Harder Algebra Test #2

1. Simplify: $\dfrac{k}{2} \times \dfrac{k}{2}$

2. Simplify: $(5x^3)^2$

3. Simplify: $\dfrac{9ef}{12e}$

4. Simplify: $\dfrac{6xy^3}{18x^5y}$

5. Expand and simplify: $2x(y - 1)$

6. Expand and simplify: $3(a + 2b) + 5(a - 2b)$

7. Expand and simplify: $(k + 2)(k - 3)$

8. Expand and simplify: $(2x + 1)(2x + 5)$

9. Factorise fully: $12x + 16$

10. Factorise fully: $2xy + 4x^2y$

11. Factorise fully: $x^2 + 2x - 8$

12. Factorise fully: $x^2 - 5x + 6$

13. Solve: $10x + 17 > 8x$

14. Solve: $114 \leq 62 - 8x$

15. Solve: $2x - 13 = 7x - 34$

16. Solve: $\dfrac{2x + 3}{2} = 8$

17. Solve: $x^2 - 7x + 12 = 0$

18. Solve: $6x - 8 = x^2$

19. Solve: $\dfrac{3}{x - 4} = 8$

20. Solve: $\dfrac{2}{5x} = 3$

Answers: Harder Algebra Test #2

1. $\dfrac{k}{2} \times \dfrac{k}{2}$ $\qquad = \dfrac{k \times k}{2 \times 2}$ $\qquad = \dfrac{k^2}{4}$ or $\dfrac{1}{4}k^2$

2. $(5x^3)^2$ $\qquad = 5x^3 \times 5x^3$ $\qquad = 25x^6$

3. $\dfrac{9ef}{12e}$ $\qquad = \dfrac{\cancel{3e} \times 3f}{\cancel{3e} \times 4}$ $\qquad = \dfrac{3f}{4}$ or $\dfrac{3}{4}f$

4. $\dfrac{6xy^3}{18x^5y}$ $\qquad = \dfrac{\cancel{6xy} \times y^2}{\cancel{6xy} \times 3x^4}$ $\qquad = \dfrac{y^2}{3x^4}$ or $\dfrac{1}{3}x^{-4}y^2$

5. $2x(y - 1)$ $\qquad = 2x \times y + 2x \times {}^-1$ $\qquad = 2xy - 2x$ or $2xy + {}^-2x$

6. $3(a + 2b) + 5(a - 2b) = 3a + 6b + 5a - 10b$ $\qquad = 8a - 4b$ or $8a + {}^-4b$

7. $(k + 2)(k - 3)$ $\qquad = k^2 - 3k + 2k - 6$ $\qquad = k^2 - k - 6$ or $k^2 + {}^-k + {}^-6$

8. $(2x + 1)(2x + 5)$ $\qquad = 4x^2 + 10x + 2x + 5$ $\qquad = 4x^2 + 12x + 5$

9. $12x + 16$ $\qquad = 4 \times 3x + 4 \times 4$ $\qquad = 4(3x + 4)$ *no alternative*

10. $2xy + 4x^2y$ $\qquad = 2xy \times 1 + 2xy \times 2x$ $\qquad = 2xy(1 + 2x)$ or $2xy(2x + 1)$

11. $x^2 + 2x - 8$ $\qquad {}^-2 \times 4 = {}^-8, \ {}^-2 + 4 = 2 \ ...$ $\qquad = (x + 4)(x - 2)$ or $(x - 2)(x + 4)$

12. $x^2 - 5x + 6$ $\qquad {}^-2 \times {}^-3 = {}^+6, \ {}^-2 + {}^-3 = {}^-5$ $\qquad = (x - 2)(x - 3)$ or $(x - 3)(x - 2)$

13. $10x + 17 > 8x$ $\qquad 10x - 8x + \cancel{17}_{-17} > \cancel{8x}_{-8x} + {}^-17$ $\qquad x > {}^-8.5$

14. $114 \le 62 - 8x$ $\qquad 114 \, \cancel{-}_{-114} + 8x \le 62 - 114 + \cancel{{}^-8x}_{+8x}$ $\qquad x \le {}^-6.5$

15. $2x - 13 = 7x - 34$ $\qquad \cancel{2x}_{-2x} + {}^-13 + 34 = 7x - 2x \, \cancel{-34}_{+34}$ $\qquad x = \dfrac{21}{5} = 4.2$

16. $\dfrac{2x + 3}{2} = 8$ $\qquad 2x + 3 = 8 \times 2$ $\qquad 2x = 16 - 3$ $\qquad x = \dfrac{13}{2} = 6.5$

17. $x^2 - 7x + 12 = 0$ $\qquad (x - 4)(x - 3) = 0$ $\qquad x = 4$ or $x = 3$

18. $6x - 8 = x^2$ $\qquad x^2 - 6x + 8 = 0$ $\qquad (x - 4)(x - 2) = 0$ $\quad x = 4$ or $x = 2$

19. $\dfrac{3}{x - 4} = 8$ $\qquad 3 = 8(x - 4)$ $\qquad 3 = 8x - 32$ $\qquad x = \dfrac{35}{8} = 4.375$

20. $\dfrac{2}{5x} = 3$ $\qquad 2 = 3 \times 5x$ $\qquad 15x = 2$ $\qquad x = \dfrac{2}{15} = 0.13333$