

Manipulation of Variables

$$\textcircled{1} \quad 3x = 6y - 9 \quad \div 6 \quad \frac{1}{2}x = y - \frac{3}{2}$$

$$y = \frac{1}{2}x + \frac{3}{2}$$

$y = \frac{x+3}{2}$

✓

$$\textcircled{2} \quad 4y - 2x = 6 \quad \div 4 \quad y - \frac{1}{2}x = \frac{3}{2}$$

$$y = \frac{1}{2}x + \frac{3}{2}$$

$y = \frac{x+3}{2}$

✓

$$\textcircled{3} \quad \frac{3y}{2} = 6 \quad \times 2x \quad \div 3$$

$y = 2x$

✓

$$\textcircled{4} \quad \frac{3y}{(x-1)} = 6 \quad \times (x-1) \quad 3y = 6x - 6$$

$$\div 3 \quad y = 2x - 2$$

$y = 2(x-1)$

✓

$$\textcircled{5} \quad \frac{3y+2}{(x-1)} = 6 \quad \times (x-1) \quad 3y+2 = 6x - 6$$

$$\div 3 \quad \frac{3y = 6x - 8}{y = 2x - \frac{8}{3}}$$
✓ o.e

$$\textcircled{6} \quad 4x+3 = 2(y-1)$$

$$4x+3 = 2y-2 \quad \boxed{\div 2} \quad \boxed{y = 2x + \frac{5}{2}}$$
✓ o.e..

- ① when $x=4$, $y = \frac{(4+3)}{2} = \frac{7}{2}$ ✓
- ② when $x=4$, $y = \frac{(4+3)}{2} = \frac{7}{2}$ ✓
- ③ when $x=4$, $y = 2(4) = 8$ ✓
- ④ when $x=4$, $y = 2(4-1) = 6$ ✓
- ⑤ when $x=4$, $y = 2(4) - \frac{8}{3} = \frac{16}{3}$ ✓
- ⑥ when $x=4$, $y = 2(4) + \frac{5}{2} = \frac{21}{2}$ ✓

Manipulation of Variables

$$\textcircled{1} \quad 2x^2 - x = \boxed{x(2x-1)}$$

$$\textcircled{2} \quad 4x^3 + 8x^2 = \boxed{4x^2(x+2)} \quad \checkmark$$

$$\textcircled{3} \quad x^2 + 8x + 7 = \boxed{(x+7)(x+1)} \quad \checkmark$$

$$\textcircled{4} \quad 2x^2 + 16x + 14 = \boxed{(2x+2)(x+7)} \quad \checkmark \quad \text{Q.E.D. } (2(2x+1)) \\ = (2x+2)$$

$$\textcircled{5} \quad x^2 - 5x + 6 = \boxed{(x-3)(x-2)} \quad \checkmark$$

$$\textcircled{6} \quad x^2 - x - 12 = \boxed{(x-4)(x+3)} \quad \checkmark$$

$$\textcircled{1} \quad x=0, \frac{1}{2} \quad \checkmark$$

$$\textcircled{2} \quad x=0, -2 \quad \checkmark$$

$$\textcircled{3} \quad x=-7, -1 \quad \checkmark$$

$$\textcircled{4} \quad x=-1, -7 \quad \checkmark$$

$$\textcircled{5} \quad x=3, 2 \quad \checkmark$$

$$\textcircled{6} \quad x=4, -3 \quad \checkmark$$