Midterm Review

Real & Equal

$D = 0$

#3/ $x^2 + kx + 5k = 5kx - 6$

$\Delta = b^2 - 4ac \leftarrow ax^2 + bx + c = 0$

$-4kx$

$x^2 + kx - 5kx + 5k + 6 = 0$

$a = 1$

$b = -4k$

$c = 5k + 6$

$(-4k)^2 - 4(1)(5k+6) = 0$

$\frac{16k^2}{4} - \frac{20k}{4} - \frac{24}{4} = \frac{0}{0}$

$4k^2 - 5k - 6 = 0$

-24

$4k^2 - 8k + 3k - 6 = 0$

$4k(k-2) + 3(k-2) = 0$

$(k-2)(4k+3) = 0$

$k = 2 \text{ or } -\frac{3}{4}$

#7) $\frac{3}{4}(y-2)=3(x-6)^2$

Transformational: $\frac{1}{3}\left(\frac{3}{4}\right)(y-2)=(x-6)^2$

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

Standard: $y-2=4(x-6)^2$

$y=4(x-6)^2+2$

general form: $y=4(x^2-12x+36)+2$

$y=4x^2-48x+146$

$V(6,2)$

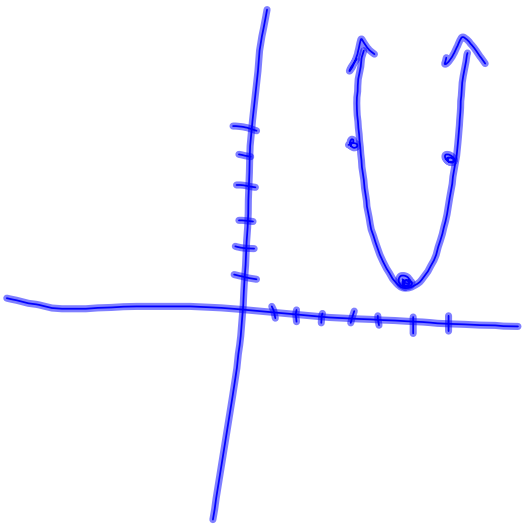
D: $x\in R$

R: $\{y \mid y\geq 2, y\in R\}$

Aos: $x=6$

$\rightarrow (x+h, ay+k)$

Mapping Rule: $(x,y)\rightarrow(x+6, 4y+2)$



#5/

	d (ft)	s (ft./s)	t (s)
Faster	1500	x	$\frac{1500}{x}$
Slower	1000	y	$\frac{1000}{y}$

$t = \frac{d}{s}$

① $\frac{1500}{x} - 10 = \frac{1000}{y}$

$x - 5 = y$

$x(x-5)\left(\frac{1500}{x} - 10\right) = \frac{1000}{x-5}\,x(x-5)$

$1500(x-5) - 10x(x-5) = 1000x$

$1500x - 7500 - 10x^2 + 50x = 1000x$

$\frac{0}{10} = \frac{10x^2}{10} - \frac{550x}{10} + \frac{7500}{10}$

$0 = x^2 - 55x + 750$

$x = \frac{55 \pm \sqrt{(-55)^2 - 4(1)(750}}{2(1)}$

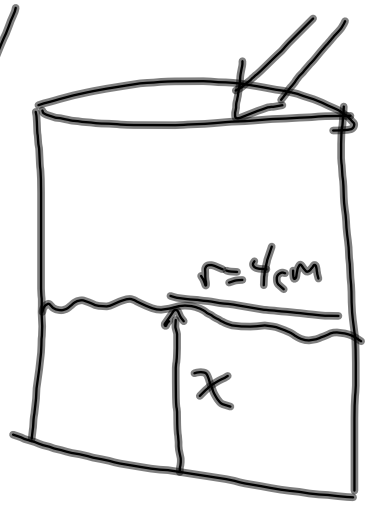
$x = \frac{55 \pm 5}{2}$

$x = \frac{60}{2}$ or $x = \frac{50}{2}$

$x = 30$ ft./sec, $y = 25$ ft./sec

$x = 25$ ft./sec, $y = 20$ ft./sec

2/



$V = 2t$

Let "t" Rep. time is sec.

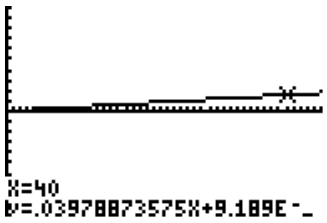
$V = \pi (4)^2 x$

$x = \frac{V}{16\pi}$

$x = \frac{2t}{16\pi}$ @ 40 sec

$\frac{80}{2} = \frac{2t}{2}$

$40 \text{ sec} = t$

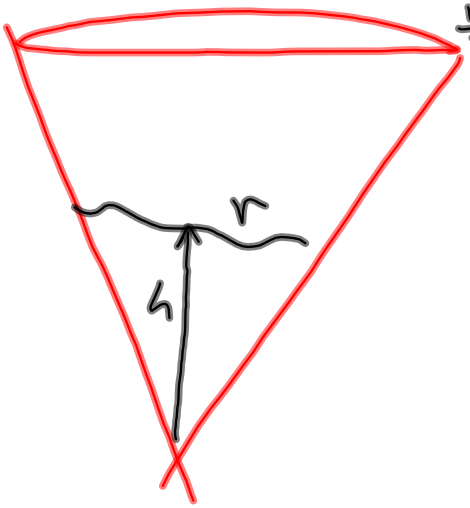


$x = 0.04 \text{ cm/sec}$

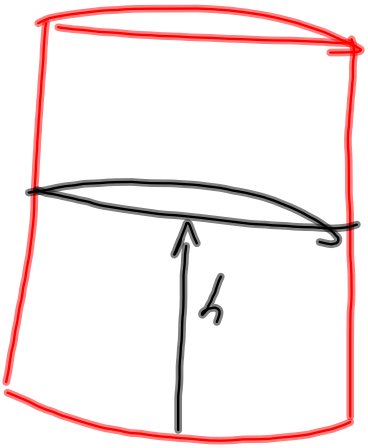
$V = \frac{1}{3}\pi r^2 h$

$r = 3h$

$\frac{r}{3} = h$



$V = \pi r^2 h$



6/

Let x Rep. Months after Sept.

$P = (\text{Amount Sold})(\text{Selling Price}) - (\text{Storage Costs})$

$P = (1000 - 20x)(2.50 + 1.25x) - 750x$

$P = 2500 + 1250x - 50x - 25x^2 - 750x$

$P = -25x^2 + 450x + 2500$

$P = -25(x^2 - 18x + 81) + 2500 + 2025$

$P = -25(x - 9)^2 + 4525$

$V(9, 4525)$

(Months, P)

9 months later