1 Arrange $-2\frac{1}{2}$, -2.52, $1.\dot{2}$, $1.0\dot{2}$, $1\frac{1}{5}$ in ascending order.

Answer ....., ..., ..., ..., ... [1]

2 Solve $-\frac{x}{3} \leq 4$ and illustrate the solution on a number line.

Answer ..... [1]

Number line :

[1]

3 It is given that $A = 2^2 \times 3^4 \times 5$ and $B = 2^3 \times 3^2 \times 5^2 \times 7$. Giving your answer in index notation, write down

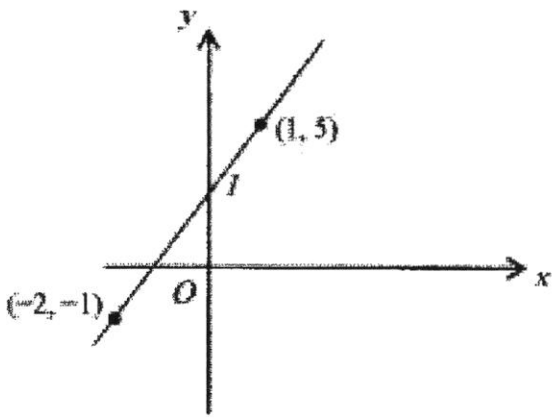
(a) the HCF of A and B,

Answer (a) .....[1]

(b) the LCM of A and B.

Answer (b) .....[1]

4 Find the gradient of the line l shown below.



Answer ..... [2]

5 Evaluate the following.

(a) $12-\frac{15}{7}\times\left(1\frac{1}{3}\div 5\frac{1}{2}\right)+\left(-2\frac{2}{5}\right)$

Answer (a) .....[1]

(b) $\frac{\sqrt[3]{15^2+19^3}}{\sqrt{20-\pi}}$, giving your answer correct to 2 decimal places.

Answer (b) .....[1]

6 Raju cycles y km in 4 hours. If he maintains the same average speed, how many km can he cycle in x minutes?

Answer ..... km [2]

7 Given that $C = 2^5 \times 3^2 \times 5^3$, find the smallest integer k that will make kC

(a) a square number,

Answer (a) k = ...[1]

(b) a perfect cube.

Answer (b) k = ...[1]

8 Evaluate the following.

(a) $(5.12-1.23)^2+[-4.21+(-1.45)]\div(-2+5)^3$, giving your answer to the nearest integer.

Answer (a) .....[1]

(b) $\left(\frac{3}{2}\right)^2\times\left(\frac{1}{15}-2\frac{1}{13}\right)-\left(-\frac{28}{15}+1\frac{2}{3}\right)\div\sqrt[3]{47.5}$, giving your answer correct to 3 significant figures.

Answer (b) .....[1]

9 Three bells toll at regular intervals of 20 minutes, 30 minutes and 15 minutes.

(a) Given that they toll together at 3.15 p.m., find the time they will next toll together.

Answer (a) .....[2]

(b) If there was a fourth bell that tolled together with the first three bells at 3.15 p.m., what must be the minimum interval at which the fourth bell tolls such that the four bells will next toll together at 5.15 p.m.?

Answer (b) ..... min [1]

10 Oranges cost 14 cents each. Amy has a $10 note and wishes to buy as many oranges as possible. Calculate

(a) the number of oranges that she can buy,

Answer (a) .....[2]

(b) the change that she will receive.

Answer (b) ..... cents [1]

11 **(a)** Express, correct to 1 significant figure,

(i) 4.879,

Answer (*a*)(i)..... [1]

(ii) 39.61.

Answer (ii)..... [1]

(b) Use your answer in part (a) to estimate $4.879 \div 39.61$.

Answer (*b*) .....[1]

12 If $a = \frac{c}{b} - \frac{e-d}{f+g}$, find g when $a = 3$, $b = -2$, c = 8, $d = -3$, $e = -5$ and $f = 4$.

Answer g= .....[3]

13 Factorise the following completely.

(a) $45am + 15a^2m^2 + 5a^2m$

Answer (*a*) .....[1]

(b) $2x(y+2) - 4w(2+y)$

Answer (*b*) .....[2]

14 A man bought a total of 30 books.
x books cost \$18 each and the rest cost \$3 each. If he spent \$165 in all, form an equation in x and find the number of \$3 books he bought.

Answer ..... [4]

15 **(a)** Expand and simplify $4(3a-2b)-5(3a-4b+2)$.

Answer (a) .....[2]

(b) Express $\frac{x+3}{4}-\frac{2(x+5)}{6}+\frac{3(x+1)}{2}$, as a single fraction in its simplest form.

Answer (b) .....[3]

16 Solve the following equations.

(a) $7x+5=2x-15$

Answer (*a*) $x =$ .....[2]

(b) $-\frac{10x+3}{2}+2x=\frac{1}{3}$

Answer (*b*) $x =$ .....[3]

17 **(a)** Expand and simplify $\frac{1}{3}\left[6a-2\left(\frac{3}{2}a-4b\right)\right]$.

Answer (a) .....[2]

(b) Ali bought 4 shirts at \$$x$ each, m shirts at \$15 each, $(3m+2)$ shirts at \$10 each and half a dozen shirts at \$$2x$ each. Find, in its simplest form, in terms of x and m, the total cost of the shirts he bought.

Answer (b) \$.....[3]

(c) Evaluate, without using the calculator, $\frac{-3x^2}{4y}$, where $x=-5$ and $y=\frac{3}{2}$.

Answer (c) .....[2]

18 **Answer the whole of this question on a sheet of graph paper.**

(a) It is given that $y = 2x + 3$. Copy and complete the table below. [2]

x	−2	0	3
y		3	

(b) Using a scale of 2 cm to represent 1 unit on the x-axis and 1 cm to represent 1 unit on the y-axis, draw the graph of $y = 2x + 3$. [3]

(c) Using your graph, find

(i) the value of x when $y = 0.7$, [1]

(ii) the value of y when $x = 2.6$. [1]

(d) The total cost of renting a badminton court can be represented by the equation $y = 2x + 3$, where \$$y$ is the total cost of rental and x is the number of hours rented.

(i) Explain why the graph is irrelevant for $x < 0$. [1]

(ii) What does the coefficient of x represent? [1]

End of Paper

Answers :

1. $-2.52,\ -2\frac{1}{2}, 1.0\dot{2}, 1\frac{1}{5}, 1.\dot{2}$

2. $x \geq -12$

3a. $2^2 \times 3^2 \times 5$
3b. $2^2 \times 3^4 \times 5^2 \times 7$

4. 2

5a. $9\frac{31}{385}$
5b. 4.68

6. $\frac{xy}{240}$

7a. 10
7b. 6

8a. 15
8b. −4.47

9a. 16 15/ 4.15 p. m.
9b. 8

10a. 71
10b. 6 cents

11ai. 5
11aii. 40
11b. $\frac{1}{8}$

12. $-3\frac{5}{7}$

13a. $5am(9+3am+a)$

13b. $2(y+2)(x-2w)$

14. 25

15a. $-3a+12b-10$
15b. $\frac{17x+7}{12}$

16a. −4

16b. $-\frac{11}{18}$

17a. $a+\frac{8}{3}b$

17b. $16x+45m+20$

17c. -12.5

18a. $-1, 9$

18ci. -1.1

18cii. 8.2

18di. Irrelevant because cannot rent for negative number of hours

18dii. The cost of renting for 1h/gradient of line

Marking Scheme: 60m

1. , $-2\frac{1}{2}$, -2.52, $1.\dot{2}$, $1.0\dot{2}$, $1\frac{1}{5}$

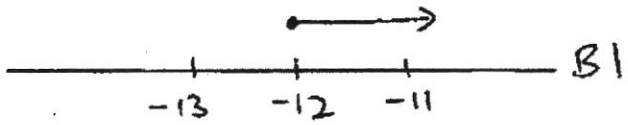
, -2.5, -2.52, $1.222\cdots$, $1.022\cdots$, 1.2

In ascending order: $-2.52, -2\frac{1}{2}, 1.0\dot{2}, 1\frac{1}{5}, 1.\dot{2}$ B1

(1)

2. $-\frac{x}{3} \leq 4$

$x \geqslant -12$ B1



B1

(2)

3. a) $2^2 \times 3^2 \times 5$ B1 do not accept 180

b) $2^2 \times 3^4 \times 5^2 \times 7$ B1 do not accept 56700 (2)

4. gradient = $\frac{\text{Rise}}{\text{Run}}$

$= \frac{6}{3}$ M1

$= 2$ A1

(2)

5 a) $12 - \frac{15}{7} \times (1\frac{1}{5} \div 5\frac{1}{2}) + (-2\frac{2}{5})$

$= 9\frac{31}{385}$ B1

b) $\frac{\sqrt[3]{15^2 + 119^3}}{\sqrt{20 - \pi}} = 4.68$ B1

(2)

6. 240mn $\rightarrow$ y km. M1 or 1h $\rightarrow \frac{y}{4}$ km M1

x mn $\rightarrow \frac{y}{240}(x)$ x min $\rightarrow \frac{y}{4} \times \frac{x}{60}$ km

$= \frac{xy}{240}$ km. A1 $= \frac{xy}{240}$ km A1

(2)

7. $C = 2^5 \times 3^2 \times 5^3$

a) $k = 2 \times 5$
$= 10$ B1

b) $k = 2 \times 3$
$= 6$ B1

(2)

8. a) 15 B1

b) -4.47 B1

(2)

9. a)

2	20, 30, 15
2	10, 15, 15
3	5, 15, 15
5	5, 5, 5
	1, 1, 1

LCM $= 2 \times 2 \times 3 \times 5$ } M1
$= 60$ min.

Time = 4.15 p.m. / 1615 A1

(3)

b) 8 min B1

10 a) No. of oranges $= \frac{1000}{14}$ M1
$= 71\frac{3}{7}$
≈ 71 A1

b) change $= 1000 - 71(14)$
$= 1000 - 994$
$= 6\,¢$ A1

or $\frac{3}{7} \times 14$
$= 6\,¢$

(3)

11. a) i) $4.879 = 5$ B1

ii) $39.61 = 40$ B1

b) $\frac{5}{40} = \frac{1}{8}$ A1

(3)

14. \$3 → $30-x$

\$18 → x

$18x + 3(30-x) = 165$ M1

$18x + 90 - 3x = 165$ M1

$15x = 75$

$x = 5$ M1

∴ he bought $30-5 = 25$ \$3 books A1 (4)

15 a) $4(3a-2b) - 5(3a-4b+2)$

$= 12a - 8b - 15a + 20b - 10$ M1

$= -3a + 12b - 10$ A1

b) $\frac{x+3}{4} - \frac{2(x+5)}{6} + \frac{3(x+1)}{2}$

$= \frac{3(x+3) - 4(x+5) + 18(x+1)}{12}$ M1

$= \frac{3x+9 - 4x - 20 + 18x + 18}{12}$ M1

$= \frac{17x + 7}{12}$ A1 (5)

16 a) $7x+5 = 2x-15$

$5x = -20$ M1 + either side correct.

$x = -4$ A1

b) $2x - \frac{10x+3}{2} = \frac{1}{3}$

$12x - 3(10x+3) = 2$ M1

$12x - 30x - 9 = 2$ M1

$-18x = 11$

$x = -\frac{11}{18}$ A1

or

$-\frac{10x+3}{2} + 2x = \frac{1}{3}$

$-3(10x+3) + 12x = 2$ M1

$-30x - 9 + 12x = 2$ M1

$-18x = 11$

$x = -\frac{11}{18}$ A1 (5)

12. $a = \frac{c}{b} - \frac{e-d}{f+g}$

$3 = \frac{8}{-2} - \frac{-5-(-3)}{4+g}$ substitution M1

$3 = -4 - \frac{-2}{4+g}$

$\frac{2}{4+g} = 7$ M1

$28 + 7g = 2$

$7g = -26$

$g = \frac{-26}{7} / -3\frac{5}{7}$ A1 (3)

13. a) $45am + 15a^2m^2 + 5a^2m$

$= 5am(9 + 3am + a)$ A1

b) $2x(y+2) - 4w(2+y)$

$= (y+2)(2x-4w)$ M1

$= 2(y+2)(x-2w)$ A1 (3)

14. $A = 2^2 \times 3^4 \times 5$

$B = 2^2 \times 3^2 \times 5^2 \times 7$

a) HCF $= 2^2 \times 3^2 \times 5$ M1

$= 180$ A1

b) LCM $= 2^2 \times 3^4 \times 5^2 \times 7$ M1

$= 56700$ A1 (4)

"7a) $\frac{1}{3}[6a - 2(\frac{3}{2}a - 4b)]$

$= \frac{1}{3}[6a - 3a + 8b]$ M1

$= \frac{1}{3}[3a + 8b]$

$= a + \frac{8}{3}b$ A1

b) $4x + 15m + 10(3m+2) + 6(2x)$ M1

$= 4x + 15m + 30m + 20 + 12x$ M1

$= 16x + 45m + 20$ A1

c) $-\frac{3x^2}{4y}$

$= \frac{-3(-5)^2}{4(\frac{3}{2})}$

$= \frac{3(25)}{6} = -\frac{75}{6}$ M1

$= -\frac{25}{2} \,/\, -12\frac{1}{2}$ A1

(7)

if. Refer to graph paper. (9)

18. spent $\frac{3}{5}$, saved $\frac{2}{5}$ M1

Food $= \frac{5}{8} \times \frac{3}{5}$

$= \frac{3}{8}$ M1

other items $= \frac{3}{5} - \frac{3}{8}$

$= \frac{9}{40}$ M1

$\frac{3}{8} - \frac{9}{40} = \frac{3}{20} \rightarrow \$600$ M1

$\frac{2}{5} \rightarrow \$600 \div \frac{3}{20} \times \frac{2}{5}$

$= \$1600$ A1 (5)

19. see graph paper (7)

60

18. $y = 2x + 3$

x	-2	0	3
y	-1	3	9

B1 + B1

BP~244

Name _____ Index No. _____

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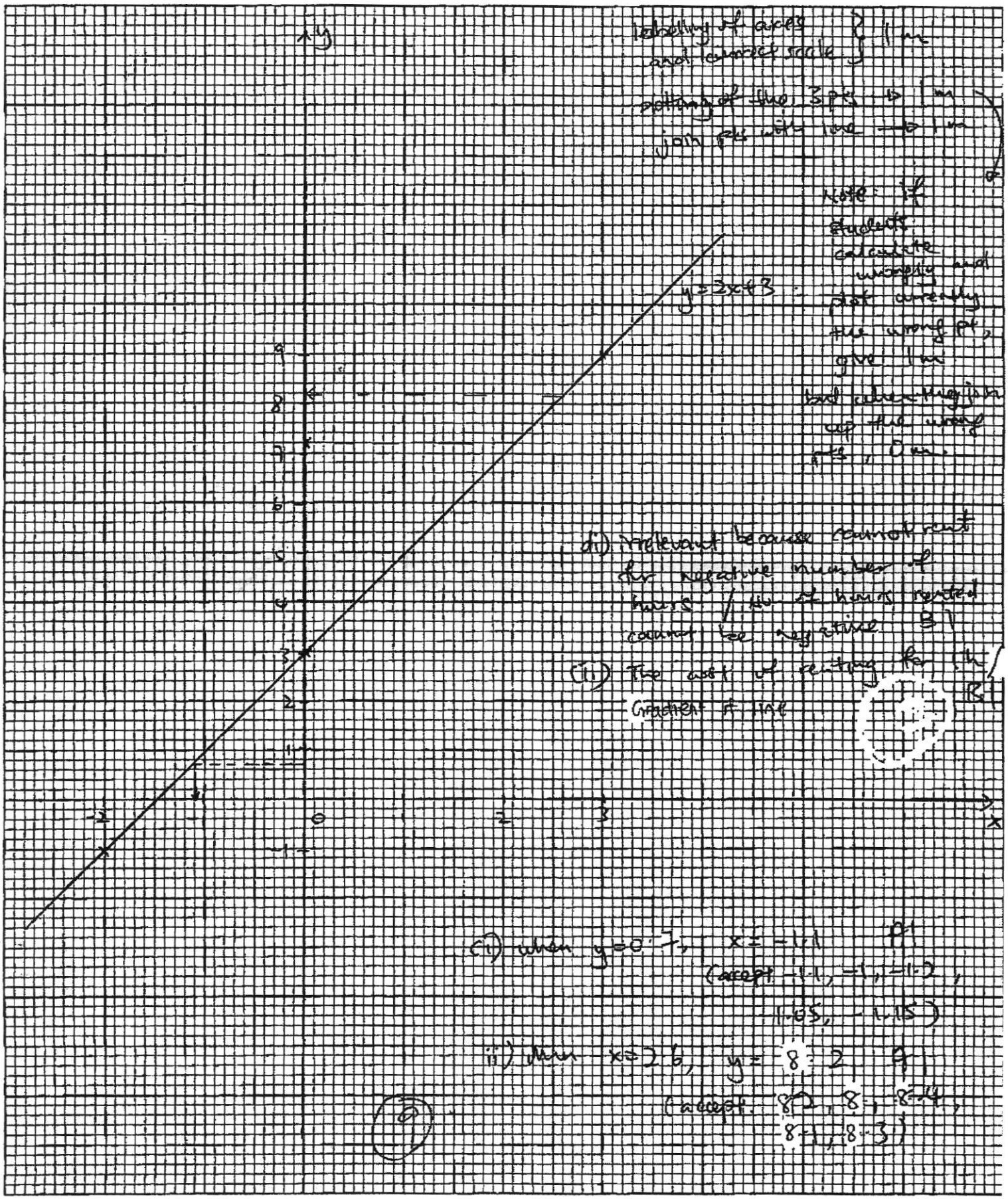

labelling of axes and correct scale P1

plotting of two pts → 1m

join pts with line → 1m

Note: If students calculate wrongly and plot correctly the wrong pts, give 1m but subsequently up the wrong pts, 0m.

(i) Irrelevant because cannot have negative number of hours / no. of hours rented cannot be negative B1

(ii) The rate of rising for the Gradient of line B1

(a) when $y = 0$, $x = -1.1$ P1

(accept $-1.1, -1, -1.2, -1.05, -1.15$)

(b) when $x = 2.6$, $y = 8.2$ P1

(accept $8.2, 8, 8.4, 8.1, 8.3$)

(8)

28 cm x 24 cm