

Harder Algebra Test #1

1. Simplify: $12e^3 \times \frac{e}{4}$
2. Simplify: $(3xy)^3$
3. Simplify: $\frac{e^2f}{ef^2}$
4. Simplify: $\frac{6x^3}{4x^5}$
5. Expand and simplify: $3x(x - 2)$
6. Expand and simplify: $3(x + 3) - 5(x - 2)$
7. Expand and simplify: $(x - 2)(x - 5)$
8. Expand and simplify: $(x - 3)(2x + 1)$
9. Factorise fully: $8x + 4$
10. Factorise fully: $8x^3 + 4x^2y$
11. Factorise fully: $x^2 + 14x + 40$
12. Factorise fully: $x^2 - 2x - 15$
13. Solve: $4 < 2 - 3x$
14. Solve: $8x + 23 < 3x$
15. Solve: $5x - 11 = 3x - 24$
16. Solve: $\frac{5}{x+2} = 3$
17. Solve: $x^2 + 5x + 6 = 0$
18. Solve: $x^2 = 3x + 4$
19. Solve: $\frac{x}{2} + \frac{x}{5} = 3$
20. Solve: $\frac{2-x}{5} = -3$

Answers: Harder Algebra Test #1

1. $12e^3 \times \frac{e}{4} = 12 \times \frac{1}{4} \times e^3 \times e = 3e^4$
2. $(3xy)^3 = 3xy \times 3xy \times 3xy = 27x^3y^3$
3. $\frac{e^2f}{ef^2} = \frac{ef \times e}{ef \times f} = \frac{e}{f}$ or ef^{-1}
4. $\frac{6x^3}{4x^5} = \frac{\cancel{2x^3} \times 3}{\cancel{2x^3} \times 2x^2} = \frac{3}{2x^2}$ or $1.5x^{-2}$
5. $3x(x-2) = 3x \times x + 3x \times -2 = 3x^2 - 6x$ or $3x^2 + -6x$
6. $3(x+3) - 5(x-2) = 3x + 9 - 5x + 10 = -2x + 19$
7. $(x-2)(x-5) = x^2 - 5x - 2x + 10 = x^2 - 7x + 10$
8. $(x-3)(2x+1) = 2x^2 + 1x - 6x - 3 = 2x^2 - 5x - 3$
9. $8x + 4 = 4 \times 2x + 4 \times 1 = 4(2x + 1)$ *no alternative*
10. $8x^3 + 4x^2y = 2x^2 \times 4x + 4x^2 \times y = 4x^2(2x + y)$ *no alternative*
11. $x^2 + 14x + 40 = 10 \times 4 = 40. 10 + 4 = 14 = (x+4)(x+10)$ or *vice versa*
12. $x^2 - 2x - 15 = 3 \times -5 = -15, 3 + -5 = -2 = (x-5)(x+3)$ or $(x+3)(x-5)$
13. $4 < 2 - 3x = 4 - 2 < \cancel{2} - \cancel{2} + -3x = 2 < -3x = \frac{-2}{3} > x$ or $x < -0.6667$ etc
14. $8x + 23 < 3x = 8x - 3x + \cancel{23} - \cancel{23} < \cancel{3x} - \cancel{3x} + -23 = x < -4.6$
15. $5x - 11 = 3x - 24 = 5x - 3x - \cancel{11} + \cancel{11} = \cancel{3x} - \cancel{3x} - 24 + 11 = x = \frac{-13}{2} = -6.5$
16. $\frac{5}{x+2} = 3 = 5 = 3(x+2) = 5 = 3x + 6 = x = \frac{-1}{3} = -0.3333$
17. $x^2 + 5x + 6 = 0 = (x+2)(x+3) = 0 = x = -2$ or $x = -3$
18. $x^2 = 3x + 4 = x^2 - 3x - 4 = 0 = (x-4)(x+1) = 0 = x = 4$ or $x = -1$
19. $\frac{x}{2} + \frac{x}{5} = 3 = \frac{5x}{10} + \frac{2x}{10} = 3 = \frac{7x}{10} = 3 = x = \frac{30}{7} = 4.2857$
20. $\frac{2-x}{5} = -3 = 2-x = -3 \times 5 = -x = -15 - 2 = x = 17$