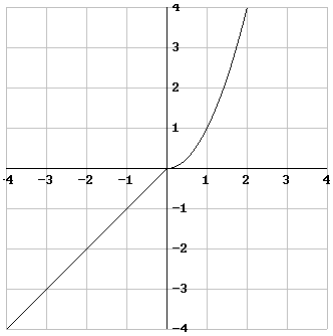
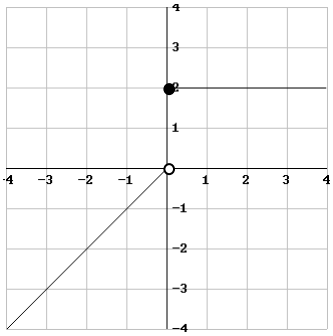
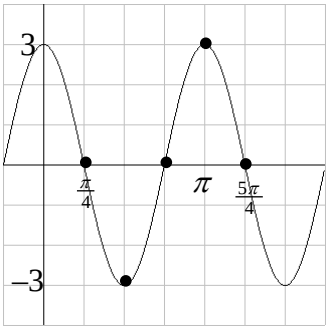
Semester Review Key

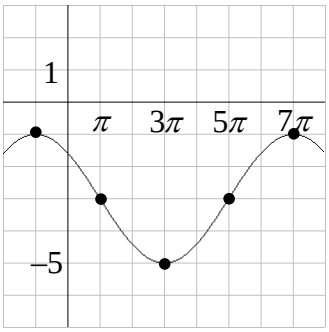
1. $x = -21$
2. $[0, \infty)$
3. $x = -\frac{5}{3}$
4. $x = 1, -4, \pm i$
5. $u^2 v^4$
6. $\frac{6}{ab^4}$
7. $f(-x) = 3(-x)^3 - 2(-x)$
   $= -3x^3 + 2x$
   $\therefore$ Since $f(-x) = -f(x)$
   $f(x)$ is odd
8. $f(-x) = -2(-x)^4 - 4(-x) + 7$
   $= -2x^4 + 4x + 7$
   $\therefore$ Since $f(-x) \neq -f(x)$ nor $f(-x)$
   $f(x)$ is neither odd or even
9. $-4 + 10i$
10. $5 - 3i$
11. $-\frac{4}{5} + \frac{7}{5}i$
12. (a) 0 (b) $\frac{1}{4}$ (c) 7
13. 
    It is continuous
14. 
    It is discontinuous
15. $y = 50(0.97)^x$
    22.76 days
16. $x = 1$
17. (a) $-\frac{\sqrt{2}}{2}$ (b) $\frac{1}{2}$
    (c) undefined (d) $\frac{1}{2}$
18. samples: $\frac{11\pi}{4}; -\frac{5\pi}{4}$
19. $\csc\theta = -\frac{3}{2}$
    $\cos\theta = \frac{\sqrt{5}}{3}; \sec\theta = \frac{3}{\sqrt{5}}$
    $\tan\theta = -\frac{2}{\sqrt{5}}; \cot\theta = -\frac{\sqrt{5}}{2}$
20. $y = 2\cos 4\left(x + \frac{\pi}{8}\right) - 3$
21. a) Amp = 3 (flipped over x-axis)
    Period = π
    Phase Shift = Right $\frac{\pi}{4}$
    Vertical Shift = none



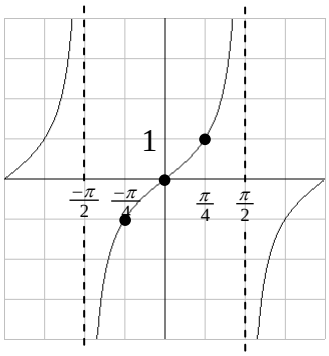
b) MUST rewrite as

$$y = 2\cos\left(\frac{1}{4}(x + \pi)\right) - 3$$

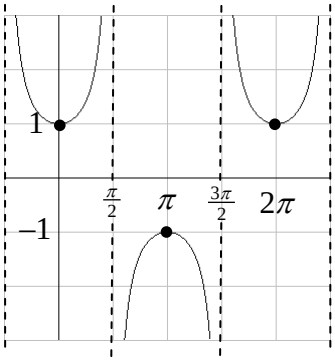
Amp = 2
Period = 8π
Phase Shift = Left π
Vertical Shift = Down 3



c)



d)



22. (a) $\frac{\pi}{4}$ (b) $\frac{2\pi}{3}$ (c) 2
(d) $-\frac{1}{2}$ (e) 0 (f) $\frac{\pi}{6}$

23. $\frac{2x}{\sqrt{1-4x^2}}$

24. $\frac{\sqrt{2}-\sqrt{6}}{4}$

25. $-\frac{120}{169}$

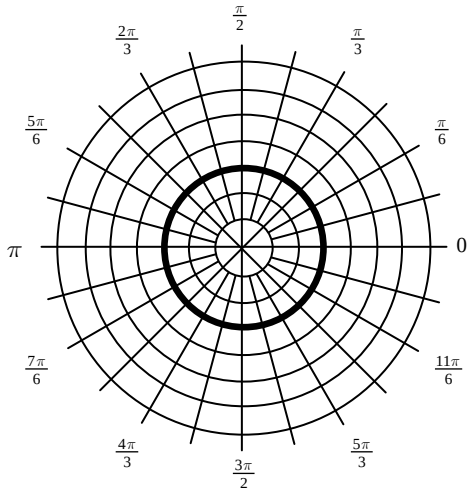
26. 0, π, π/3, 2π/3

27. π/4, 3π/4, 5π/4, 7π/4

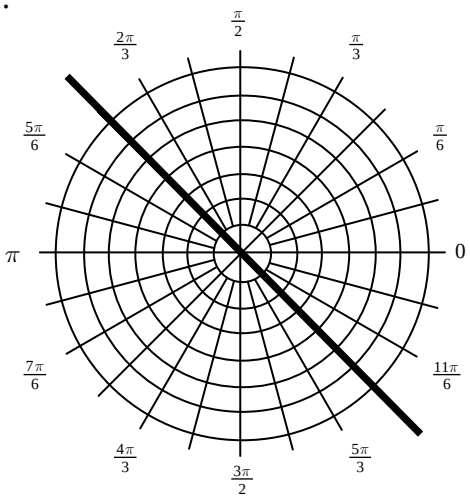
28. $\frac{\pi}{2}+k\cdot 2\pi$ & $\frac{3\pi}{2}+k\cdot 2\pi$

29. (3, 5π/6); (3, –7π/6);
(–3, –π/6); (–3, 11π/6)

30.



31.



32. $\left(-4\sqrt{2}, 4\sqrt{2}\right)$

33. $\left(1, \frac{5\pi}{6}\right)$

34. $r = \frac{5}{2}\sin\theta$

35. $y = -x\sqrt{3}$

36. –250.6°

37. 94°43′12″

38. 840.3 rpm

39. 12 π

40. 44. 5 ft

41. 2931.09 ft,

42. (a) 41.6 sq. units
(b) 222.3 sq. units

43. $\frac{1}{2}$

44. $\sin\left(\frac{7\pi}{10}\right)$

45. 2sin θ

46. 1

47. Answers may vary …

$$\frac{2\tan x}{1+\tan^2 x} = \frac{\frac{2\sin x}{\cos x}}{\sec^2 x}$$
$$= \frac{2\sin x}{\cos x}\cdot\frac{1}{\sec^2 x}$$
$$= \frac{2\sin x}{\cos x}\cdot\cos^2 x$$
$$= 2\sin x\cos x$$
$$= \sin(2x)$$

48. Answers may vary …

$$\frac{\cos x}{1+\sin x}+\frac{\cos x}{1-\sin x}=\frac{\cos x(1-\sin x)+\cos x(1+\sin x)}{(1+\sin x)(1-\sin x)}$$
$$=\frac{\cos x-\cos x\sin x+\cos x+\cos x\sin x}{1-\sin^2 x}$$
$$=\frac{2\cos x}{\cos^2 x}$$
$$=\frac{2}{\cos x}$$
$$=2\sec x$$

49. Answers may vary …

$$\sin(\pi-x)=\sin\pi\cos x-\cos\pi\sin x$$
$$=0\cdot\cos x-(-1)\sin x$$
$$=\sin x$$

50. (a) $c = 7.3$
$B = 74.1°$; $A = 15.9°$
(b) $B = 30.5°$; $149.5°$
$C = 124.5°$; $5.5°$
$c = 243.8$; 28.3
(c) $C = 55.3°$; $A = 40.5°$
$B = 84.3°$
51. Horizontal: 3
Vertical: 1.5
52. $\langle 7,-5\rangle$; $\sqrt{74}$
53. 5; 127°
54. 73.65 lb., $\theta = -23.05°$
55. –9; no
56. 45°
57. 614.4 ft-lb.
58. $x = -2 + 6t$
$y = 5 - 3t$
59. $y=-\frac{3}{5}x+\frac{37}{5}$
60. (a) $x = 75(\cos 25)\,t$
$y = -16t^2 + 75(\sin 25)t + 5$
(c) 144.64 ft (d) 2.1279 sec
(e) 20.7 ft (f) .99 sec
61. 1,560,000
62. 52,360
63. –60
64. (a) $x^4 - 8x^3 + 24x^2 - 32x + 16$
(b) $32x^5 + 80x^4y + 80x^3y^2 + 40x^2y^3 + 10xy^4 + y^5$
65. 165
66. (a) 0.67 (b) 0.33
67. (a) $\frac{25}{7776}$ (b) $\frac{13}{3888}$
68. (a) $g_1 = 2$
$g_n = 3g_{n-1}$
(b) $g_n = 2(3)^{n-1}$
69. a) 35/6
b) –21/2
c) $a_n=-\frac{21}{2}+\frac{35}{6}(n-1)$
70. a) 4
b) 2
c) $g_n = 2(4)^{n-1}$
71. $\sum_{n=1}^{\infty}2+3(n-1)$ ... OR ... $\sum_{n=1}^{\infty}3n-1$
72. $\sum_{n=1}^{8}6\left(\frac{1}{3}\right)^{n-1}$
73. does not exist
74. $\frac{1}{5}$