Routine Algebra Test #3

1. Simplify fully: $\frac{1}{2}x^4 \times 6x$

2. Simplify fully: $2x^2 - 4x + 6x^2 - 2x$

3. Simplify fully: $\frac{9x^2}{3x^2}$

4. Simplify fully: $\frac{18k}{6k^3}$

5. Expand and simplify: $4(x + 4) - 2(x + 5)$

6. Expand and simplify: $5x(x + y)$

7. Expand and simplify: $(x - 1)(x + 1)$

8. Expand and simplify: $(x + 3)^2$

9. Factorise fully: $6x + 18$

10. Factorise fully: $x^2y - xy$

11. Factorise fully: $x^2 + 11x + 30$

12. Factorise fully: $x^2 + 3x - 28$

13. Solve: $2x + 10 = 15$

14. Solve: $8x + 12 = 5$

15. Solve: $2x + 16 = 5x - 2$

16. Solve: $4x + 5 = 9x - 12$

17. Solve: $\frac{1}{3}(x + 1) = 4.1$

18. Solve: $\frac{2x + 4}{7} = 11$

19. Calculate E $= 5xy$ when $x = 3$ and $y = {}^-2$

20. Calculate F $= \frac{-x}{x - 8}$ when $x = 4$

Answers: Routine Algebra Test #3

1. $\frac{1}{2}x^4 \times 6x$ $= \frac{1}{2} \times 6 \times x^4 \times x$ $= 3x^5$

2. $2x^2 - 4x + 6x^2 - 2x$ $= 8x^2 - 6x$

3. $\frac{9x^2}{3x^2}$ $= \frac{\cancel{3x^2} \times 3}{\cancel{3x^2} \times 1}$ $= 3$

4. $\frac{18k}{6k^3}$ $= \frac{\cancel{6k} \times 3}{\cancel{6k} \times k^3}$ $= \frac{3}{k^2}$ (or $3k^{-2}$)

5. $4(x + 4) - 2(x + 5) = 4x + 16 - 2x - 10$ $= 2x + 6$

6. $5x(x + y)$ $= 5x \times x + 5x \times y$ $= 5x^2 + 5xy$

7. $(x - 1)(x + 1)$ $= x^2 + 1x - 1x - 1$ $= x^2 - 1$ (or $x^2 + {}^-1$)

8. $(x + 3)^2$ $= (x + 3)(x + 3)$ $= x^2 + 3x + 3x + 9$ $= x^2 + 6x + 9$ (any order)

9. $6x + 18$ $= 6 \times x + 6 \times 3$ $= 6(x + 3)$

10. $x^2y - xy$ $= xy \times x - xy \times 1$ $= xy(x - 1)$ (no alternative)

11. $x^2 + 11x + 30$ $30 = 30 \times 1, 10 \times 3$ or 6×5 $= (x + 6)(x + 5)$ or $(x + 5)(x + 6)$

12. $x^2 + 3x - 28$ $^-35 = {}^-28 \times 1, {}^-14 \times 2, {}^-7 \times 4$ etc $= (x + 7)(x - 4)$ or $(x - 4)(x + 7)$

13. $2x + 10 = 15$ $2x \cancel{+10}_{-10} = 15 - 10$ $x = \frac{5}{2} = 2.5$

14. $8x + 12 = 5$ $8x \cancel{+12}_{-12} = 5 - 12$ $x = \frac{-7}{8} = {}^-0.875$

15. $2x + 16 = 5x - 2$ $\cancel{2x}_{-2x} + 16 + 2 = 5x - 2x \cancel{-2}_{+2}$ $x = \frac{18}{3}$ $x = 6$

16. $4x + 5 = 9x - 12$ $\cancel{4x}_{-4x} + 5 + 12 = 9x - 4x \cancel{-12}_{+12}$ $x = \frac{17}{5} = 3.4$

17. $\frac{1}{3}(x + 1) = 4.1$ $3 \times \frac{1}{3}(x + 1) = 3 \times 4.1$ $x + 1 = 12.3$ $x = 11.3$

18. $\frac{2x + 4}{7} = 11$ $2x + 4 = 7 \times 11$ $2x = 77 - 4$ $x = \frac{73}{2} = 36.5$

19. $E = 5xy$ if $x = 3$ and $y = {}^-2$ $= 5 \times 3 \times {}^-2$ $\Rightarrow E = {}^-30$

20. $F = \frac{-x}{x - 8}$ if $x = 4$ $= \frac{-4}{4 - 8}$ $= \frac{-4}{-4}$ $\Rightarrow F = 1$