5C even Answers – Stewart 8th edition
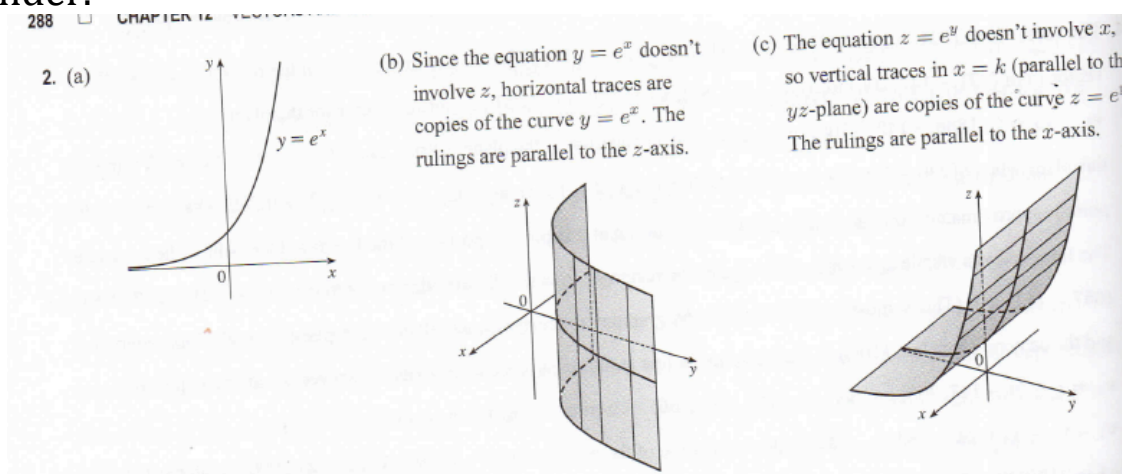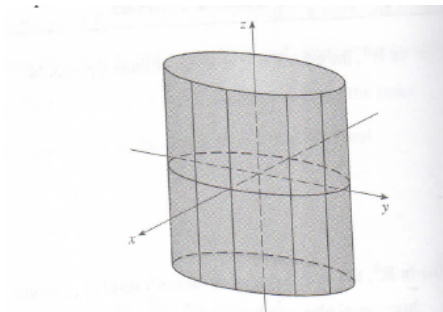
12.1: 4) xy- (2,3,0); yz-: (0,3,5); xz- (2,0,5); length of diagonal is $\sqrt{38}$

6) y=3 is plane parallel to xz plane, z= 5 is plane parallel to xy plane, intersection is a line.

10) PQ=3, QR= $3\sqrt{5}$, RP=6. Right triangle

12) a)6, b)4, c)2, d) $2\sqrt{10}$, e) $2\sqrt{13}$, f) $2\sqrt{5}$
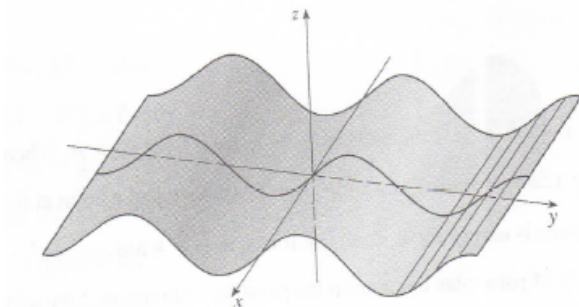
22) $(x-3)^2 + (y-5)^2 + (z+3)^2 = 41$

12.6: 2) Cylinder.

2. (a) $y = e^x$

(b) Since the equation $y = e^x$ doesn't involve z, horizontal traces are copies of the curve $y = e^x$. The rulings are parallel to the z-axis.

(c) The equation $z = e^y$ doesn't involve x, so vertical traces in $x = k$ (parallel to the yz-plane) are copies of the curve $z = e^y$. The rulings are parallel to the x-axis.
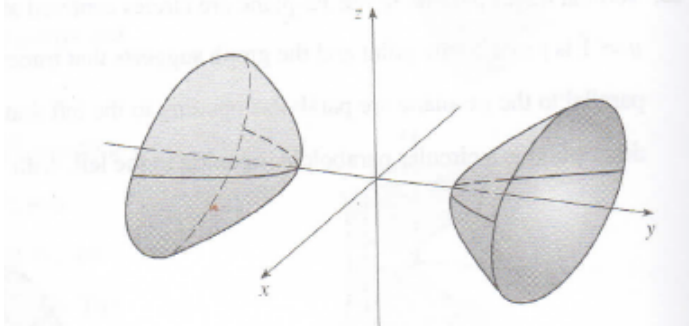
4) Cylinder.

8) Cylinder. Note: rulings should be parallel to x axit.
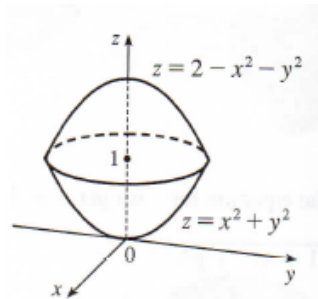

22) IV 24) III 26) I 28) V

34) Show scale, especially on one of the elliptical cross sections.

34. $y^2 = x^2 + 4z^2 + 4$ or $-x^2 + y^2 - 4z^2 = 4$ or

$-\dfrac{x^2}{4} + \dfrac{y^2}{4} - z^2 = 1$ represents a hyperboloid of two

sheets with axis the y-axis.

44)

$z = 2 - x^2 - y^2$

$z = x^2 + y^2$

52) Subtract equations to eliminate x you get 6x+5y=2, a plane.

12.2: **4)** (a) AC   (b) CB   (c) DA   (d) DB

26) $\vec{u} = \left\langle \dfrac{6}{7}, \dfrac{2}{7}, \dfrac{-3}{7} \right\rangle$; $4\vec{u} = \left\langle \dfrac{24}{7}, \dfrac{8}{7}, \dfrac{-12}{7} \right\rangle$

42) a) $\pm\left\langle \dfrac{1}{2}, \dfrac{\sqrt{3}}{2} \right\rangle$ **b)** $\pm\left\langle \dfrac{\sqrt{3}}{2}, \dfrac{-1}{2} \right\rangle$

12.3: **26)** $\dfrac{2 \pm \sqrt{6}}{2}$ **56)** $\theta = \cos^{-1}\left(\dfrac{2}{\sqrt{6}} \right) \approx 35°$

12.4: **14)** No need to find components. $\|\vec{u} \times \vec{v}\| = \|\vec{u}\| \|\vec{v}\| \sin\theta = 10\sqrt{2}$; out of page

16) 6, $\langle +,-,0 \rangle$

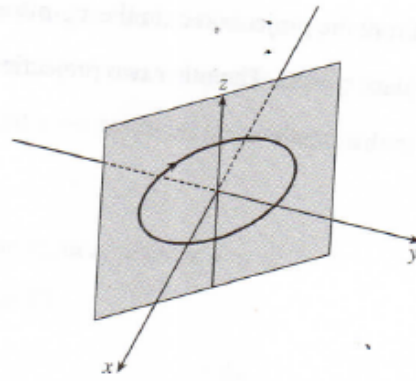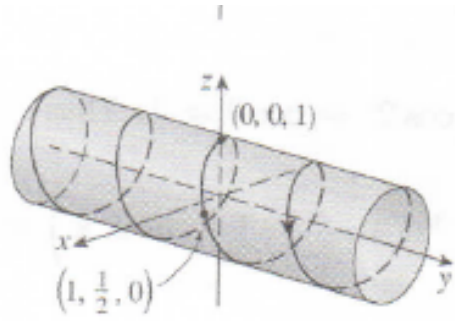**12.5:** **4)** $\begin{cases} x = 2t \\ y = 14 - 3t \\ z = -10 + 9t \end{cases}$ **12)** $\begin{cases} x = 1 + 5t \\ y = 2t \\ z = -3t \end{cases}$ **48)** (0,7,9)   **78)** 2

13.1: 10)   14) Ellipse in the plane y=-x

22) VI   24) I   26) III

44) $\begin{cases} x = t \\ y = t^2 \\ z = 4t^2 + t^4 \end{cases}$ (many possible)

50) The particles do not collide. Paths intersect at (1,1,1) and (2,4,8).

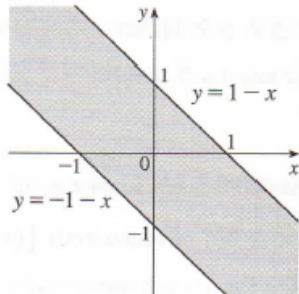**13.2:** 28) $\left(\sqrt{3}, 1, e^{\frac{\pi}{6}} \right)$

32a) (1,2,1)

40) $\left\langle \frac{1}{2} t e^{2t} - \frac{1}{4} e^{2t}, -t - \ln|1-t|, \sin^{-1}(t) \right\rangle + \vec{C}$

13.3: 22) $\dfrac{\sqrt{(4t^2 - 8t + 5)e^{2t} + 4}}{(1 + 4t^2 + e^{2t})^{3/2}}$

13.4: 24) a) $100\left(\dfrac{100\sqrt{3} + \sqrt{31960}}{9.8} \right) \approx 3592m$ b) $\approx 1631m$

14.1: 20)

20. $\sin^{-1}(x+y)$ is defined only when $-1 \le x+y \le 1$ =
$-1-x \le y \le 1-x$. Thus the domain of f is
$\{(x,y) \mid -1-x \le y \le 1-x\}$, consisting of those
points on or between the parallel lines $y = -1-x$ and
$y = 1-x$.

32) a) III   b) I   c) IV   d) V   e) VI   f) II
36) I is paraboloid, II is cone
62) A IV   **64)** E III   **66)** D V

14.3: 10) $f_x(2,1) \approx 2.8$, $f_y(2,1) \approx -2.1$

82) a) $T_x(2,1) = -\dfrac{20}{3}$ b) $T_y(2,1) = -\dfrac{10}{3}$

90) $W_T(-15,30) \approx 1.3048$ so we would expect the apparent temp to drop by approximately 1.3
degrees C if the actual temp decreases by 1 ° C.
$W_v(-15,30) \approx -0.1592$ so we would expect the apparent temp to drop by approximately 0.16
degrees C if the wind speed increases by 1 km/h.

14.5: 38) 8160π in^3/sec

14.6: 34)   a) ascend at rate of 0.8 vertical meters per horizontal meter
b) descend at rate of approximately 0.14 vertical m per horiz m.
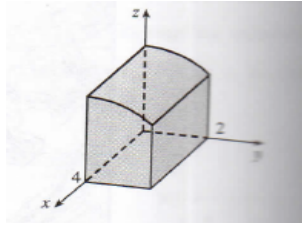c) direction $\langle -0.6, -0.8 \rangle$, rate is 1, angle is 45 °.

60) $\left(\dfrac{19}{3}, \dfrac{14}{3}, \dfrac{19}{3}\right)$ and (-7,-2,-7)
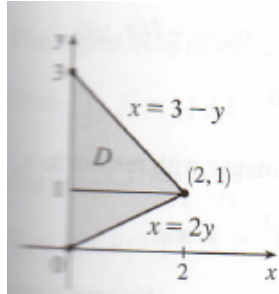
14.7: 48)   10cm x 10cm x 10cm
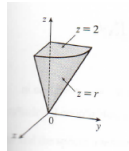
15.1: 12)

30) $\dfrac{\pi}{6}\ln 2$

42) 640/3

15.2: 64)

$$\iint_D f(x,y)\,dA = \int_0^1 \int_0^{2y} f(x,y)\,dx\,dy + \int_1^3 \int_0^{3-y} f(x,y)\,dx\,dy$$
$$= \int_0^2 \int_{x/2}^{3-x} f(x,y)\,dy\,dx$$

15.3: 20) $\dfrac{14\pi}{3}$

15.7: 12)

15.8: 20) $\dfrac{-255}{4}\pi$ 30) $\dfrac{8\sqrt{2}}{3}\,\pi$

16.1: 12) III   14) II   16) I   18) II

16.2: 18) negative

16.3: 14)   a) $f(x,y)=xe^{xy}$ b) -1
        26) (possibly) conservative
        30) Not conservative, line integral not independent of path.

16.4: 18) $\frac{625}{8}\pi$

16.5: 12) a) m b)v c) s   d) v   e) m f) v   g) a   h) m   i) v   j) m k) m l) s

16.8: 18) π

16.9: 2) 2430π