11. $\int (4-18x)\,dx = \boxed{4x - 9x^2 + C}$

13. $\int t^{-6/11}\,dt = \boxed{\frac{11}{5} t^{5/11} + C}$

15. $\int (18t^5 - 10t^4 - 28t)\,dt = \boxed{3t^6 - 2t^5 - 14t^2 + C}$

17. $\int (z^{-4/5} - z^{2/3} + z^{5/4})\,dz = \boxed{5z^{1/5} - \frac{3}{5} z^{5/3} + \frac{4}{9} z^{9/4} + C}$

19. $\int \frac{1}{\sqrt[3]{x}}\,dx = \int x^{-1/3}\,dx = \frac{3}{2} x^{2/3} + C = \boxed{\frac{3\sqrt[3]{x^2}}{2} + C}$

21. $\int \frac{36\,dt}{t^3} = \int 36t^{-3}\,dt = -18t^{-2} + C = \boxed{\frac{-18}{t^2} + C}$

23. $\int (t^{1/2}+1)(t+1)\,dt = \int (t^{3/2} + t^{1/2} + t + 1)\,dt = \boxed{\frac{2}{5}t^{5/2} + \frac{2}{3}t^{3/2} + \frac{1}{2}t^2 + t + C}$

25. $\int \frac{x^3+3x-4}{x^2}\,dx = \int \left(x + \frac{3}{x} - 4x^{-2}\right)dx = \boxed{\frac{1}{2}x^2 + 3\ln|x| + \frac{4}{x} + C}$

27. $\int 12\sec x \tan x\,dx = \boxed{12\sec x + C}$

29. $\int (\csc t \cot t)\,dt = \boxed{-\csc t + C}$

31. $\int \sec^2(-3\theta)\,d\theta = \frac{\tan(-3\theta)}{-3} + C = \boxed{-\frac{1}{3}\tan(-3\theta) + C}$

33. $\int 25\sec^2(3z)\,dz = \boxed{\frac{25\tan(3z)}{3} + C}$

35. $\int \left(\cos(3\theta) - \frac{1}{2}\sec^2\left(\frac{\theta}{4}\right)\right)d\theta = \boxed{\frac{\sin(3\theta)}{3} - 2\tan\left(\frac{\theta}{4}\right) + C}$

37. $\int (3e^{5x})\,dx = \frac{3e^{5x}}{5} + C = \boxed{\frac{3}{5}e^{5x} + C}$

39. $\int (8x - 4e^{5-2x})\,dx = 4x^2 - \frac{4e^{5-2x}}{-2} + C = \boxed{4x^2 + 2e^{5-2x} + C}$

41. B → The graph of B does not flatten at $x=0$. Since $f(0)=0$, the antiderivative would need to be flat at $x=0$.

43. $\int (x+13)^6\,dx = \frac{1}{7}(x+13)^7 + C$

$\frac{d}{dx}\left[\frac{1}{7}(x+13)^7 + C\right] = (x+13)^6$ ✓

45. $\int (4x+13)^2\,dx = \frac{1}{12}(4x+13)^3 + C$

$\frac{d}{dx}\left[\frac{1}{12}(4x+13)^3 + C\right] = 3\cdot\frac{1}{12}(4x+13)^2\cdot 4 = (4x+13)^2$ ✓

47. $\frac{dy}{dx} = x^3 \rightarrow y = \frac{x^4}{4} + C$ $\quad y(0) = \frac{0^4}{4} + C = 4 \rightarrow C = 4$

so... $y = \frac{1}{4}x^4 + 4$

49. $\frac{dy}{dt} = 2t + 9t^2,\ y(1) = 2$

$y = t^2 + 3t^3 + C \rightarrow y(1) = 1^2 + 3(1)^3 + C = 2 \rightarrow 4 + C = 2 \rightarrow C = -2$

so $y = 3t^3 + t^2 - 2$

51. $\frac{dy}{dt} = \sqrt{t},\ y(1) = 1$

$y = \frac{2}{3}t^{3/2} + C \rightarrow y(1) = \frac{2}{3}(1)^{3/2} + C = 1 \rightarrow \frac{2}{3} + C = 1 \rightarrow C = \frac{1}{3}$

$y = \frac{2\sqrt{t^3}}{3} + \frac{1}{3}$

53. $\frac{dy}{dx} = (3x+2)^3,\ y(0) = 1$

$y = \frac{(3x+2)^4}{4\cdot 3} + C = \frac{1}{12}(3x+2)^4 + C \rightarrow y(0) = \frac{1}{12}(2)^4 + C = 1$

$= \frac{4}{3} + C = 1$

$C = -\frac{1}{3}$

so $y = \frac{1}{12}(3x+2)^4 - \frac{1}{3}$

55. $\frac{dy}{dx} = \sin x$, $y(\frac{\pi}{2}) = 1$

$y = -\cos x + C \rightarrow y(\frac{\pi}{2}) = 0 + C = 1 \rightarrow C = 1$

$y = -\cos x + 1$

57. $\frac{dy}{dx} = \cos 5x$, $y(\pi) = 3$

$y = \frac{1}{5}\sin 5x + C \rightarrow y(\pi) = \frac{1}{5}(0) + C = 3 \rightarrow C = 3$

$y = \frac{1}{5}\sin 5x + 3$

59. $\frac{dy}{dx} = e^x$, $y(2) = 0$

$y = e^x + C \rightarrow y(2) = e^2 + C = 0 \rightarrow C = -e^2$

$y = e^x - e^2$

61. $\frac{dy}{dt} = 9e^{12-3t}$, $y(4) = 7$

$y = -3e^{12-3t} + C \rightarrow y(4) = -3e^0 + C = 7 \rightarrow -3 + C = 7 \rightarrow C = 10$

$y = -3e^{12-3t} + 10$

63. $f''(x) = 12x$, $f'(0) = 1$, $f(0) = 2$

$f'(x) = 6x^2 + C \rightarrow f'(0) = 0 + C = 1 \rightarrow C = 1$

$f'(x) = 6x^2 + 1$

$f(x) = 2x^3 + x + C \rightarrow f(0) = 0 + C = 2 \rightarrow C = 2$

$f(x) = 2x^3 + x + 2$

65. $f''(x) = x^3 - 2x + 1$, $f'(0) = 1$, $f(0) = 0$

$f'(x) = \frac{1}{4}x^4 - x^2 + x + C$ $\quad f'(0) = 0 + C = 1 \rightarrow C = 1$

$f'(x) = \frac{1}{4}x^4 - x^2 + x + 1$

$f(x) = \frac{1}{20}x^5 - \frac{1}{3}x^3 + \frac{1}{2}x^2 + x$ $\quad C = 0$ since $f(0) = 0$

67. $f''(t) = t^{-3/2}$, $f'(4) = 1$, $f(4) = 4$

$f'(t) = -2t^{-1/2} + C \rightarrow f'(4) = \frac{-2}{\sqrt{4}} + C = 1 \rightarrow -1 + C = 1 \rightarrow C = 2$

$f'(t) = \frac{-2}{\sqrt{t}} + 2$

$f(t) = -4t^{1/2} + 2t + C \rightarrow f(4) = -4\sqrt{4} + 2(4) + C = 4 \rightarrow 0 + C = 4 \rightarrow C = 4$

$f(t) = -4\sqrt{t} + 2t + 4$

69. $f''(t) = t - \cos t$, $f'(0) = 2$, $f(0) = -2$

$f'(t) = \frac{1}{2}t^2 - \sin t + C \rightarrow f'(0) = 0 + C = 2 \rightarrow C = 2$

$f'(t) = \frac{1}{2}t^2 - \sin t + 2$

$f(t) = \frac{1}{6}t^3 + \cos t + 2t + C \rightarrow f(0) = 1 + C = -2 \rightarrow C = -3$

$f(t) = \frac{1}{6}t^3 + \cos t + 2t - 3$

71. $s(1) = 0$

$v(t) = s'(t) = 6t^2 - t$

$s(t) = 2t^3 - \frac{1}{2}t^2 + C \rightarrow s(1) = 2 - \frac{1}{2} + C = 0 \rightarrow C = -3/2$

$s(t) = 2t^3 - \frac{1}{2}t^2 - \frac{3}{2}$

73. $a(t) = -9.8 \rightarrow v(t) = -9.8t + V_0 \leftarrow V_0 = 0$ due to word "dropped"

impact velocity $v(5) = -9.8(5) = -49$ m/s

Balloon was going down at rate of 49 m/s when it hit ground.

75. given $s(0) = 0$

$\frac{ds}{dt} = v(t) = \sin\left(\frac{\pi}{2}t\right) \rightarrow s(t) = \frac{-\cos\left(\frac{\pi}{2}t\right)}{\frac{\pi}{2}} + C$ $\qquad s(0) = \frac{-2}{\pi} + C = 0$, $C = \frac{2}{\pi}$

$s(t) = \frac{-2}{\pi}\cos\left(\frac{\pi}{2}t\right) + C$

$s(t) = \frac{-2}{\pi}\cos\left(\frac{\pi}{2}t\right) + \frac{2}{\pi}$

77. given: $V_0 = 25$, $a(t) = -4$

$a(t) = -4$

$v(t) = -4t + 25$

$s(t) = -2t^2 + 25t + 0$ ← let original position be 0

car stops when $v(t) = 0 \rightarrow 4t = 25 \rightarrow t = \frac{25}{4}$ s

car travels: $s\left(\frac{25}{4}\right) = -2\left(\frac{25}{4}\right)^2 + 25\left(\frac{25}{4}\right) = 78.125$ m

79. $\frac{dv}{dm} = -50m^{-\frac{1}{2}} \rightarrow v(m) = -100m^{\frac{1}{2}} + C$

given: $v(900) = -100\sqrt{900} + C = 0 \rightarrow C = 3000$

so $v(m) = -100\sqrt{m} + 3000$

and $v(729) = -100\sqrt{729} + 3000 = 300$ m/s