1. $|2y+5|=2$, so

$2y+5=2$	*or*	$2y+5=-2$
$2y=2-5$		$2y=-2-5$
$2y=-3$		$2y=-7$
$\frac{2y}{2}=\frac{-3}{2}$		$\frac{2y}{2}=\frac{-7}{2}$

Hence the solutions are: $y=-\frac{3}{2}$ and $y=-\frac{7}{2}$

2.

$$\begin{aligned} y^3x^{-2}x^3x^{-2}\times y^2\div x^2 &= y^3x^{-2}x^3x^{-2}\times y^2\times x^{-2} \\ &= x^{-2}x^3x^{-2}x^{-2}y^3y^2 \\ &= x^{-2+3-2-2}y^{3+2} \\ &= x^{-3}y^5 \end{aligned}$$

3. $\frac{15y^{-2}y^1}{y^3y^1}=\frac{15y^{-2+1}}{y^{3+1}}=\frac{15y^{-1}}{y^4}=15y^{-1-4}=15y^{-5}$

4. $3z\left(3+6z\right)=3\times 3z+6z\times 3z=9z+18z^2$

5. $\left(4+3x\right)\left(3+4x\right)=4\times 3+4\times 4x+3x\times 3+3x\times 4x=12+16x+9x+12x^2=12x^2+25x+12$

6. $-2=\frac{6x}{-3}-2$, so $-2x=-2+2$, so $-2x=0$

Hence solution is: $x=0$

7. $-3+\frac{-3}{5z}=5$, so $\frac{-3}{5z}=3+5$, so $\frac{-3}{5z}=8$, so $-3=8\times 5z$, so $-3=40z$, so $z=\frac{-3}{40}$

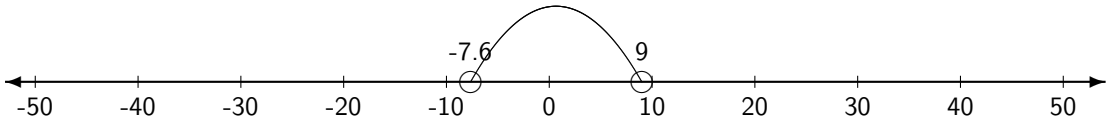
Hence solution is: $z=-\frac{3}{40}$

8.

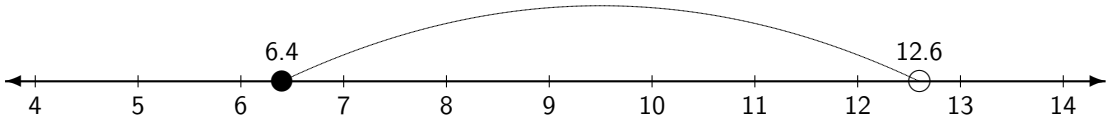
$$\begin{aligned} \frac{-15}{20}\div\frac{20}{-7} &= \frac{-15}{20}\times\frac{-7}{20} \\ &= \frac{\cancel{5}\times(-3)}{\cancel{5}\times 4}\times\frac{-7}{20} \\ &= \frac{-3}{4}\times\frac{-7}{20} \\ &= \frac{-3\times(-7)}{4\times 20} \\ &= \frac{21}{80} \end{aligned}$$

Hence solution is: $y=\frac{21}{80}$

9. In interval form the answer is $(-7.6, 9.0)$ and on a real line the answer is:



10. In inequality form the answer is $6.4 \leq x < 12.6$ and on a real line the answer is:



11. $-1 = 3z - 6$, so $-1 + 6 = 3z$, so $5 = 3z$, so $\frac{5}{3} = \frac{3z}{3}$

Hence $z = \frac{5}{3}$

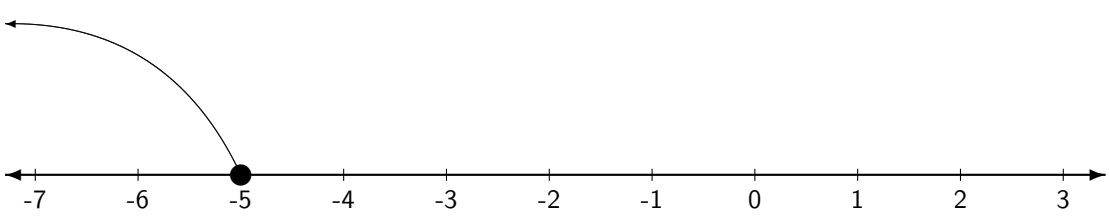
12. $-2z - 3 = 3$, so $-2z = 3 + 3$, so $-2z = 6$, so $\frac{-2z}{-2} = \frac{6}{-2}$

Hence $z = -3$

13.

$$\begin{aligned} -4x - 3 &\geq -3x + 2 \\ -4x - 3 + 3 &\geq -3x + 2 + 3 \\ -4x &\geq -3x + 5 \\ -4x + 3x &\geq -3x + 3x + 5 \\ -x &\geq 5 \\ -x \div (-1) &\leq 5 \div (-1) \\ x &\leq -5 \end{aligned}$$

In interval format the answer is $(\infty, -5]$, and on a real line the answer is:



14. $\sqrt{18z} = 9\sqrt{10}$, so $\sqrt{18z} = \sqrt{9 \times 9 \times 10} = \sqrt{810}$, so $18z = 810$. Hence $z = 45$

15. $\sqrt{108} = y\sqrt{3}$. Now $\sqrt{108} = \sqrt{36 \times 3} = \sqrt{6 \times 6 \times 3} = 6\sqrt{3}$. Hence $y = 6$

16.

$$\begin{aligned}\left(\sqrt{5} - \sqrt{3}\right)\sqrt{2} &= \sqrt{2} \times \sqrt{5} - \sqrt{2} \times \sqrt{3} \\ &= \sqrt{2 \times 5} - \sqrt{2 \times 3} \\ &= \sqrt{10} - \sqrt{6}\end{aligned}$$

17.

$$\begin{aligned}\left(\sqrt{8} - \sqrt{3}\right)\left(\sqrt{6} - \sqrt{6}\right) &= \left(\sqrt{8} - \sqrt{3}\right) \times 0 \\ &= 0\end{aligned}$$

18. Substituting for x into the equation gives $4 = -6z + 6$, so $-6z = 4 - 6$, so $-6z = -2$, so $\dfrac{-6z}{-6} = \dfrac{-2}{-6}$

Hence $z = \dfrac{1}{3}$

19. Mayumi ate x pieces of sushi. Rumi ate 4 more, so $x + 4$.
So, $x + x + 4 = 26$
$2x = 22$
$x = 11$

So Mayumi ate 11 pieces and Rumi ate $11 + 4 = 15$ pieces (check: $11 + 15 = 26$)

20. Let the first hospital have x doctors. The second hospital therefore has $3x - 20$ doctors.
So, $x + 3x - 20 = 204$
$4x = 224$
$x = 56$

So the first hospital has 56 doctors and the second hospital has $56 + 3 \times 56 - 20 = 148$. (check: $56 + 148 = 204$)

21. $((x + x^2) \div x - 16 - x) \div 3 = \left(\dfrac{x + x^2}{x} - 16 - x\right) \div 3$

$= \left(\dfrac{x(1 + x)}{x} - 16 - x\right) \div 3$

$= (1 + x - 16 - x) \div 3$

$= -15 \div 3$

$= -5$

The x's disappear, so regardless of what number x is the answer is always -5.