MA154 ANSWERS TO EVEN PROBLEMS

SECTION 6.1
2. (a) $600^0, 960^0, -120^0, -480^0$
   (b) $675^0, 1035^0, -45^0, -405^0$
   (c) $210^0, 570^0, -510^0, -870^0$
8. (a) $27^0\ 47'\ 56"$
   (b) 164.1^0
10. (a) $2\pi/3$
    (b) $-3\pi/4$
    (c) $7\pi/6$
14. (a) 150^0
    (b) 240^0
    (c) 495^0
18. $85^0\ 56'\ 37"$
22. 83.2833^0
26. $12^0\ 51'\ 50"$
28. $81^0\ 43'\ 26"$
30. 8.59 km
34. (a) 103.13^0

SECTION 6.2
4. $\dfrac{2\sqrt{2}}{3}, \dfrac{1}{3}, 2\sqrt{2}, \dfrac{1}{2\sqrt{2}}$

   $3, \dfrac{3}{2\sqrt{2}}$

14. $x = 2\sqrt{2},\ y = 2\sqrt{2}$
24. 1017 feet
30. (a) -0.1098
    (b) 2.4380
    (c) -0.2350
    (d) 0.3090
68. $-15/17, -8/17, 15/8, 8/15,$
    $-17/8, -17/15$
72. $-\dfrac{5}{\sqrt{34}}, \dfrac{3}{\sqrt{34}}, -\dfrac{5}{3},$

    $-\dfrac{3}{5}, \dfrac{\sqrt{34}}{3}, -\dfrac{\sqrt{34}}{5}$
82. $-4/5, -3/5, 4/3, 3/4, -5/3,$
    $-5/4$
84. $-\dfrac{\sqrt{3}}{2}, \dfrac{1}{2}, -\sqrt{3}, -\dfrac{1}{\sqrt{3}},$

    $2, -\dfrac{2}{\sqrt{3}}$

86. $\dfrac{1}{5}, -\dfrac{2\sqrt{6}}{5}, -\dfrac{1}{2\sqrt{6}},$

    $-2\sqrt{6}, -\dfrac{5}{2\sqrt{6}}, 5$

SECTION 6.3
4. $-12/13, -5/13, 12/5, 5/12,$
   $-13/5, -13/12$
18. (a) 1, (b) $-\dfrac{\sqrt{2}}{2}$, (c) 0
30. (a) 1, (b) $1/2$
32. (a) 0, (b) ∞
34. (a) $\sqrt{3}$, (b) $-\infty$

SECTION 6.4
2. (a) 15^0, (b) 85^0, (c) 70^0, (d) 40^0
10. (a) $-\dfrac{\sqrt{2}}{2}$, (b) $\dfrac{\sqrt{3}}{2}$
12. (a) $-\dfrac{\sqrt{3}}{2}$, (b) -1
16. (a) $-\sqrt{2}$, (b) $-\dfrac{2}{\sqrt{3}}$
24. (a) 1.448, (b) 1.035
30. (a) 78.49^0, (b) $78^0\ 29'$
36. (a) $55.3^0, 124.7^0$
    (b) $131.3^0, 228.7^0$
    (c) $123.3^0, 303.3^0$
    (d) $36.0^0, 216.0^0$
    (e) $45.6^0, 314.4^0$
    (f) $205.6^0, 334.4^0$

SECTION 6.5
6.

28.

36.

SECTION 6.5 CONT.
44. (a) amp $= 3$, per $= 1$,
    ph sh $= -1/4$
    (b) $y = 3\sin\left(2\pi x + \dfrac{\pi}{2}\right)$

SECTION 6.7
4. $a = 3\sqrt{3}, b = c = 3$
12. $\beta = 58^0\ 50', b = 843, c = 985$
26. 6.1 meters
34. 108.1 feet
46. (a) 7.49 feet, (b) 1.51 feet
48. 30.1 meters
64. 2.9 miles
66. (a) 288^0, (b) 1.4 hours

SECTION 7.1
52. Let $t = \pi$

SECTION 7.2
2. $\pi + 2\pi n$
20. $\dfrac{3\pi}{4} + \pi n$
22. $\dfrac{\pi}{3} + 2\pi n, \dfrac{5\pi}{3} + 2\pi n$
28. $\dfrac{\pi}{3} + \pi n, \dfrac{2\pi}{3} + \pi n$
30. $\dfrac{\pi}{2} + \pi n$
42. $\dfrac{2\pi}{3}, \dfrac{4\pi}{3}, \pi$
48. No solutions
50. $0, \pi, \dfrac{3\pi}{2}$

SECTION 7.3
6. (a) $\dfrac{\sqrt{2}+\sqrt{3}}{2}$, (b) $\dfrac{\sqrt{6}-\sqrt{2}}{4}$
10. (a) $\dfrac{-3-\sqrt{3}}{3}$, (b) $-2-\sqrt{3}$
12. $\cos 63^0$
14. $\sin 61^0$
18. (a) $63/65$, (b) $-63/16$,
    (c) QIV
20. (a) $3/5$, (b) $4/5$, (c) $3/4$
    (d) $-117/125$, (e) $44/125$
    (f) $-117/44$
22. (a) -0.92, (b) 2.43, (c) QIII

SECTION 7.4
10. (a) $-\dfrac{\sqrt{2}+\sqrt{3}}{2}$,

    (b) $\dfrac{\sqrt{2-\sqrt{2}}}{2}$, (c) $\sqrt{2}-1$
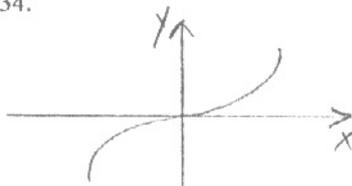38. $\dfrac{\pi}{2}, \dfrac{3\pi}{2}, \dfrac{\pi}{6}, \dfrac{5\pi}{6}$

SECTION 7.4 CONT.

44. (a) $-\dfrac{3\pi}{2}, -\dfrac{\pi}{2}, \dfrac{\pi}{2}, \dfrac{3\pi}{2}$

    or $-\dfrac{11\pi}{6}, -\dfrac{7\pi}{6}, \dfrac{\pi}{6}, \dfrac{5\pi}{6}$

SECTION 7.6

4. (a) 0, (b) π, (c) 0
12. (a) $\pi/3$, (b) $2\pi/3$, (c) $\pi/6$
14. (a) $\dfrac{\sqrt{3}}{2}$, (b) 0, (c) Not def.
20. (a) 120/169, (b) $-1519/1681$,
    (c) $-240/161$
24. $\dfrac{\sqrt{1-x^2}}{x}$
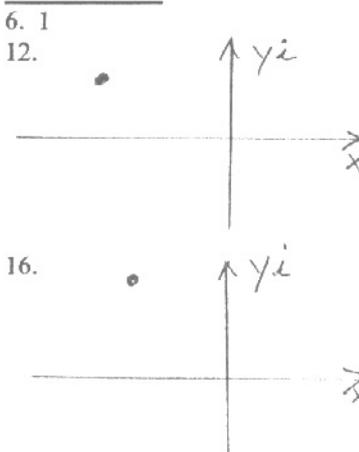32. (a) $\pi/2$, (b) π, (c) $-\pi/2$
34.

54. 3.8078, 5.6170

SECTION 8.1

8. No triangle exists
16. 54.88^0, 52.11^0, 16.70
24. 577 yards
28. (a) 836 feet, (b) 5468 feet

SECTION 8.2

8. 41^040', 85^030', 52^050'
16. 150 miles
18. 271.7 feet
20. 60.05^0
24. (a) 74.9 miles, (b) N62^0E

SECTION 8.3

6. 1
12.

16.

22. 2 cis $(\pi/6)$
30. 6 cis $(3\pi/2)$

SECTION 8.3 CONT.

40. $\sqrt{13}\, cis\left(\tan^{-1}\dfrac{2}{3}\right)$
48. $4\sqrt{2} - 4i\sqrt{2}$
50. $-6 - 6i\sqrt{3}$

SECTION 8.5

2. $\langle 0,9 \rangle, \langle -4,3 \rangle, \langle 2, 39 \rangle, \langle -18, 9 \rangle$
8.
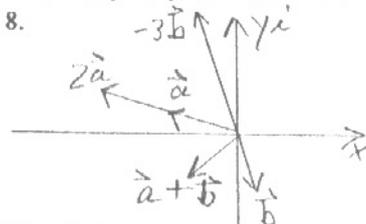
12. $-3\,d$
14. e
16. $2\,f$
30. 4, $4\pi/3$
38. 10.1 lb.
46. H: 15.32, V: 12.86
48. H: 158.63, V: 20.88
50. (a) $\langle 0,0 \rangle$, (b) None
60. 7.76 mi/hr

SECTION 8.6

2. (a) -29, (b) 176^0 3'
10. Vect. are orthogonal
12. Vect are orthogonal
14. Same direction
16. Opposite direction
18. $\pm\dfrac{5}{6}$
20. $-21/10$

SECTION 4.5

2.

(b) D = all non zero real numbers,
    R = $(0,\infty)$
(c) Inc: $(-\infty,0)$, Dec: $(0,\infty)$
6.
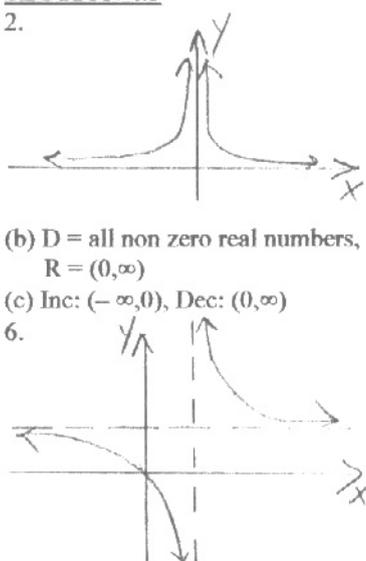
SECTION 4.5 CONT

6. (b) D: $\left(-\infty, \dfrac{5}{2}\right) \cup \left(\dfrac{5}{2}, \infty\right)$
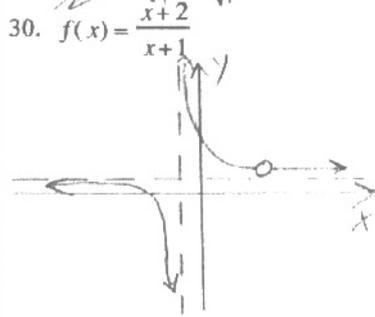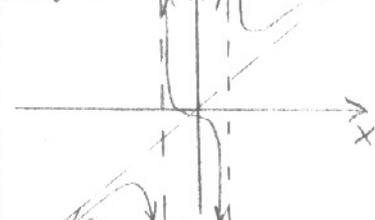
    R: $(-\infty, 2) \cup (2, \infty)$
14.
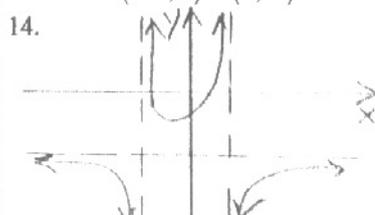
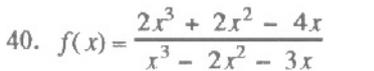(b) $(-\infty, -3) \cup (-3,3) \cup (3,\infty)$
(c) Inc: $(-1,3) \cup (3,\infty)$
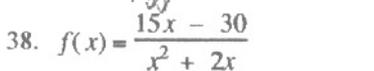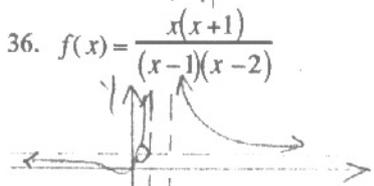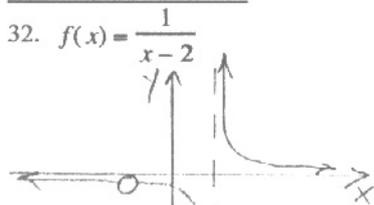   Dec: $(-\infty, -3) \cup (-3,-1)$
20.

(b) D: $(-\infty, 0) \cup (0,2) \cup (2,\infty)$
    R: $(-\infty, -6) \cup (0,\infty)$
24.

(b) D: $(-\infty, \infty)$, R: $(-4,1)$
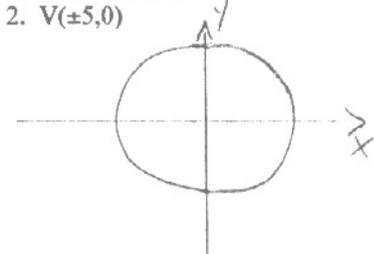(c) Inc: $(0,\infty)$, Dec: $(-\infty, 0)$
28. y = x

30. $f(x) = \dfrac{x+2}{x+1}$

MA154 ANSWERS TO EVEN PROBLEMS

SECTION 4.5 CONT

32. $f(x) = \dfrac{1}{x-2}$

36. $f(x) = \dfrac{x(x+1)}{(x-1)(x-2)}$

38. $f(x) = \dfrac{15x - 30}{x^2 + 2x}$

40. $f(x) = \dfrac{2x^3 + 2x^2 - 4x}{x^3 - 2x^2 - 3x}$

SECTION 11.1

6. $V(3, -1)$

12. $V(-4, 2)$
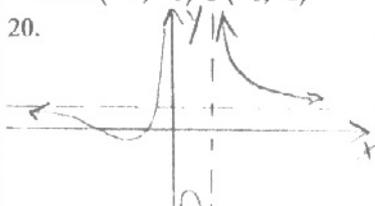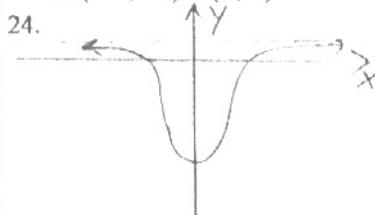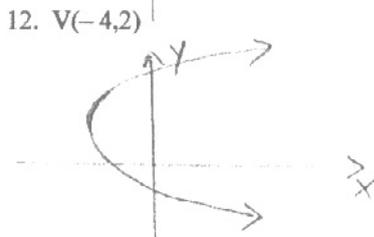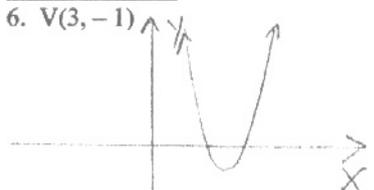
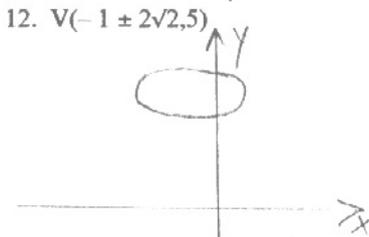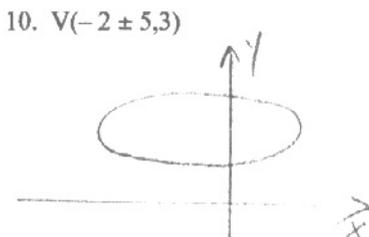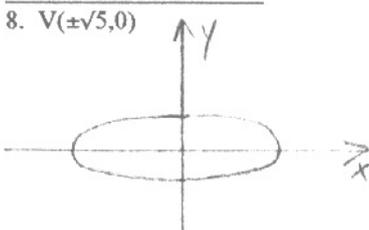14. $x^2 = 12(y + 2)$

16. $(y + 2)^2 = -2(x - 3)$

SECTION 11.2

2. $V(\pm 5, 0)$

SECTION 11.2 CONT.

8. $V(\pm\sqrt{5}, 0)$

10. $V(-2 \pm 5, 3)$

12. $V(-1 \pm 2\sqrt{2}, 5)$

16. $\dfrac{x^2}{16} + \dfrac{y^2}{9} = 1$

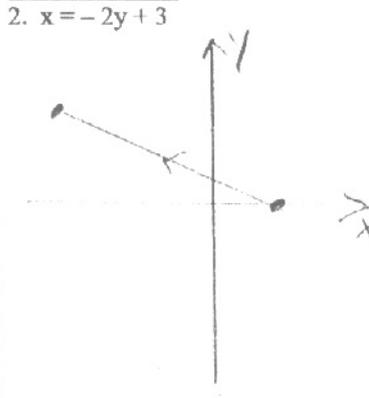18. $\dfrac{(x-1)^2}{4} + \dfrac{(y+2)^2}{16} = 1$

30. $\dfrac{x^2}{9} + \dfrac{4y^2}{49} = 1$

46. (a) $y = \sqrt{960\left(1 - \dfrac{x^2}{10000}\right)}$
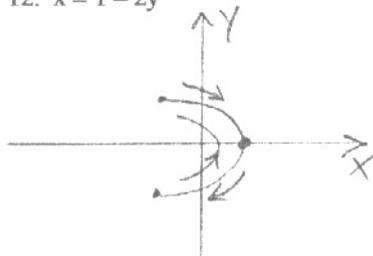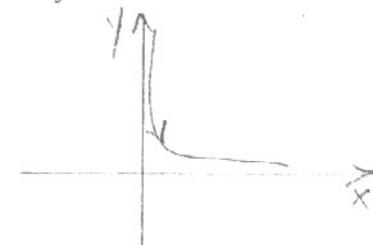
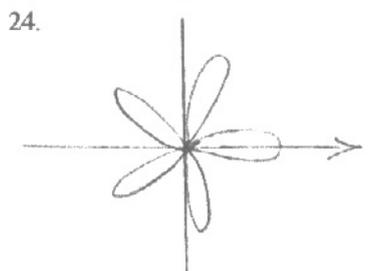 (b) 30.984 feet ≈ 31 feet

SECTION 11.3

6. $V(0, \pm 1)$, $y = \pm\dfrac{1}{\sqrt{15}} x$

8. $V\left(\pm 2\sqrt{2}, 0\right)$, $y = \pm\dfrac{\sqrt{2}}{2} x$

12. $V(3 \pm 5, 1)$,

  $(y - 1) = \pm\dfrac{2}{5}(x - 3)$

14. $V(-2, -5 \pm 3)$,

  $(y - 6) = \pm(x + 2)$

16. $V\left(-2 \pm \dfrac{3}{5}, -3\right)$
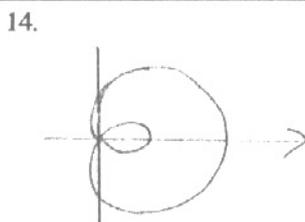
SECTION 11.4

2. $x = -2y + 3$

MA154 ANSWERS TO EVEN PROBLEMS
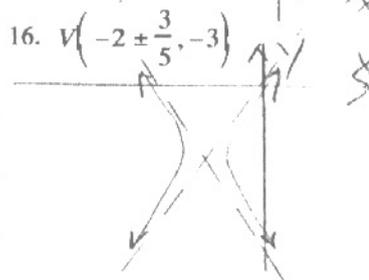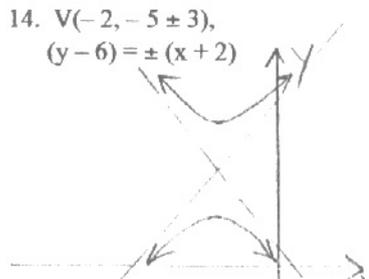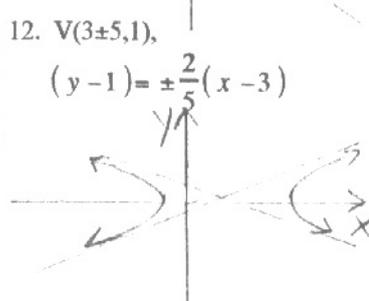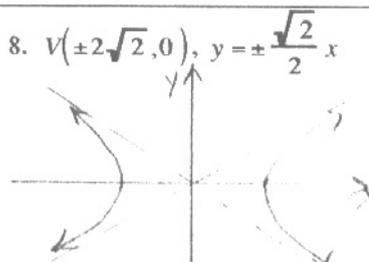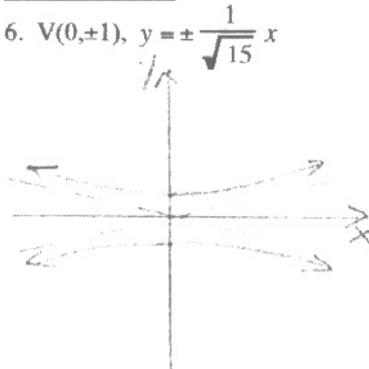
SECTION 11.4 CONT

12. $x = 1 - 2y^2$

16. $y = 1/x$

SECTION 11.5

4.

8.

10.

14.

16.

18.

22.

24.
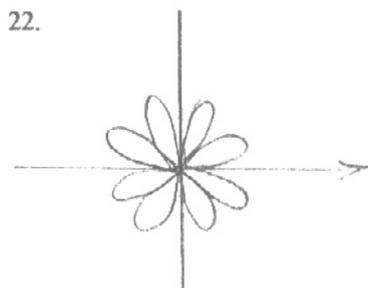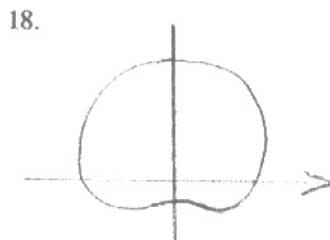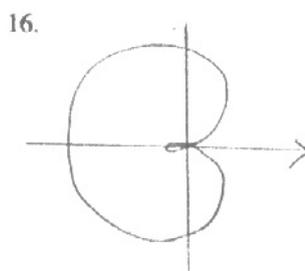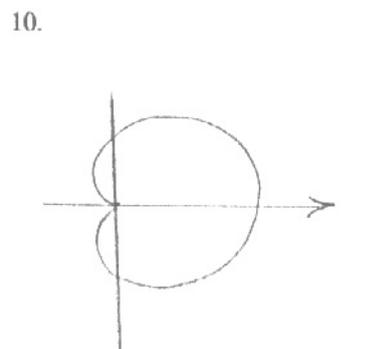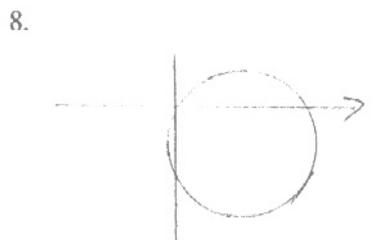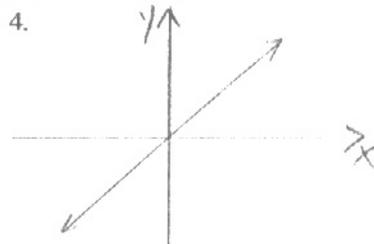
38. (a) $\left(2\sqrt{2}, -2\sqrt{2} \right)$

    (b) $\left(\sqrt{3}, 1 \right)$

44. (a) $(4, 5\pi/4)$ (b) $(8, 2\pi/3)$

46. (b), (d), (e), (f)

48. $r = 2 \csc \theta$

50. $r = 8 \tan \theta \sec \theta$

58. $y = -2$

60. $x^2 + y^2 = 4$