MATH1040/7040 ASSIGNMENT 2 SOLUTIONS

1. A few lines.

2.

(a) $|2y+4| = 4$, so

$$\begin{aligned} 2y+4 &= 4 & \quad \textit{or} \quad & & 2y+4 &= -4 \\ 2y &= 4-4 & & & 2y &= -4-4 \\ 2y &= 0 & & & 2y &= -8 \end{aligned}$$

Hence the solutions are: $y = 0$ and $y = -4$

(b) $\dfrac{8z^{-2}z^{-3}}{z^{-1}z^{-3}} = \dfrac{8z^{-2-3}}{z^{-1-3}} = \dfrac{8z^{-5}}{z^{-4}} = 8z^{-5-(-4)} = 8z^{-1}$

(c)

$$\begin{aligned} y^{-1}x^0x^{-2}x^1 \times y^2 \div x^{-1} &= y^{-1}x^0x^{-2}x^1 \times y^2 \times x^1 \\ &= x^0x^{-2}x^1x^1y^{-1}y^2 \\ &= x^{0-2+1+1}y^{-1+2} \\ &= x^0y^1 \\ &= y \end{aligned}$$

(d) $\sqrt{8} = y\sqrt{2}$. Now $\sqrt{8} = \sqrt{4 \times 2} = \sqrt{2 \times 2 \times 2} = 2\sqrt{2}$. Hence $y = 2$

(e)

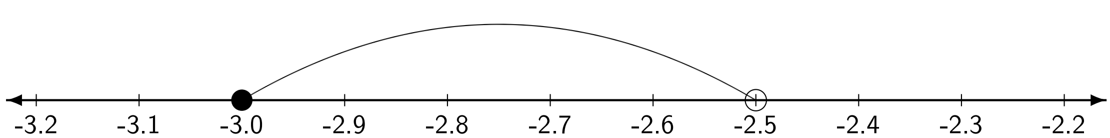
$$\begin{aligned} \left(\sqrt{6}+\sqrt{7}\right)\sqrt{6} &= \sqrt{6}\times\sqrt{6} + \sqrt{6}\times\sqrt{7} \\ &= \sqrt{6\times 6} + \sqrt{6\times 7} \\ &= 6 + \sqrt{42} \end{aligned}$$

(f)

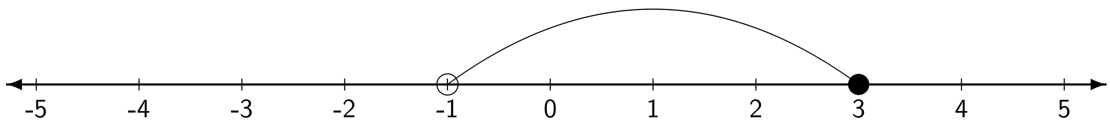
$$\begin{aligned} \left(\sqrt{6}+\sqrt{4}\right)\left(\sqrt{6}+\sqrt{6}\right) &= \sqrt{6}\times\sqrt{6} + \sqrt{6}\times\sqrt{6} + \sqrt{4}\times\sqrt{6} + \sqrt{4}\times\sqrt{6} \\ &= \sqrt{6\times 6} + \sqrt{6\times 6} + \sqrt{4\times 6} + \sqrt{4\times 6} \\ &= 6 + 6 + \sqrt{24} + \sqrt{24} \\ &= 6 + 6 + 2\sqrt{6} + 2\sqrt{6} \\ &= 12 + 4\sqrt{6} \end{aligned}$$

(g) $|-33| = 33$

(h) In interval form the answer is $[-3, -2.5)$ and on a real line the answer is:



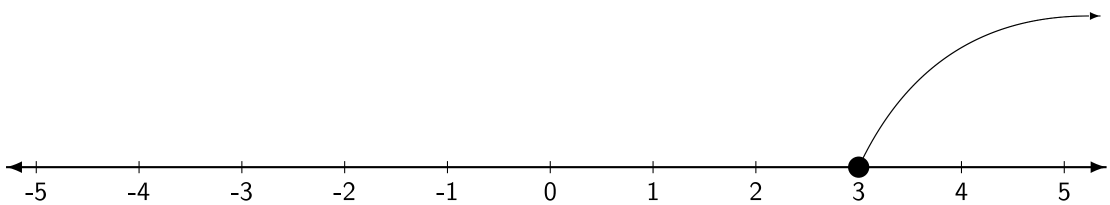
(i) In inequality form the answer is $-1 < x \leq 3$ and on a real line the answer is:



(j)

$$\begin{aligned} -2x - 3 &\leq 3x - 18 \\ -2x - 3 + 3 &\leq 3x - 18 + 3 \\ -2x &\leq 3x - 15 \\ -2x - 3x &\leq 3x - 3x - 15 \\ -5x &\leq -15 \\ -5x \div (-5) &\geq -15 \div (-5) \\ x &\geq 3 \end{aligned}$$

In interval format the answer is $[3, \infty)$, and on a real line the answer is:



3.

- Let the middle number be n. The number one less than n would be $n-1$, and the number one more than n would be $n+1$.

  If we square n we get n^2. When we multiply $n-1$ by $n+1$, we get $(n-1)(n+1) = n^2 + n - n - 1 = n^2 - 1$

  Hence the rule always works! Try it with three other consecutive numbers.

4. **(a)** **(i)** $n = 120$, so $t = \dfrac{120}{8} + 6 \Rightarrow t = 15 + 6 \Rightarrow t = 21°C$

(ii) $n = 0$, so $t = \dfrac{0}{8} + 6 \Rightarrow t = 0 + 6 \Rightarrow t = 6°C$

(b)$t = 30$, so $30 = \dfrac{n}{8} + 6$

$\Rightarrow 24 = \dfrac{n}{8}$

$\Rightarrow n = 192$. So, with 10 crickets in a bowl there are $10 \times 192 = 1920$ chirps per minute.