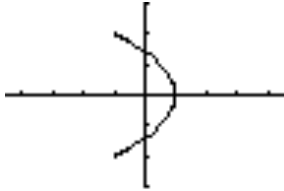


10.3 Even Answers

2) $-3\mathbf{i} + 4\mathbf{j}$

- 4) (a) $8\mathbf{i} + 2\mathbf{j}$
 (b) $2\mathbf{i} - 6\mathbf{j}$
 (c) $15\mathbf{i} - 6\mathbf{j}$
 (d) $\mathbf{i} - 16\mathbf{j}$

6) (a)



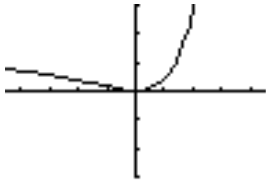
(b) $\mathbf{v}(t) = (-2\sin 2t)\mathbf{i} + (2\cos t)\mathbf{j}$
 $\mathbf{a}(t) = (-4\cos 2t)\mathbf{i} + (-2\sin t)\mathbf{j}$

(c) $\mathbf{v}(0) = \langle 0, 2 \rangle$ speed = 2

Direction = $\langle 0, 1 \rangle$

(d) velocity = $2\langle 0, 1 \rangle$

8) (a)



(b) $\mathbf{v}(t) = \left\langle \frac{2}{t+1}, -2t \right\rangle \mathbf{i} + (-2t)\mathbf{j}$

$\mathbf{a}(t) = \left\langle -\frac{2}{(t+1)^2}, -2 \right\rangle \mathbf{i} + (-2)\mathbf{j}$

(c) $\mathbf{v}(1) = \langle 1, 2 \rangle$ speed = $\sqrt{5}$

Direction = $\left\langle \frac{1}{\sqrt{5}}, \frac{2}{\sqrt{5}} \right\rangle$

(d) velocity = $\sqrt{5} \left\langle \frac{1}{\sqrt{5}}, \frac{2}{\sqrt{5}} \right\rangle$

10) $\mathbf{v}(t) = (-2\sin t)\mathbf{i} + (3\cos t)\mathbf{j}$

$\mathbf{r}\left(\frac{\pi}{4}\right) = (\sqrt{2} - 3)\mathbf{i} + \left(\frac{3}{\sqrt{2}} + 1\right)\mathbf{j}$

$\mathbf{v}\left(\frac{\pi}{4}\right) = (-\sqrt{2})\mathbf{i} + \left(\frac{3}{\sqrt{2}}\right)\mathbf{j}$

slope = $-\frac{3}{2}$

(a) $y - \left(\frac{3}{\sqrt{2}} + 1\right) = -\frac{3}{2} [x - (\sqrt{2} - 3)]$

(b) $y - \left(\frac{3}{\sqrt{2}} + 1\right) = \frac{2}{3} [x - (\sqrt{2} - 3)]$

12) $\left(\sqrt{2} + \frac{\pi}{2}\right)\mathbf{j}$

14) $(\ln|t|)\mathbf{i} + (-\ln|5 - t|)\mathbf{j}$

16) $\mathbf{r}(t) = \left(\frac{t^4}{4} + 2t^2 + 1\right)\mathbf{i} + \left(\frac{t^2}{2} + 1\right)\mathbf{j}$

18) $\mathbf{r}(t) = \left(-\frac{t^2}{2} + 10\right)\mathbf{i} + \left(-\frac{t^2}{2} + 10\right)\mathbf{j}$

20) $t = \frac{k\pi}{2}$ where k is any nonnegative integer

24) Angle between \mathbf{v} and \mathbf{a} measures 90°