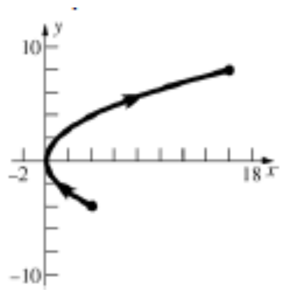
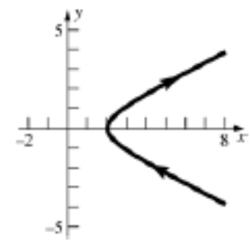
Math2210 Midterm 1
Answers to Even-Numbered Review Problems

Chapter 10 Review (pg 553)
Sample Test Problems

#26 $x = \frac{y^2}{4}$

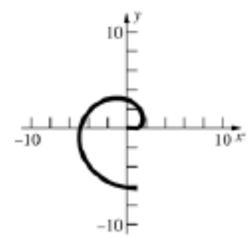


#28 $\frac{x^2}{4} - y^2 = 1$



#30 Tangent Line: $x + 6y - 6 = 0$

#32 L = $2\pi^2$



Chapter 11 Review (pg 613-615)

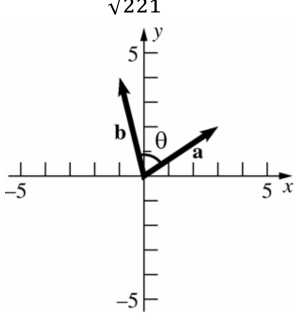
Concepts Test Problems

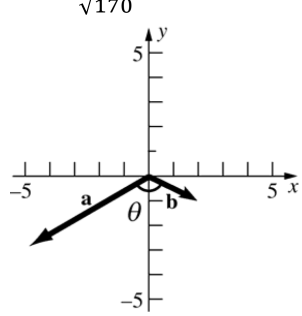
#2 False, #4 False, #6 False, # 8 True, #12 True, #14 False, #16 True, #20 False, #22 False, #24 False, #26, True, #28 False, #40 False

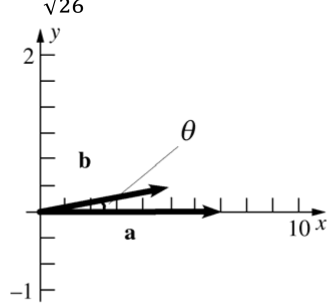
Sample Test Problems #1-19 all, 21, 25-27 all, 30-41 all, 43, 44

#2 Center: (3,-1,4); radius: $\sqrt{26}$,

#4a. $\frac{5}{\sqrt{221}} \approx 0.3363$, b. $-\frac{7}{\sqrt{170}} \approx 0.5369$ c. $\frac{5}{\sqrt{26}} \approx 0.9806$





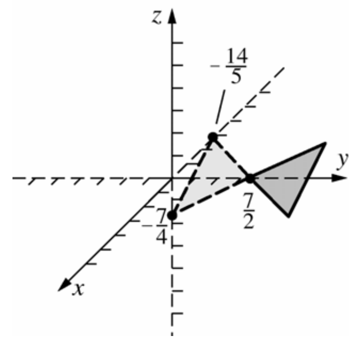


#6a. $\theta = \cos^{-1} 0.121716 \approx 83.009°$ b. $\theta = \cos^{-1} 0.67200 \approx 47.608°$

#8a. -5$\langle 1,1,-1 \rangle$, b. $\langle 6,-2,10 \rangle$, c. 20, d. $\langle 4,3,-5 \rangle$

#10 $\frac{\pm\langle 6,3,5 \rangle}{\sqrt{70}}$,

#12a. $\langle x-2, y+4, z+5 \rangle$ b. 5x-4y+8z = -14 c.



#14. 7x -3y+9z=-4, #16 (0,25,16), (-50,0, 16)

#18 $\frac{x-4}{3} = \frac{y-5}{5} = \frac{z-8}{2}$

#26

a. $\lim_{t\to 0}\left\langle e^{2t}, e^{-t}\right\rangle = \left\langle \lim_{t\to 0} e^{2t}, \lim_{t\to 0} e^{-t}\right\rangle = \langle 1,1 \rangle$

b. $\lim_{h\to 0}\frac{\mathbf{r}(0+h)-\mathbf{r}(0)}{h} = \mathbf{r}'(0) = \langle 2,-1 \rangle$

c. $\int_0^{\ln 2}\left\langle e^{2t}, e^{-t}\right\rangle dt$

$= \left[\left\langle \left(\frac{1}{2}\right)e^{2t}, -e^{-t}\right\rangle\right]_0^{\ln 2}$

$= \left\langle 2, -\frac{1}{2}\right\rangle - \left\langle \frac{1}{2}, -1\right\rangle = \left\langle \frac{3}{2}, \frac{1}{2}\right\rangle$

d. $D_t[t\mathbf{r}(t)] = t\mathbf{r}'(t) + \mathbf{r}(t)$

$= t\left\langle 2e^{2t}, -e^{-t}\right\rangle + \left\langle e^{2t}, e^{-t}\right\rangle$

$= \left\langle e^{2t}(2t+1), e^{-t}(1-t)\right\rangle$

e. $D_t[\mathbf{r}(3t+10)] = [\mathbf{r}'(3t+10)](3)$

$= 3\left\langle 2e^{6t+20}, -e^{-3t-10}\right\rangle$

$= \left\langle 6e^{6t+20}, -3e^{-3t-10}\right\rangle$

f. $D_t[\mathbf{r}(t)\cdot\mathbf{r}'(t)] = D_t[2e^{4t} - e^{-2t}]$

$= 8e^{4t} + 2e^{-2t}$