

Recap Mix 5

1.
 - a. Substitute $y = 3x - 1$ into $5x - 2y$ and simplify
 - b. Hence, using your answer to part a, solve the following simultaneous equations:

$$5x - 2y = -2$$

$$y = 3x - 1$$

2. **Check** that you got $x = 4, y = 11$

3. Write down the values of:

- a. 6^0

- b. 11^{-1}

- c. 3^{-2}

- d. $\left(1\frac{3}{7}\right)^{-1}$

4. **Check** that you got $1, \frac{1}{11}, \frac{1}{9}, \frac{7}{10}$

5. Write 32×10^8 in standard form.

6. Write 751×10^{-6} in standard form.

7. Calculate $(3 \times 10^{-8}) \div (5 \times 10^{-2})$, leaving your answer in standard form.

8. Calculate $2.7 \times 10^{-10} + 5 \times 10^{-12}$, leaving your answer in standard form.

9. **Check** that you got $3.2 \times 10^9, 7.51 \times 10^{-4}, 6 \times 10^{-7}, 2.75 \times 10^{-10}$

10. Calculate $\sqrt{9 \times 10^{14}}$, leaving your answer in standard form.

11. **Check** that you got 3×10^7

12. Without using a calculator, evaluate $73^2 - 71^2$. (Hint: how can you factorise $a^2 - b^2$?)

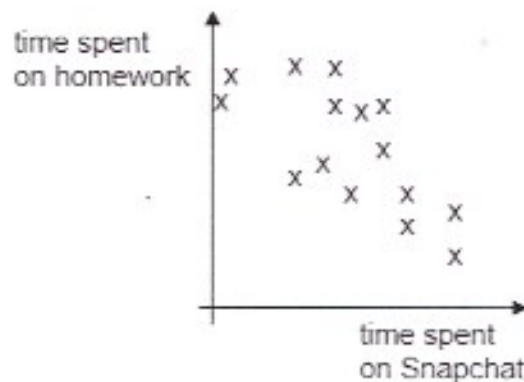
13. **Check** that you got $(73 + 71) \times (73 - 71) = 144 \times 2 = 288$

14. Consider the relation $2xy + y = 8$.

- Rearrange the equation to get $x = \dots$
- Hence find the value of x when $y = 1$.
- Are there any values that y cannot take?

15. **Check** that for b) you got $\frac{7}{2}$

16. Mr Elliott collects the following data about his Maths class:



- Describe the correlation.
 - Mr Elliott says "pupils who spend more time on Snapchat spend less time on homework". How can you improve his conclusion?
17. **Check** that you described both the size and strength of the correlation (e.g. fairly weak negative correlation). To improve the conclusion, Mr Elliott could say "In general..." as it is not true for all his students, and he should only conclude for members of his class.

Recap Mix 6 (Non-Calculator)

1. Write 56×10^{-8} in standard form.

2.

a. Copy and complete: $\frac{1}{10^5} = 10^{\square}$

b. Copy and complete: $\frac{72}{10^5} = 72 \times 10^{\square}$

c. Hence write $\frac{72}{10^5}$ in standard form.

3. Write $\frac{39}{10^{12}}$ in standard form.

4.

a. Copy and complete: $8^{12} \times 8^5 = 8^{\square}$

b. Copy and complete: $2 \times 8^{12} \times 4 \times 8^5 = 8^{\square}$

5. Simplify $3 \times 12^{15} \times 4 \times 12^{-6}$ as far as possible.

6.

a. Explain why $(3 \times 10^5)^4 = 81 \times 10^{20}$

b. Hence write $(3 \times 10^5)^4$ in standard form.

7. Write $(4 \times 10^7)^3$ in standard form.

8.

a. Write $(9 \times 10^8)^2$ in standard form.

b. Hence write $\sqrt{8.1 \times 10^{17}}$ in standard form.

9. Write $\sqrt{2.5 \times 10^{27}}$ in standard form (Hint: start by writing it as $\sqrt{25 \times 10^{\square}}$)

10.

a. Simplify $\left(\frac{a}{b}\right)^{-2}$

b. Simplify $\left(\frac{2x}{5y}\right)^{-2}$

11. Turn over and check your answers to questions 3, 5, 7, 9 and 10b appear in the answer box. Tick your answers using a different colour pen.
If you have any of these questions wrong, retry and then come to see me **before** Thursday's lesson.

Answer box for questions 3, 5, 7, 9 and 10b

6.4×10^{22}	12^{10}	$\frac{25y^2}{4x^2}$	3.9×10^{-11}	5×10^{13}
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Bonus Question

Work out the values of the five fractions below. Spot anything?

$$1, \quad \frac{1}{1+1}, \quad \frac{1}{1+\frac{1}{1+1}}, \quad \frac{1}{1+\frac{1}{1+\frac{1}{1+1}}}, \quad \frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{1+1}}}}$$

What do you think the next fraction in the sequence is?

1. a) $y = 3x - 1$

$2y = 6x - 2$

$5x - 2y = 5x - 6x + 2$

$5x - 2y = -x + 2$

$= 6x - 2y = 2$

b) $5x - 2y = -2$

$y = 3x - 1$

$y - 3x = -1$

$2y - 6x = -2$

$-x = -4$

$x = 4$

$3x = 12$

$y = 12 - 1$

$y = 11$

2. yes.

3. a) 1.

b) $\frac{1}{11}$

c) $\frac{1}{10}$

d) $(\frac{10}{7})^{-1} = \frac{7}{10}$

4. yes.

5. $32 \times 10^8 = \underline{3.2 \times 10^9}$

6. $751 \times 10^{-6} = \underline{7.51 \times 10^{-4}}$

7. $(3 \times 10^{-8}) \div (5 \times 10^{-2}) = \frac{3 \times 10^{-8}}{5 \times 10^{-2}} = 0.6 \times 10^{-6} = \underline{6 \times 10^{-7}}$

$$\begin{aligned} 8. & 2.7 \times 10^{-10} + 5 \times 10^{-12} \\ &= 270 \times 10^{-12} + 5 \times 10^{-12} \\ &= 275 \times 10^{-12} \\ &= \underline{2.75 \times 10^{-10}} \end{aligned}$$

9. Yes.

$$10. \sqrt{9 \times 10^{14}} = 3 \times 10^7$$

11. Yes.

$$\begin{aligned} 12. & a^2 - b^2 = (a-b)(a+b) \\ & 73^2 - 71^2 = (73+71)(73-71) \\ & 73-71=2, \quad 73+71=144 \\ & 144 \times 2 = 288. \end{aligned}$$

13. Yes.

$$\begin{aligned} 14. & a) 2x = \frac{8-y}{y} \\ & x = \frac{8-y}{2y} \end{aligned}$$

$$\begin{aligned} b) & y=1 \\ & 8-y=7 \\ & 2y=2 \\ & \frac{7}{2}=3.5 \\ & \underline{x=3.5} \end{aligned}$$

c) y cannot be 0.

15. Yes.

16. a) It is negative. When y goes up, x goes down. On average, people who spent time on Snapchat more would spend time on math homework less.

b) Improvement: "On average, pupils who spend more time on Snapchat tend to spend less time on Maths homework, and vice versa." Mr Elliot could not say this for all students, only for members of his class.

17. Yes.