Name: **Class/Set:**

Demo Algebra Questions

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Please write your answers on this worksheet, showing all necessary working.

1: Simplify the following:

a) $m^8 \div m^7$

_____

b) $\frac{n \times n}{n}$

_____

c) $w \times w \times w \times w \times w$

_____

d) $p^3 \times p^9$

_____

2: Simplify the following:

a) $(3b^9t)^3$

_____

b) $2r^6g^8 \times 3r^{10}g^5$

_____

c) $\frac{10z^7j^{11}}{5z^5j^{10}}$

_____

d) $4e^5v^2 \times 5e^5v^7$

_____

3: Simplify the following:

a) $10y + 9 + 10y + 8$

_____

b) $5s - 3x + 8 - 6s - 7x + 10$

_____

c) $5q - 6a + 9q + 4a$

_____

d) $-f + 3f$

_____

4: Multiply out and simplify the following:

a) $5k(7k - 10)$

_____

b) $-(4u - 7) + 7(-6u + 7)$

_____

c) $8(h - 1)$

_____

d) $-3(2c + 1)$

_____

5: Factorise the following:

a) $63n^2 - 70n$

_____

b) $-4g - 2$

_____

c) $72p - 81$

_____

d) $27w^2 + 3wj$

_____

6: Multiply out and simplify the following:

a) $(t + 7)(t + 8)$

_____

b) $(q - 7)(q - 10)$

_____

c) $(r - 1)(r + 1)$

_____

d) $(y + 3)(y - 8)$

_____

7: Factorise the following:

a) $a^2 + 10a + 9$ b) $z^2 - z$ c) $b^2 - 4$ d) $k^2 + 4k - 45$

_____ _____ _____ _____

8: Factorise the following:

a) $36x^2 + 5x - 1$ b) $25u^2 - 10u + 1$

_____ _____

9: Simplify the following as far as possible:

a) $\frac{3f + 9}{6f}$ b) $\frac{6s - 4}{6s + 2}$

_____ _____

10: Simplify the following as far as possible:

a) $\frac{e^2 + e}{2e^2 + e}$ b) $\frac{20h^2 - 60h}{8h}$

_____ _____

11: Simplify the following as far as possible:

a) $\frac{m^2 - 9}{m^2 + 8m + 15}$

b) $\frac{v^2 - 25}{v + 5}$

_____ _____

12: Simplify the following as far as possible:

a) $\frac{c - 4}{2} - \frac{c}{4}$

b) $\frac{z + 2}{2} - \frac{9z}{10}$

_____ _____

13: Simplify the following as far as possible:

a) $\frac{3}{3g + 2} + \frac{5}{3g - 1}$

b) $\frac{1}{2a - 1} + \frac{4}{a + 4}$

_____ _____

14: Simplify the following as far as possible:

a) $\frac{5}{14r+21} \times \frac{8r+12}{7}$

b) $\frac{5n-10}{9n} \div \frac{5n-10}{4n}$

15: Simplify the following as far as possible:

a) $\frac{j^2+3j+2}{9} \div \frac{j^2+6j+8}{2}$

b) $\frac{f^2-3f-4}{5} \times \frac{2}{f^2+4f+3}$

16: Work out the following:

a) $6w + 4x$ when $w = -3$ and $x = 5$.

b) $7k - p$ when $k = 8$ and $p = -5$.

17: Rearrange to make x the subject:

a) $y = \sqrt{\left(\frac{x}{4}\right)} + 4$

b) $y = \sqrt{(9x + 6)}$

18: Rearrange to make x the subject:

a) $y = \frac{1 - 10x}{7x}$

b) $y = \frac{-7x + 4}{4x - 3}$

19: Solve the following:

a) $9 - \frac{s}{4} = 3$

b) $\frac{v - 49}{5} = -10$

20: Solve the following:

a) $-2t = -4t - 18$

_____

b) $-b + 3 = b + 17$

_____

21: Solve the following:

a) y is inversely proportional to q^2. If $y = 9$ when $q = 4$, find y when $q = 5$

_____

b) $h \propto c^3$. If $h = 686$ when $c = 7$, find h when $c = 6$

_____

22: Solve the following:

a) $-9m + 8e = 114$
$3m + 6e = -12$

_____

b) $u + a = 7$
$4u + 7a = 46$

_____

23: Solve using the quadratic formula, giving your answer in simplified surd form:

a) $x^2 - 9x - 2 = 0$

b) $j^2 + 10j + 4 = 0$

24: Solve the following simultaneous equations:

a) $s = y^2 + y - 2$
$s = 5y + 3$

b) $f = t^2 + 5t + 19$
$f = -4t - 1$

25: Solve the following inequalities:

a) $2x^2 - 4 > 46$

b) $3x^2 + 11 < 23$

Answers: Demo Algebra Questions

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1:	a) m	b) n	c) w^5	d) p^{12}
2:	a) $27b^{27}t^3$	b) $6r^{16}g^{13}$	c) $2z^2j$	d) $20e^{10}v^9$
3:	a) $20y + 17$	b) $-s - 10x + 18$	c) $14q - 2a$	d) $2f$
4:	a) $35k^2 - 50k$	b) $-46u + 56$	c) $8h - 8$	d) $-6c - 3$
5:	a) $7n(9n - 10)$	b) $-2(2g + 1)$	c) $9(8p - 9)$	d) $3w(9w + j)$
6:	a) $t^2 + 15t + 56$	b) $q^2 - 17q + 70$	c) $r^2 - 1$	d) $y^2 - 5y - 24$
7:	a) $(a + 1)(a + 9)$	b) $z(z - 1)$	c) $(b + 2)(b - 2)$	d) $(k - 5)(k + 9)$
8:	a) $(4x + 1)(9x - 1)$		b) $(5u - 1)(5u - 1)$	
9:	a) $\frac{f + 3}{2f}$		b) $\frac{3s - 2}{3s + 1}$	
10:	a) $\frac{e + 1}{2e + 1}$		b) $\frac{5(h - 3)}{2}$	
11:	a) $\frac{m - 3}{m + 5}$		b) $v - 5$	

12: a) $\frac{2c - 8}{4} - \frac{c}{4} = \frac{c - 8}{4}$

b) $\frac{5z + 10}{10} - \frac{9z}{10} = \frac{-4z + 10}{10} = \frac{-2(2z - 5)}{10} = \frac{-(2z - 5)}{5}$

13: a) $\frac{9g - 3}{(3g + 2)(3g - 1)} + \frac{15g + 10}{(3g - 1)(3g + 2)} = \frac{24g + 7}{(3g + 2)(3g - 1)}$

b) $\frac{a + 4}{(2a - 1)(a + 4)} + \frac{8a - 4}{(a + 4)(2a - 1)} = \frac{9a}{(2a - 1)(a + 4)}$

14: a) $\frac{5}{7(2r + 3)} \times \frac{4(2r + 3)}{7} = \frac{20(2r + 3)}{49(2r + 3)} = \frac{20}{49}$

b) $\frac{5(n - 2)}{9n} \times \frac{4n}{5(n - 2)} = \frac{20n(n - 2)}{45n(n - 2)} = \frac{4}{9}$

15: a) $\frac{(j + 1)(j + 2)}{9} \times \frac{2}{(j + 2)(j + 4)} = \frac{2(j + 1)(j + 2)}{9(j + 2)(j + 4)} = \frac{2(j + 1)}{9(j + 4)}$

b) $\frac{(f - 4)(f + 1)}{5} \times \frac{2}{(f + 1)(f + 3)} = \frac{2(f - 4)(f + 1)}{5(f + 1)(f + 3)} = \frac{2(f - 4)}{5(f + 3)}$

16:	a) 2	b) 61

17: a) $x = 4(y-4)^2$	b) $x = \frac{y^2-6}{9}$
18: a) $x = \frac{1}{10+7y}$	b) $x = \frac{3y+4}{4y+7}$
19: a) $s = 24$	b) $v = -1$
20: a) $t = -9$	b) $b = -7$
21: a) $5\frac{19}{25}$	b) 432
22: a) $m = -10$, $e = 3$	b) $u = 1$, $a = 6$
23: a) $x = 4\frac{1}{2} \pm \frac{1}{2}\sqrt{89}$	b) $j = -5 \pm \sqrt{21}$
24: a) $y = -1$ and $s = -2$ $y = 5$ and $s = 28$	b) $t = -5$ and $f = 19$ $t = -4$ and $f = 15$
25: a) $x < -5$ or $x > 5$	b) $-2 < x < 2$