F Michaelmas Trial Practice 1

1. Calculate 239×7.2.

   $\boxed{1720.8}$

2. Calculate $\frac{1}{2} + \frac{2}{5} \times 2\frac{1}{4}$.

   $\boxed{\frac{7}{5}}$

3. $P = 2^{10} \times 3^2 \times 7^3$
   $Q = 2^8 \times 3^6 \times 5^2$.

   (a) Write (as a product of primes) the HCF of P and Q.

   $\boxed{\text{HCF} = 2^8 \times 3^2}$

   (b) Write (as a product of primes) the LCM of P and Q.

   $\boxed{\text{LCM} = 2^{10} \times 3^6 \times 5^2 \times 7^3}$

4. Expand and simplify $(2x - 3)^3$.

   $\boxed{8x^3 - 36x^2 + 54x - 27}$

5. Solve the following for x.

   (a) $\dfrac{4}{2x - 3} = 8$.

   $\boxed{x = \frac{7}{4}}$

   (b) $a(x - b) = b(x + c)$.

   $\boxed{x = \frac{ab + bc}{a - b}}$

   (c) $(x - 3)(x + 4) = (x - 1)(x + 10)$.

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

   (d) $3 \times \dfrac{1}{9^{x-2}} = \dfrac{27^x}{3^{2-x}}$.

   $\boxed{x = \frac{7}{6}}$

   (e) $\dfrac{x - 3}{2} - \dfrac{4 - 3x}{4} = 3x - \dfrac{x - 1}{2}$.

   $\boxed{x = -\frac{12}{5}}$

6. In a building 50 people were asked as to whether they enjoyed rugby and/or football. 27 liked rugby. 25 liked football. 5 liked neither. How many liked rugby but not football? $\boxed{20}$

7. Solve the following simultaneous equations for x and y.

   (a) $2x + 3y = 10$
       $4x - 2y = -4$.

   $\boxed{(x, y) = (\frac{1}{2}, 3)}$

   (b) $0.4x + 0.8y = 1$
       $0.2x + 0.6y = 2$.

   $\boxed{(x, y) = (-\frac{25}{2}, \frac{15}{2})}$

   (c) $x + ay = 1$
       $2x + 3y = -1$. [Express answers as single fractions.]

   $\boxed{(x, y) = \left(-\frac{a+3}{2a-3}, \frac{3}{2a-3}\right)}$

8. A Venn diagram has three sets A, B and C. $A \cap B = \emptyset$. $C \subset A$. Draw the Venn diagram.

   $\boxed{\text{A and B not overlapping. C entirely within A}}$

9. Prove the result that the angle subtended in a semi circle is $90°$.

10. Draw a Venn diagram with three overlapping sets A, B and C, which overlap in the normal way. Shade the region $A' \cap (B \cup C)'$. $\boxed{\text{Everything outside the three circles}}$

11. What is the smallest integer that 288 must be multiplied by to make it a perfect cube? $\boxed{6}$

12. If Adriana can paint the fence in 7 minutes and Cindy can paint the same fence in 2 minutes, how long will it take them working together? $\boxed{\frac{14}{9} \text{ minutes}}$

13. If x Etonians can annoy y beaks in z days, how long will it take a Etonians to annoy b beaks?
    $\boxed{\frac{bxz}{ay} \text{ days}}$