Final Review Answers
Fall 2011

1. (a) Parabola; Vertex: (1, -1); Focus: (1, -3); Directrix: y = 1

   (b) Ellipse; Center: (1, -2); Vertices: (1, -6), (1, 2); Foci: (1, -2 $\pm 2\sqrt{3}$); Eccentricity: $\frac{\sqrt{3}}{2}$

   (c) Hyperbola; Center: (-3, 5); Vertices: $(-\frac{10}{3}, 5)$, $(-\frac{8}{3}, 5)$; Foci: $(-3 \pm \frac{\sqrt{10}}{3}, 5)$; Eccentricity: $\sqrt{10}$

   (d) Parabola; Vertex: (-1, 0); Focus: (0, 0); Directrix: x = -1

   (e) Parabola; Vertex: (1, 1); Focus: (1, 2); Directrix: y = 0

   (f) ; Center: (-2, -3); Vertices: (-2, -6), (-2, 0); Foci: (-2, -3$\pm\sqrt{13}$); Eccentricity: $\frac{\sqrt{13}}{3}$

   (g) Ellipse; Center: (1, -1); Vertices: $(\frac{9}{4}, -1), (-\frac{1}{4}, -1)$; Foci: $(\frac{7}{4}, -1), (\frac{1}{4}, -1)$; Eccentricity $\frac{3}{5}$

   (h) Circle: Center: (2, -3); Radius: $\sqrt{8}$

2. (a) $\frac{(x-2)^2}{25} + \frac{y^2}{21} = 1$

   (b) $\frac{x^2}{4} - \frac{(y-2)^2}{12} = 1$

3. (a) $3x + 2y - 13 = 0$

   (b) $x^2 + \frac{y^2}{9} = 1$

   (c) $y = \frac{e^{2x}}{2}$

   (d) $\frac{(x-3)^2}{9} + \frac{(y-2)^2}{25} = 1$

   (e) $y = \frac{1}{x^2}$

   (f) $x^2 + y^2 = 36$

   (g) $1 + y^2 = x^2$

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

4. (a) $(0, -4)$
   (b) $(\sqrt{2}, -\sqrt{2})$
   (c) $(-\sqrt{3}, -1)$
   (d) $(-\sqrt{3}, -1)$
   (e) $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$
   (f) $(-15, 0)$

5. Answers may vary. These are some possibilities.
   (a) $(9, \frac{3\pi}{2}), (-9, \frac{\pi}{2})$
   (b) $(-2\sqrt{3}, \frac{\pi}{6}), (2\sqrt{3}, -\frac{5\pi}{6})$
   (c) $(2\sqrt{2}, \frac{\pi}{4}), (2\sqrt{2}, -\frac{-7\pi}{4})$
   (d) $(\sqrt{26}, 101.3^o), (\sqrt{26}, -258.7^o)$
   (e) $(1, \frac{4\pi}{3}), (-1, \frac{\pi}{3})$

6. (a) $r = 6\cos\theta$
   (b) $r = \dfrac{2}{4\cos\theta + 7\sin\theta}$

7. (a) $x^2 + y^2 - 4x = 0$
   (b) $x\sqrt{3} + y = 0$
   (c) $x^2 + y^2 = 100$
   (d) $(x^2 + y^2)^2 = 6xy$
   (e) $x^2 = x^2y^2 + y^4$
   (f) $x^2 - 4x + y^2 - 2y = 0$

8. Graph

9. (a) 3 feet
   (b) 52.35 feet
   (c) Yes

10. (a) Amplitude: 1; Period: $\frac{2\pi}{3}$; Phase Shift: $\frac{\pi}{6}$ right; Vertical Shift: none

    (b) Amplitude: 1; Period: $\frac{2\pi}{5}$; Phase Shift: $\frac{\pi}{6}$ left; Vertical Shift: none

    (c) Amplitude: 1; Period: 2π; Phase Shift: $\frac{\pi}{4}$ left; Vertical Shift: 3

    (d) Amplitude: 5; Period: $\frac{\pi}{4}$; Phase Shift: $\frac{\pi}{2}$ right, Vertical Shift: 2

11. (a) $\cos\theta = \frac{\sqrt{95}}{12}$

    (b) $\tan\theta = -\frac{7\sqrt{95}}{95}$

    (c) $\csc\theta = -\frac{12}{7}$

    (d) $\sec\theta = \frac{12\sqrt{95}}{95}$

    (e) $\cot\theta = -\frac{\sqrt{95}}{7}$

12. 66.8^o

13. Answers may vary

14. (a) $x = 0, \pi$

    (b) $x = 0, \frac{3\pi}{4}, \pi, \frac{5\pi}{4}$

    (c) $x = \pi, \frac{3\pi}{2}$

    (d) $x = 0, \frac{\pi}{6}, \frac{\pi}{2}, \frac{5\pi}{6}, \pi, \frac{7\pi}{6}, \frac{3\pi}{2}, \frac{11\pi}{6}$

    (e) $x = \frac{\pi}{8}, \frac{3\pi}{8}, \frac{9\pi}{8}, \frac{11\pi}{8}$

    (f) $x = 0, \frac{\pi}{8}, \frac{3\pi}{8}, \frac{5\pi}{8}, \frac{7\pi}{8}, \frac{9\pi}{8}, \frac{11\pi}{8}, \frac{13\pi}{8}, \frac{15\pi}{8}$

15. (a) $b \approx 6.55, A = 35^o, C = 35^o$

    (b) $A \approx 29.7^o, B \approx 52.4^o, C \approx 97.9^o$

    (c) $A = 70^o, b \approx 2.8, c \approx 6.6$

16. 311.4 meters

17. 10.2 kilometers

18. $n = \dfrac{26 \arccos(\frac{P}{3.5} - 1)}{\pi}$

19. $\dfrac{(x-2)^2}{36} + \dfrac{(y+6)^2}{16} = 1$ and $\dfrac{(x-2)^2}{16} + \dfrac{(y+6)^2}{36} = 1$

20. (a) $\dfrac{\sqrt{5}}{5}$

    (b) $\dfrac{3}{5}$

    (c) $-\dfrac{5}{13}$

    (d) $-\dfrac{3\sqrt{7}}{7}$

21. $8\sqrt{6}$ meters

22. 36 feet

23. (a) $-\dfrac{3}{\sqrt{7}}$

    (b) $\dfrac{13}{12}$

    (c) $-\dfrac{42\sqrt{7}}{112}$

    (d) $-\dfrac{119}{169}$