

Harder Algebra Test #3

1. Simplify to one fraction: $\frac{k}{2} + 3$
2. Simplify: $(4x^2y)^3$
3. Simplify: $\frac{8x^2y}{40xy}$
4. Simplify: $\frac{24xy}{18x^2y}$
5. Expand and simplify: $5x(x + \frac{1}{2})$
6. Expand and simplify: $3(a + 4) - 5(a - 7)$
7. Expand and simplify: $(5x + 2)(x - 3)$
8. Expand and simplify: $(2x - 1)^2$
9. Factorise fully: $12x^2 + 18x$
10. Factorise fully: $a^2b + 7ab$
11. Factorise fully: $x^2 - 3x - 40$
12. Factorise fully: $x^2 - 9$
13. Solve: $4x + 7 \leq 8x$
14. Solve: $2 - 3x > 11$
15. Solve: $7x - 3 = 15x - 14$
16. Solve: $\frac{1.8}{x} = 12$
17. Solve: $x^2 - 3x - 18 = 0$
18. Solve: $10x = x^2 + 21$
19. Solve: $\frac{7}{x+2} = 3$
20. Solve: $\frac{2x+8}{x} = x$

Answers: Harder Algebra Test #3

1. $\frac{k}{2} + 3 = \frac{k}{2} + \frac{6}{2} = \frac{k+6}{2}$
2. $(4x^2y)^3 = 4x^2y \times 4x^2y \times 4x^2y = 64x^6y^3$
3. $\frac{8x^2y}{40xy} = \frac{\cancel{8xy} \times x}{\cancel{8xy} \times 5} = \frac{x}{5}$ or $\frac{1}{5}x$
4. $\frac{24xy}{18x^2y} = \frac{\cancel{6xy} \times 4}{\cancel{6xy} \times 3x} = \frac{4}{3x}$ or $\frac{4}{3}x^{-1}$
5. $5x(x + \frac{1}{2}) = 5x \times x + 5x \times \frac{1}{2} = 5x^2 + 2.5x$
6. $3(a + 4) - 5(a - 7) = 3a + 12 - 5a + 35 = -2a + 47$ or $47 - 2a$
7. $(5x + 2)(x - 3) = 5x^2 - 15x + 2x - 6 = 5x^2 - 13x - 6$ or $5x^2 + -13x + -6$
8. $(2x - 1)^2 = (2x - 1)(2x - 1) = 4x^2 - 2x - 2x + 1 = 4x^2 - 4x + 1$ or $4x^2 + -4x + 1$
9. $12x^2 + 18x = 6x \times 2x + 6x \times 3 = 6x(2x + 3)$ *no alternative*
10. $a^2b + 7ab = ab \times a + ab \times 7 = ab(a + 7)$ *no alternative*
11. $x^2 - 3x - 40 = -8 \times 5 = -40, -8 + 5 = -3 = (x + 5)(x - 8)$ or $(x - 8)(x + 5)$
12. $x^2 - 9 = 3 \times -3 = -9, 3 + -3 = 0 = (x - 3)(x + 3)$ or $(x + 3)(x - 3)$
13. $4x + 7 \leq 8x = 7 \leq 8x - 4x = \frac{7}{4} \leq x = x \geq 1.75$
14. $2 - 3x > 11 = 2 - 11 = -3x + 3x > 11 - 11 + 3x = -9 > 3x = x < -3$
15. $7x - 3 = 15x - 14 = 7x - 7x + -3 + 14 = 15x - 7x - 14 + 14 = x = \frac{11}{8} = 1.375$
16. $\frac{1.8}{x} = 12 = 1.8 = 12 \times x = x = \frac{1.8}{12} = x = 0.15$
17. $x^2 - 3x - 18 = 0 = (x + 3)(x - 6) = 0 = x = -3$ or $x = 6$
18. $10x = x^2 + 21 = x^2 - 10x + 21 = 0 = (x - 7)(x - 3) = 0 = x = 7$ or $x = 3$
19. $\frac{7}{x+2} = 3 = 7 = 3(x + 2) = 7 = 3x + 6 = x = \frac{1}{3} = 0.3333$
20. $\frac{2x+8}{x} = x = 2x + 8 = x^2 = x^2 - 2x - 8 = 0 = (x - 4)(x + 2) = 0 = x = -2$ or $x = 4$