

Section 2.2

$$2. |x-4|-5=2 \Rightarrow |x-4|=7 \Rightarrow \begin{array}{l} x-4=7 \Rightarrow x=11 \\ \text{OR} \\ x-4=-7 \Rightarrow x=-3 \end{array}$$

$$6. |5-6x|=0 \Rightarrow 5-6x=0 \Rightarrow x=5/6$$

$$8. 4|x-2|=3x-4 \Rightarrow |x-2|=\frac{3x-4}{4}=\frac{3}{4}x-1$$

$$\text{So } x-2=\frac{3}{4}x-1 \quad x-2=-\left(\frac{3}{4}x-1\right)=-\frac{3}{4}x+1$$

$$x-\frac{3}{4}x=1 \Rightarrow \frac{1}{4}x=1 \Rightarrow \boxed{x=4}$$

$$x+\frac{3}{4}x=3 \Rightarrow \frac{7}{4}x=3 \Rightarrow \boxed{x=\frac{12}{7}}$$

$$16. 3x^3-48x=0 \Rightarrow 3x(x^2-16)=0 \text{ so } x=0, \pm 4$$

$$18. t-t^3=0 \Rightarrow t(1-t^2)=0 \Rightarrow t=0, \pm 1$$

$$28. 6y^2=-5-y^4 \Rightarrow y^4+6y^2+5=0 \Rightarrow (y^2+5)(y^2+1)=0$$

So there is no solution.

$$32. (x+4)^3+2=0 \Rightarrow (x+4)^3=-2 \Rightarrow x+4=\sqrt[3]{-2}$$

$$\Rightarrow x=-4+\sqrt[3]{-2} \approx -5.26$$

$$38. 2x^5-15x^3-27x=0 \Rightarrow x(2x^4-15x^2-27)=0$$

$$\Rightarrow x(2x+3)(x-9)=0 \quad x=0, -3/2, 9$$

$$46. 8t^{-2}-17t^{-1}+2=0 \quad w=t^{-1} \text{ so } 8w^2-17w+2=0$$

$$\Rightarrow (8w-1)(w-2)=0 \Rightarrow w=\frac{1}{8}, 2 \Rightarrow t^{-1}=\frac{1}{8} \Rightarrow t=8$$

$$t^{-1}=2 \Rightarrow t=1/2$$

$$52. t^{3/2}=8 \Rightarrow (t^{3/2})^{2/3}=8^{2/3} \Rightarrow t=8^{2/3}=4$$

$$54. (2y+3)^4=5 \Rightarrow 2y+3=\pm\sqrt[4]{5} \Rightarrow y=\frac{-3\pm\sqrt[4]{5}}{2}$$

$$58. x^{4/3}+3x^{2/3}-28=0 \quad w=x^{2/3}$$

$$w^2+3w-28=0 \Rightarrow (w+7)(w-4)=0 \quad w=-7$$

$$x^{2/3}=-7 \text{ (makes no sense - cannot be negative)} \quad w=4$$

$$x^{2/3}=4 \Rightarrow x=4^{3/2}=8$$

$$61. \sqrt{1-3x} = 2 \Rightarrow (\sqrt{1-3x})^2 = (2)^2 \Rightarrow 1-3x = 4 \\ \Rightarrow x = \frac{3}{-3} = -1$$

$$64. x - \sqrt{x} = 20 \Rightarrow (x-20)^2 = (\sqrt{x})^2 \Rightarrow x^2 - 40x + 400 = x \\ \Rightarrow x^2 - 41x + 400 = 0 \Rightarrow (x-25)(x-16) = 0 \Rightarrow x = 25, 16 \\ \text{(only 25 checks so } x = 25 \text{ is only solution)}$$

$$73. \sqrt{3+2t} + \sqrt{-1+4t} = 1 \Rightarrow (\sqrt{-1+4t} - 1)^2 = (-\sqrt{3+2t})^2 \\ \Rightarrow (\sqrt{4t-1} - 1)^2 = 3+2t \Rightarrow 4t - 1 - 2\sqrt{4t-1} + 1 = 3+2t \\ 2\sqrt{4t-1} = -3 - 2t + 4t \Rightarrow (2\sqrt{4t-1})^2 = (2t-3)^2 \\ \Rightarrow 4(4t-1) = (4t^2 - 12t + 9) \Rightarrow 16t - 4 = 4t^2 - 12t + 9 \\ \Rightarrow 4t^2 - 28t + 13 = 0 \Rightarrow (2t-1)(2t-13) = 0 \\ \Rightarrow t = \frac{1}{2}, 6.5$$