6. $\dfrac{\pi + \frac{10}{3} + \sqrt{2}}{3} = 2.63$

7. $\dfrac{1000}{6} = 166.66 \Rightarrow 166$

8. $42 \text{ boxes} \times \dfrac{12 \text{ cookies}}{1 \text{ box}} \times \dfrac{8 \text{ chips}}{1 \text{ cookie}} \times \dfrac{8 \text{ oz}}{288 \text{ chips}} = 112 \text{ oz}$

9. $A = \left(\dfrac{D}{2}\right)^2 \pi = 4860$

10. $P = 2(\ell + w) \Rightarrow 16.2 = 2(5.33 + w) \Rightarrow w = 2.77$

16. $\dfrac{2.2396 - 2.196}{3} = 0.015$ (2 SD)

17. $\rho = \dfrac{m}{V} \Rightarrow 0.638 = \dfrac{342}{(12^2)x} \Rightarrow x = 3.72$

18. $C = 2\pi r = 2\pi(3960 + 100) = 25509.73 \text{ mi}$
$v = \left(\dfrac{25509.73 \text{ mi}}{90 \text{ min}}\right)\left(\dfrac{5280 \text{ ft}}{1 \text{ mi}}\right)\left(\dfrac{1 \text{ min}}{60 \text{ s}}\right) = 24900 \text{ ft/s}$

19. $x = 106 \tan 31.5^\circ = 65.0$

20. $x = \sqrt{1.39^2 - 0.935^2} = 1.0285$
$A = \frac{1}{2}x(0.935) = 0.481$

26. $m = \dfrac{2.93 - 3.45}{40} = -0.013$
$p(x) = -0.013(x - 100) + 2.93 = -0.013x + 4.23$
$R(x) = x \cdot p(x) = x(-0.013x + 4.23) = -0.013x^2 + 4.23x$
Max $x = -\dfrac{b}{2a} = -\dfrac{4.23}{2(-0.013)} = 162.69$

27. 50 mph = 73.33 ft/s
$v = at \Rightarrow 73.33 \text{ ft/s} = a(8.4 \text{ s}) \Rightarrow a = 8.73 \text{ ft/s}^2$
$d = \frac{1}{2}at^2 = \frac{1}{2}(8.73 \text{ ft/s}^2)(8.4 \text{ s})^2 = 308 \text{ ft}$

28. $x = \sqrt{40^2 + 32^2} = 51.2$

29. $AB = x\sqrt{3} \Rightarrow 5.64 = x\sqrt{3} \Rightarrow x = 3.256$
$V = x^3 = 34.5$

30. $TSA = \pi r(r + \ell) \Rightarrow 97.8 = \pi(2.9)(2.9 + \ell) \Rightarrow \ell = 7.83$
$\ell = \sqrt{r^2 + h^2} \Rightarrow 7.83 = \sqrt{2.9^2 + h^2} \Rightarrow h = 7.28$

36. First, find the concentration of the mix:
$2(0.12) + 1(0.07) = 3x \Rightarrow x = 0.10333 = 10.333\%$
Find amount of water y:
$(40 - y)(0.10333) + y(0) = 40(0.02) \Rightarrow y = 32.3 \text{ pt}$

37. Stream speed = 2.56 mph = 3.75 ft/s
In one second, the rower goes at an angle so that he stays in the direct line with across the river. $v = \sqrt{4.2^2 - 3.75^2} = 1.89$ ft/s
$t = \dfrac{d}{v} = \dfrac{144}{1.89} = 76.1 \text{ s} = 1.27 \text{ min}$

38. Geometric series: $r = 100\% + 10\% = 1.1$
$S_n = a_1\left(\dfrac{1 - r^n}{1 - r}\right)$
$S_{30} = (10 \text{ min})\left(\dfrac{1 - (1.1)^{30}}{1 - 1.1}\right) = 1644.94 \text{ min} = 27.4 \text{ hr}$

39. $r = \dfrac{a + b - c}{2} = \dfrac{51.9 + 71.3 - \sqrt{51.9^2 + 71.3^2}}{2} = 17.5$
$A = \pi r^2 = 963$

40. In triangle on right, $\theta = 180^\circ - 78^\circ - 61^\circ = 41^\circ$. Use Law of Sines to get bottom side.
$\dfrac{x}{\sin 41^\circ} = \dfrac{4.47}{\sin 78^\circ} \Rightarrow x = 2.998$
Bottom side total = $x = 4.29 = 7.288$
Use Law of Cosines on whole triangle:
$y^2 = 7.288^2 + 4.47^2 - 2(7.288)(4.47)\cos(61^\circ)$
$\Rightarrow y = 6.44$

46. $\dfrac{x}{9.6} = \left(\dfrac{7.2}{5}\right)^2 \Rightarrow x = 19.9$

47. $y = 1.07x + 2.65 = 30 \Rightarrow x = 25.5$

48. Solver: $J = 1.02$

49. $V_{\text{pyr}} = \frac{1}{3}Bh_1$ and $V_{\text{prm}} = Bh_2$
$\frac{1}{3}h_1 = 0.95 \Rightarrow h_2 = 2.85$
$SA_{\text{pyr}} = \ell\sqrt{\left(\dfrac{w}{2}\right)^2 + h^2} + w\sqrt{\left(\dfrac{\ell}{2}\right)^2 + h^2} = 20.49$
$SA_{\text{prm}} = 2h(\ell + w) + \ell w = 21.82$
$TSA = 42.3$

50. $\Delta V = \pi(21)^2(63.4) - \frac{4}{3}\pi(21)^3 = 49000$

56. $f'(x) = \dfrac{1(x^2) - 2x(x + 3)}{x^4} = \dfrac{-x^2 - 6x}{x^4} = \dfrac{-x - 6}{x^3}$
$f'(1.25) = -3.71$

57. Ant 1: position vector is $\langle 6At, 4At\rangle$ where $A = \dfrac{.24}{\sqrt{52}}$

Ant 2: position vector is $\langle 6 - 6Bt, 4Bt\rangle$ where $B = \dfrac{.18}{\sqrt{52}}$

Distance between ants = D and

$D^2 = (6At - 6 + 6Bt)^2 + (4At - 4Bt)^2$

Minimize D^2 with derivative:

$(D^2)' = 2(6At-6+6Bt)(6A+6B)+2(4At-4Bt)(4A-4B)$.

Set equal to 0 and solve for t: $t = 17.015$

$\Rightarrow\ D^2 = 0.3236 \ \Rightarrow\ D = 0.569$ ft = 6.83 in

58. $Q = \begin{bmatrix} 136 & 34 \\ 123 & 1 \end{bmatrix} \Rightarrow Q_{22} = 1.00$

59. Solve for intersection: $x_2 = 0.936$

$A = \int_0^{x_2} 2\sin(3x) - 0.7x\, dx = 0.990$

60. Use theorem about tangent and secant segments: $t^2 = s \cdot x$

$7.33^2 = (4.35 + D)(4.35) \ \Rightarrow\ D = 8.001 \ \Rightarrow\ r = 4.00$

$\theta = \tan^{-1}\left(\dfrac{7.33}{r}\right) = 1.07$

$\alpha = \frac{\pi}{2} - \theta = 0.500$

61. $\theta = \cos^{-1}\left(\dfrac{2}{18}\right) = 1.459$ rad

Use all of larger circle circumference except the arc formed by $2\theta = 2\pi(2) - 2\theta(7) = 23.55$ cm

Similarly, for small circle: $\alpha = \dfrac{\pi}{2} - \cos^{-1}\left(\dfrac{2}{18}\right) = 0.1113$ rad

$2\pi(5) - 2\alpha(5) = 30.303$ cm

Total chain = $2\sqrt{328} + 23.55 + 30.303 = 90.1$ cm

62. $P = \left(\dfrac{1}{1728}\right)^{120} = 1728^{-120}$

$\log P = -120 \log 1728 = -388.5052486 \Rightarrow P = 10^{-388.5052486} = 3.12 \times 10^{-389}$

63. $4 = 6 + 66\sin 30^\circ t + \frac{1}{2}(-32.17)t^2 \ \Rightarrow\ t = 2.11$ s

$d_h = 66\cos 30^\circ t = 120.63$ ft = 40.2 yd

64. Angle on left is 45°. Coordinatize with circle center as origin. $A = (-0.142, 0)$, $C = (0.142, 0)$, $B = A + 0.284\left(\dfrac{\sqrt{2}}{2}, \dfrac{\sqrt{2}}{2}\right) = (0.0588, 0.2008)$. Draw segment from center to point on circle with y equal to the desired length: Use Pyth Thm: $(0.142)^2 = (0.0588)^2 + y^2 \ \Rightarrow\ y = 0.129$

65. Let side $s = 6$. Subtract white areas from square area 36:

$A_1 = \frac{1}{2}(6)(2) = 6$

$A_2 = \frac{1}{2}(6)(3) = 9$

$A_3 = \frac{1}{2}(4)(3) = 6$

Shaded Area = 36 − 9 − 6 − 6 = 15

Ratio: $\dfrac{15}{36} = 0.417$