

1 $i\sqrt{15} \cdot i\sqrt{5} = -\sqrt{75} = -5\sqrt{3}$

2 $4 \overline{) 821} \rightarrow i^{821} = i^{4(205)+1} = i^1 = i$

$$\begin{array}{r} 4 \overline{) 821} \\ \underline{8} \\ 02 \\ \underline{0} \\ 21 \\ \underline{20} \\ 1 \end{array}$$

3 $\frac{14+5i}{3+2i} \cdot \frac{3-2i}{3-2i} = \frac{42-28i+15i+10}{9+4} = 4-i$

4 $5x^2-3x-2=0 \Rightarrow (5x+2)(x-1)=0 \Rightarrow x=1, -2/5$

5 $x^2-2x+1 = \frac{3}{2}+1 \Rightarrow (x-1)^2 = \frac{5}{2} \Rightarrow x-1 = \pm\sqrt{\frac{5}{2}} \Rightarrow x = 1 \pm \sqrt{\frac{5}{2}}$

6 $(x-2)(x^2+2x+4)=0 \Rightarrow x=2$, or $x^2+2x+4=0$, whence $x = -1 \pm i\sqrt{3}$

7

	rate	x time	= dist.
Adama	5	t	5t
Tigh	6	t	6t

$(5t)^2 + (6t)^2 = 10^2 \Rightarrow 61t^2 = 100 \Rightarrow t^2 = \frac{100}{61} \Rightarrow t = \frac{10}{\sqrt{61}} = 1.280 \text{ hr.} = 76.8 \text{ min.} \approx 77 \text{ min.}$

8 $V=200 \Rightarrow lwh=200 \Rightarrow l(l-3.5)(2.8)=200 \Rightarrow 2.8l^2-9.8l-200=0 \Rightarrow l = \frac{9.8 \pm \sqrt{9.8^2-4(2.8)(-200)}}{2(2.8)} = \frac{9.8+48.333}{5.6} = 10.38 \text{ in.}$

9a $x+4\sqrt{x}+4 = 4+7\sqrt{x} \Rightarrow 3\sqrt{x}=x \Rightarrow 9x=x^2 \Rightarrow x^2-9x=0 \Rightarrow x(x-9)=0 \Rightarrow x=0, 9 \checkmark$

9b $6x-15=x^2-2x \Rightarrow x^2-8x+15=0 \Rightarrow (x-3)(x-5)=0 \Rightarrow x=3, 5$

9c $(x^2+5)(x^2-3)=0 \Rightarrow x^2=-5 \text{ or } x^2=3 \Rightarrow x = \pm i\sqrt{5}, \pm\sqrt{3}$

10a $(-\infty, \infty) \checkmark$

10b $(x-3)(x+2) < 0$

So $x-3 < 0$ & $x+2 > 0$ (or) $x-3 > 0$ & $x+2 < 0$
 $x < 3$ & $x > -2$ $x > 3$ & $x < -2$
 $(-2, 3) \checkmark$ \emptyset

10c $[-2, 5/3] \cup [5, \infty) \checkmark$

10d $\frac{3}{x-6} - \frac{2(x-6)}{x-6} \leq 0 \Rightarrow \frac{-2x+15}{x-6} \leq 0 \Rightarrow \frac{2x-15}{x-6} \geq 0 \Rightarrow (-\infty, 6) \cup [15/2, \infty) \checkmark$

10e $-4 < 5-3x < 4 \Rightarrow -9 < -3x < -1 \Rightarrow 3 > x > 1/3 \Rightarrow (1/3, 3) \checkmark$

11 $|10-4x|=4 \Rightarrow 10-4x=4 \text{ or } 10-4x=-4 \Rightarrow 4x=6 \text{ or } 4x=14 \Rightarrow x=3/2 \text{ or } x=7/2 \rightarrow \{3/2, 7/2\}$

12 $P(-4,3), Q(2,5), R(-1,-6)$
 $d_{PQ} = \sqrt{6^2+2^2} = \sqrt{40} = 2\sqrt{10}$
 $d_{PR} = \sqrt{3^2+9^2} = \sqrt{90} = 3\sqrt{10}$
 $d_{QR} = \sqrt{3^2+11^2} = \sqrt{130} = \sqrt{13} \cdot \sqrt{10}$
 $2\sqrt{10} + 3\sqrt{10} = 5\sqrt{10} \neq \sqrt{13} \cdot \sqrt{10}$
 No.