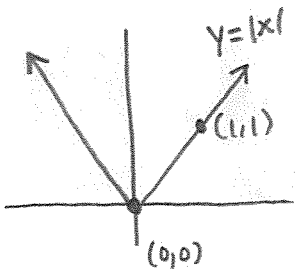
HOMEWORK 2 MATH 1540 FALL 2019

Section 3.5

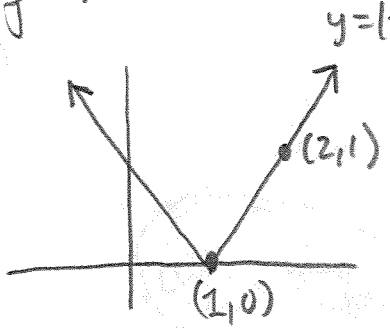
#28] Graph $h(x) = |x-1| + 4$

(horiz shift +1) (vertical shift +4)

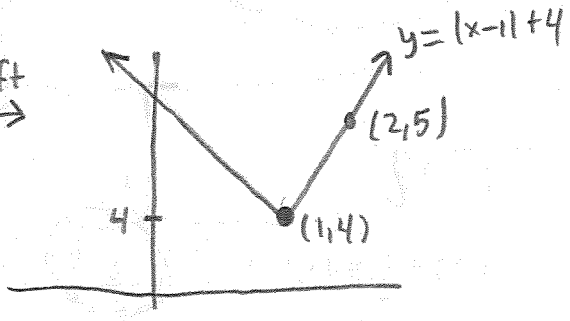
Soln: Start with base graph of $|x|$:



hor. shift +1



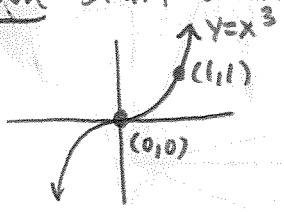
vert. shift +4



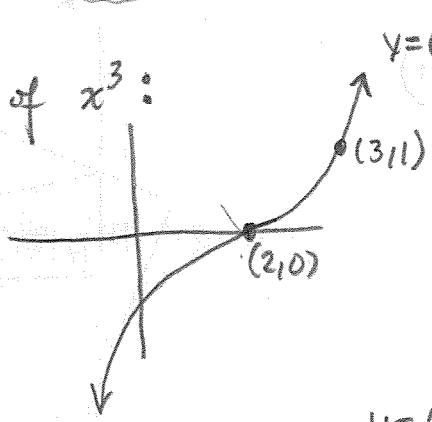
#29] Graph $k(x) = (x-2)^3 - 1$

(hor. shift +2) (vert shift -1)

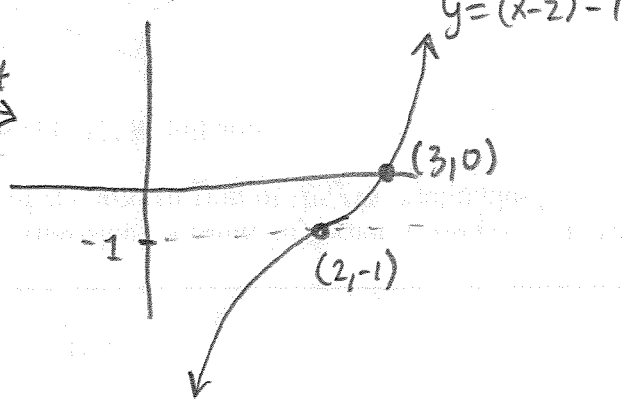
Soln: Start with base graph of x^3:



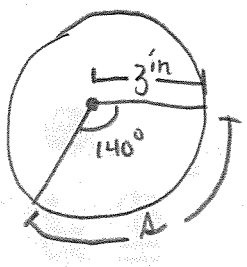
horiz shift +2



vert. shift -1



Section 7.1

#22 We are given 

and asked to find arc length.

Soln: We know

$$A = r\theta,$$

but only if θ is measured in radians. So convert

$$140^\circ = (140^\circ)\left(\frac{2\pi \text{ rad}}{360^\circ}\right) = \frac{(2\pi)(140)}{360_{180}} \text{ rad}$$

$$= \frac{140\pi}{180} \text{ rad}$$

$$= \frac{70\pi}{90} \text{ rad} = \frac{35\pi}{45} \text{ rad} = \frac{7\pi}{9} \text{ rad}$$

Now we use $r = 3$, $\theta = \frac{7\pi}{9}$ in $A = r\theta$ to obtain

$$A = 3\left(\frac{7\pi}{9}\right) = \frac{7\pi}{3} \text{ in}$$

#28 $$-\frac{5\pi}{4} \text{ rad} = \left(-\frac{5\pi}{4} \text{ rad}\right)\left(\frac{360^\circ}{2\pi \text{ rad}}\right) = \left(\frac{-5\pi(360)}{8\pi}\right)^\circ$$

$$= \left(-5\pi(45)\right)^\circ$$

$$= (-225)^\circ$$

#39 $$150^\circ = (150^\circ)\left(\frac{2\pi \text{ rad}}{360^\circ}\right) = \frac{300\pi}{360} \text{ rad} = \frac{30\pi}{36} \text{ rad} = \frac{10\pi}{12} \text{ rad} = \frac{5\pi}{6} \text{ rad}$$

#41 We are given $r = 5.02$ and $\theta = \frac{\pi}{3}$ rad. Therefore using $A = r\theta$, we see

$$A = 5.02\left(\frac{\pi}{3}\right) \approx 5.256$$

solving for r yields

$$r = \frac{3(5.0)}{\pi} \approx 1.5915$$

Problem A: We are told $\theta = 72^\circ$ (a problem! needs to be radians) and $s = 2$. First convert θ to radians:

$$\theta = 72^\circ = (72^\circ)\left(\frac{2\pi \text{ rad}}{360^\circ}\right) = \frac{144\pi}{360} \text{ rad}$$

$$= \frac{72\pi}{180} \text{ rad}$$

$$= \frac{36\pi}{90} \text{ rad}$$

$$= \frac{18\pi}{45} \text{ rad}$$

$$= \frac{2\pi}{5} \text{ rad}$$

72
×2
144

Now using $s = r\theta$, we plug in $\theta = \frac{2\pi}{5}$ and $s = 2$ to get

$$2 = r\left(\frac{2\pi}{5}\right)$$

and solving for r, we get

$$\boxed{r = \frac{10}{2\pi} = \frac{5}{\pi}}$$