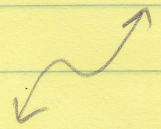
$= (t^2 - 1)(t+4)$

$= (t+1)(t-1)(t+4)$



zeros: $-1, 1, -4$

end behavior:



Range: all real #s

p129 (21a) $f(x) = \sqrt{x}$ $g(x) = 6x - 3$ $h(x) = \frac{x}{3}$

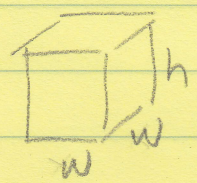
$h(f(g(\frac{1}{2})))$ =

$g(\frac{1}{2}) = 6(\frac{1}{2}) - 3 = 3 - 3 = 0$

$f(0) = \sqrt{0} = 0$

$h(0) = \frac{0}{3} = 0$

p162



$V = w^2 h = 6$

$h = \frac{6}{w^2}$

$SA = w^2 + 4wh$

$= w^2 + 4w\frac{6}{w^2} = w^2 + \frac{24}{w}$

$A(w) = w^2 + \frac{24}{w} = \frac{w^3 + 24}{w}$