

Algebraic Manipulation answers

Note: this sheet mostly only gives final answers, not the full working you should have shown. If your answers don't match these, please check with your teacher.

1. Simplify:

a. $4a + 7a = 11a$

b. $11b - 5 \cdot 5b = 5 \cdot 5b$

c. $\frac{c}{2} + 5 - 2c = 5 - \frac{3c}{2}$

d. $\frac{d}{2} + \frac{d}{4} - \frac{3d}{8} = \frac{3d}{8}$

e. $2 \cdot 5(6 - 4e) = 15 - 10e$

f. $\frac{22 - 8f}{4} + 2f = \frac{11}{2}$

2. Solve:

a. $a = 11$

b. $b = 6$

c. $c = 9 \cdot 2$

d. $d = 16$

e. $e = 0 \cdot 02$

f. $f = \frac{11}{9}$

g. $g = \frac{24}{19}$

h. $h = 10$

i. $k = \frac{2}{3}$

j. $m = 7 \cdot 6339$

3. Rewrite the following in the form $y =$ something.

a. $y = 21 + 1 = 22$

b. $y = 21 + 4 = 25$

c. $y = 21 + 121 \cdot 7 = 142 \cdot 7$

d. $y = 21 + x$

e. $y = 21 + 6x$

f. $y = 39 \cdot 2 + 1 \cdot 1x$

g. $y = 21 - 1 = 20$

h. $y = 21 - 4 = 17$

i. $y = 21 - 121 \cdot 7 = -100 \cdot 7$

j. $y = 21 - x$

k. $y = 21 - 6x$

l.

$$y = 21 - 5x + 11 = 32 - 5x$$

m. $y = -1 - 11x$

4. Rewrite the following in the form $y =$ something.

a. $y = \frac{21}{2}$

b. $y = \frac{21}{3} = 7$

c. $y = \frac{21}{7} = 3$

d. $y = \frac{21 - 3}{2} = 9$

e. $y = \frac{21 + 7}{4} = 7$

f. $y = \frac{21 - 2x}{3}$

g. $y = \frac{21 + x}{5}$

h. $y = \frac{20 - 16x}{4} = 5 - 4x$

i. $y = \frac{21}{3} - 4 = 3$

j. $y = \frac{21}{7} + 6 = 9$

k. $y = 111.5333$

l. $y = \frac{21 - 3x}{11} - 6 = \frac{-45 - 3x}{11}$

m. $y = \frac{21}{7} - x = 3 - x$

n. $y = \frac{21}{7} - x - 1 = 2 - x$

o. $y = \frac{21 - 1}{7} - x = \frac{20}{7} - x$

5. Rewrite the following in the form $y =$ something.

a. $y = 21 \times 3 = 62$

b. $y = 21 \times 5 = 105$

c. $y = (21 - 1) \times 5 = 100$

d. $y = 21 \times 3 - 1 = 62$

e. $y = 4(21 + 2x) = 84 + 8x$

f. $y = 21 \times 4 + 2x = 84 + 2x$

g. $y = \frac{21 \times 1.5 + 2x}{3} = \frac{31.5 + 2x}{3}$

h. $y = \frac{33.75 + 1.5x}{5} = 6.75 + 0.3x$

6. Rewrite the following in the form $y =$ something.

a. $y = -21$

b. $y = -(21 - 1) = -20$

c. $y = -(21 - 6) = -15$

d. $y = -(21 - 36) = 15$

e. $y = -(21 - x) = x - 21$

f. $y = -(21 - 7x) = 7x - 21$

g. $y = -\frac{21 - 5x}{7} = \frac{5x - 21}{7}$

h. $y = -\frac{10 - 5x}{7} = \frac{5x - 10}{7}$

7. Check your work by substitution back into your original equations.

8. Rewrite the following in the form $y =$ something.

a. $y = 7$

e. $y = -1.3267x$

b. $y = 3$

f. $y = \frac{22x}{169}$

c. $y = \frac{7}{3}$

g. $y = -\frac{7x}{17}$

d. $y = \frac{21 + 1.5x}{1.5} = 14 + x$

9. Find a value for x and y that makes both $5e$ and $6e$ true at the same time. (Use your calculator to graph the two lines, and find where they intersect). Now repeat this for $5f$ and $6f$, $5g$ and $6g$, and $5h$ and $6h$.

e. $x = -15; y = -36$

f. $x = 21; y = 126$

g. $x = 283.5; y = 199.5$

h. $x = 19.7414; y = 12.6724$

10. Rewrite the following situations as equations using x and y . If necessary, rearrange them so they are in the form $y = \dots$

a. The cooking time for a roast is 25 minutes for each kilogram.

$$y = 25x$$

b. The cost of having curtains made is \$25 plus \$9.30 per metre of curtain.

$$y = 25 + 9.30x$$

c. The perimeter of an isosceles triangle is 21cm

$$y + 2x = 21 \quad \dots \text{ or } \dots \quad x + 2y = 21$$

$$y = 21 - 2x \qquad y = \frac{21 - x}{2}$$

d. A rectangle has a perimeter of 38m.

$$2x + 2y = 38$$

$$y = \frac{38 - 2x}{2} = 19 - x$$

- e. A car hire company has an initial charge of \$10 then charges \$1 per km for travel over 100km.

$$y = 10 + 1(x - 100) = x - 90$$

- f. A different company has an initial charge of \$20, then charges 24c per km for each km travelled.

$$y = 20 + 0.24x$$

11. How far do you have to travel before the car in question 10f is cheaper than that in 10e?

To the nearest kilometre: 145km (they are equal at 144.74km)