SECTION A: do all questions. SMALL.

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1. (i) $A = \{1, 2, 3, 4, 5, 6, 7\}$ /2 marks

$B = \{2, 6, 8, 4, 10\}$ /2 marks

2. $2^n = 64$ /1 mark

$2^n = 2^6$ /1 mark

$\boxed{n = 6}$ The set has 6 elements. /1 mark

/1 mark

3. $A = \{1, 2, x, y, 3\}$

$B = \{a, b, x, y, c\}$

a) $A \cap B = \{x, y\}$ /2 marks

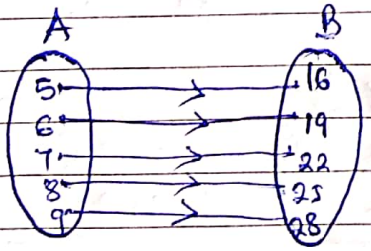
b) $A \cup B = \{1, 2, a, b, x, y, c, 3\}$ /2 marks

4. $A \times B = \{(a,2), (a,3), (b,2), (b,3)\}$

/1 mark for each pair

5. a) $B = \{16, 19, 22, 25, 28\}$, /2 marks

b)



/2 marks

c) "One to one mapping" /1 mark

6. $f(x) = 2x^2 + b$,

$f(2) = 2(2)^2 + b = 10$ /1 mark

$8 + b = 10$ /1 mark

$b = 10 - 8$

$\boxed{b = 2}$ /1 mark.

7. $f(x)^{-1} \Rightarrow x+2=y$ 1 mark

$x=y-2$ 1 mark

$\boxed{f(x)^{-1}=x-2}$ 1 mark

8. $f(x)=2x+3 \quad g(x)=3x$

$fog(x)=2(3x)+3$ 1 mark

$=6x+3$ 1 mark

$\boxed{fog(x)=6x+3}$ 1 mark

9. $\left(2\frac{1}{2} \div 1\frac{1}{2}\right)+\frac{2}{3}$

$=\left(\frac{5}{2} \div \frac{3}{2}\right)+\frac{2}{3}$ 1 mark

$=\left(\frac{5}{2} \times \frac{2}{3}\right)+\frac{2}{3}$ 1 mark

$=\frac{5}{3}+\frac{2}{3}=\boxed{\frac{7}{3}}$ 1 mark

1 mark

10. $A=L \times w=10.5\,cm \times 7\,cm=73.5\,cm^2$

1 mark 1 mark 1 mark

11. a) x be a fraction

$x=0.2222$ 1 mark

$10x=2.222$

$-1x=-0.222$ 1 mark

$9x=2$

$\frac{9}{9}x=\frac{2}{9}$

$\boxed{x=\frac{2}{9}}$ 1 mark

b) x be a fraction

$x=0.75$ 1 mark

$100x=75.757576$

$-x=0.757576$ 1 mark

$99x=75$

$\frac{99}{99}x=\frac{75}{99}$

$\boxed{x=\frac{25}{33}}$ 1 mark

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12.

function	y-intercept	Gradient
$2y+3x=2$	1 (1mark)	$-\frac{3}{2}$ (1mark)
$3x+4y=8$	2 (1mark)	$\frac{-3}{4}$ (1mark)
$5y-3x=2$	$\frac{2}{5}$ (1mark)	$\frac{3}{5}$ (1mark)

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13. a) $2x+3=17$

$2x=17-3$ (1mark)

$\frac{2x}{2}=\frac{14}{2}$ (1mark) $S=\{7\}$

$x=7$ (1mark)

b) $-3+2x=5$

$2x=5+3$ (1mark)

$\frac{2x}{2}=\frac{8}{2}$ (1mark) $S=\{4\}$

$x=4$ (1mark)

SECTION B: Attempt any three questions (45 marks)

14. a) $4x-3y-9=0$

$\frac{-3y}{-3}=\frac{-4x+9}{-3}$ (2marks)

$y=\frac{4}{3}x-3$ or $y=\frac{4x-9}{3}$ (2marks)

Gradient $=4/3$ (2marks)

y-intercept $=(0,-3)$ (2marks)

b) $3x+34-8x=11-9x-13$

$3x-8x+9x=11-13-34$ (2marks)

$\frac{4x}{4}=\frac{-36}{4}$ (2marks)

$x=-9$

$S=\{-9\}$ (3marks.)

15. a) $I = P \times r \times t$ (1mark)

$\frac{32\,400}{1} = \frac{P \cdot 6 \cdot 3}{100}$ (1 mark)

$18P = 3240000$ (1mark)

$P = \frac{3240000}{18}$ (2marks)

$P = 180,000$ Frw. 2marks

b) $I = P \times r \times t$ (1mark)

$\frac{19200}{1} = \frac{160,000 \times 4.5 \times t}{100}$ (2marks)

$\frac{720,000t}{720,000} = \frac{1920000}{720,000}$ (3 marks)

$t = 2.6$ years (2marks)

16. a) (i) $\frac{3}{2} = \frac{6}{x} \Rightarrow \frac{3x}{3} = \frac{2.6^{2}}{3_{1}}$ (1mark)

$x = 4$ (1mark)

(ii) $\frac{5}{10} = \frac{2}{x} \Rightarrow \frac{5x}{5} = \frac{2 \times 10^{2}}{5_{1}}$ (1mark)

$x = 4$ (1mark)

b) $f(x) = x + 3$ and $g(x) = 2x - 4$

(i) $fog(x) = 2x - 4 + 3$ (2marks)

$= 2x - 1$ (2marks)

(ii) $gof(x) = 2(x+3) - 4$ (2marks)

$= 2x + 6 - 4$

$= 2x + 2$ (2marks)

(iii) $fog(x) = 2x - 1$

$= 2(1) - 1$ (0.5 mark)

$= 2 - 1$ (0.5 mark)

$= 1$ (0.5 mark)

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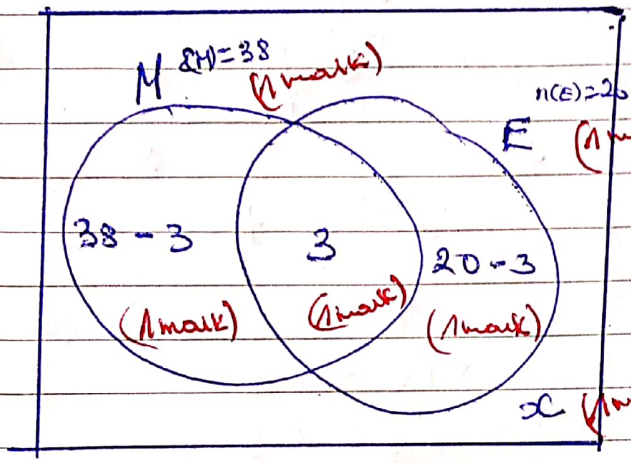
(iv) $f(-2) = x + 3$ (0.5 mark)

$= -2 + 3$ (0.5 mark)

$= 1$ (0.5 mark)

17.



$35 + 3 + 17 + x = 100$ (1 mark)

$55 + x = 100$ (1 mark)

$x = 100 - 55$

$x = 45$ (1 mark)

a) 45 students (1 mark)

b) $35 + 17 + 3 = 55$ students. (2 marks)

c) $35 + 17 = 52$ students (2 marks)