F Michaelmas Trial Practice 4

1. Find the following:

   (a) $4781 + 349$. $\boxed{5130}$

   (b) $20356 - 1497$. $\boxed{18859}$

   (c) $517 - 2 \times 48$. $\boxed{421}$

   (d) 49×31. $\boxed{1519}$

2. Expand and simplify:

   (a) $21x(3x - 2)$. $\boxed{63x^2 - 42x}$

   (b) $2x^2y(y - x^2)$. $\boxed{2x^2y^2 - 2x^4y}$

   (c) $(x - 3)(x + 6)$. $\boxed{x^2 + 3x - 18}$

   (d) $(2x - 7)(4x + 3)$. $\boxed{8x^2 - 22x - 21}$

   (e) $(3x - 4)^2$. $\boxed{9x^2 - 24x + 16}$

   (f) $(x - 1)(x - 3)(x + 4)$. $\boxed{x^3 - 13x + 12}$

   (g) $(x + 2)^3$. $\boxed{x^3 + 6x^2 + 12x + 8}$

3. Solve the following for x

   (a) $5 + 3x = 18$. $\boxed{x = \frac{13}{3} = 4\frac{1}{3}}$

   (b) $2 - 3(x - 4) = 5(x + 6)$. $\boxed{x = -2}$

   (c) $a(x - 2) = 4(x + 5)$. $\boxed{x = \frac{2a+20}{a-4}}$

   (d) $-5 = \frac{-2}{3x+4}$. $\boxed{x = -\frac{6}{5}}$

   (e) $\frac{3}{x-5} = \frac{7}{x+1}$. $\boxed{x = \frac{19}{2}}$

   (f) $\frac{x+1}{3} - 2x + 1 = x - \frac{2-3x}{4}$. $\boxed{x = -\frac{2}{41}}$

4. Simplify the following expressions:

   (a) $\frac{(a^3)^3 \times a^2}{a \times a^{-3}}$. $\boxed{a^{13}}$

   (b) $abc \times (ab^3c^2)^4$. $\boxed{a^5b^{13}c^9}$

5. If $a = 4.6$ and $b = 3.1$ to two significant figures, find

   (a) the upper bound for a. $\boxed{4.65}$

   (b) the lower bound for $2b + a$. $\boxed{10.65}$

   (c) the upper bound for $b - 3a$. $\boxed{-10.5}$

6. (a) Solve the simultaneous equations $\begin{matrix} 3x+4y=1 \\ 2x-5y=2 \end{matrix}$. $\boxed{(x, y) = \left(\frac{13}{23}, -\frac{4}{23}\right)}$

   (b) Solve the simultaneous equations $\begin{matrix} x+5y=-1 \\ 2x+3y=1 \end{matrix}$. $\boxed{(x, y) = \left(\frac{8}{7}, -\frac{3}{7}\right)}$

7. Find the values of x

   (a) $25^x = \frac{1}{125^{2x-1}}$. $\boxed{x = \frac{3}{8}}$

   (b) $\frac{2^x}{8^{1-x}} = 4^{7x-1}$. $\boxed{x = -\frac{1}{10}}$

8. Solve the following inequalities:

(a) $2 - 3x \leqslant 4(x - 2)$. $\boxed{x \geqslant \frac{10}{7}}$

(b) $43 \leqslant 2x + 3 < 77$. $\boxed{20 \leqslant x < 37}$

9. (a) B

10. (a) B

11. (a) B

12. (a) B

13. (a) B

14. (a) B