

Waterford Kamhlaba UWC: Mathematics Self-Diagnostic

FOR HIGHER LEVEL: be able to do these in your head

FOR STANDARD LEVEL: be able to do these with paper, pen and calculator

1. Solve $3 - x \geq 2$

2. Factorise $x^2 + 3x - 108$

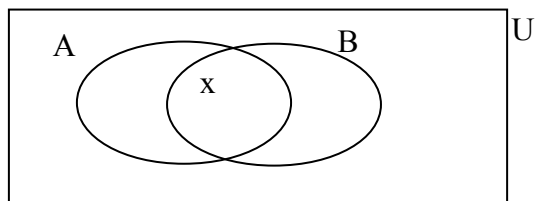
3. Solve for x and y:

$$2x + 3y = 9,$$

$$4x - 2y = 10$$

4. Calculate $1.3 \times 10^{-3} + 2.5 \times 10^{-4}$

5. Consider this Venn (set) diagram:



If $n(U)=50$, $n(A)=20$, $n(B)=29$ and $n((A \cup B)')=2$, calculate $x=n(A \cap B)$.

6. If $y \propto \frac{1}{x^2}$ and $y=1$ when $x=5$, find y when $x=10$.

7. A car has been reduced in price by 5% and is now selling for R 161 500. What was the original price?

8. Simplify to a single fraction:

$$\frac{1}{x-1} + \frac{1}{x+2}$$

9. Expand these brackets and simplify:

$$(x-1)(x^4 + x^3 + x^2 + x + 1)$$

10. Factorise $2x^2 + 7x - 15$

11. Write the equation of the straight line with

gradient $-\frac{4}{5}$ through $(-3,2)$.

12. Write the equation of the straight line parallel to $2x - 3y = 6$ passing through $(-5,2)$.

13. Simplify:

a. $(9x^{-2})^{\frac{1}{2}}$

b. $(3^{-2} + 4^{-2})^{-\frac{1}{2}}$

c. $\frac{2y^{\frac{2}{3}} - 4y^{-\frac{1}{3}}}{y^{-\frac{1}{3}}}$

14. Give the image coordinates of triangle A(3,6), B(7,6), C(7,1) after:

a. ABC rotated 90° clockwise centre (0,0)

b. ABC reflected in $x=0$

c. ABC reflected in $y=x$

d. ABC enlarged scale factor 3, centre (0,0)

15. Solve the equation

$$4(x-4)^{-2} = 36$$

16. Find the shortest side in a $30^\circ, 60^\circ, 90^\circ$ triangle whose hypotenuse is 15cm.

17. What is the probability of throwing **two** fair dice and getting a **total** which is

a. An even number

b. A prime number

c. A number that is even **and** prime

d. A number that is either even **or** prime (or both)?

18. What would be the coordinates of (1,2,3) when rotated 180° about the x-axis. The coordinate system is orientated as below:

