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- 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  $B = 2^2 \times 3^2 \times 5^2 \times 7$ . Giving your answer in index notation, write down

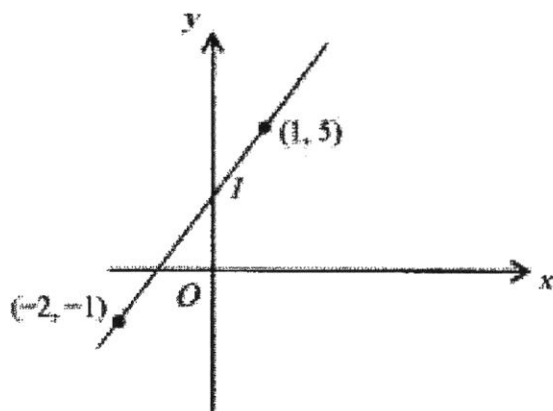
(a) the HCF of  $A$  and  $B$

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]

[Turn over

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]

[Turn over

- 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.

[Turn over

(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]

[Turn over

**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

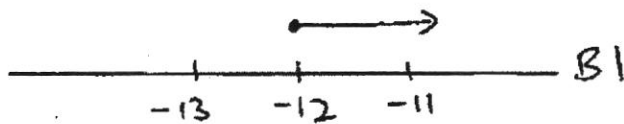
1.  $-2\frac{1}{2}, -2.52, 1.\dot{2}, 1.0\dot{2}, 1\frac{1}{5}$   
 $-2.5, -2.52, 1.222\dots, 1.022\dots, 1.2$

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

(1)

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

$x \geq -12$  B1



(2)

3. a)  $2^2 \times 3^2 \times 5$  B1  
 b)  $2^2 \times 3^4 \times 5^2 \times 7$  B1

do not accept 180

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)  $\frac{\sqrt[3]{15^2 + 11^3}}{\sqrt{20 - \pi}} = 4.68$  B1

(2)

6.  $240 \text{ min} \rightarrow y \text{ km. M1}$  or  $1 \text{ h} \rightarrow \frac{y}{4} \text{ km M1}$   
 $x \text{ min} \rightarrow \frac{y}{240} (x)$   
 $= \frac{xy}{240} \text{ km. A1}$

$x \text{ min} \rightarrow \frac{y}{4} \times \frac{x}{60} \text{ km}$   
 $= \frac{xy}{240} \text{ km A1}$

(2)

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

$$a) \quad k = 2 \times 5 \\ = 10 \quad \text{B1}$$

$$b) \quad k = 2 \times 3 \\ = 6 \quad \text{B1}$$

(2)

$$8. \quad a) \quad 15 \quad \text{B1}$$

$$b) \quad -4.47 \quad \text{B1}$$

(2)

9.a)

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

$$\text{LCM} = 2 \times 2 \times 3 \times 5 \\ = 60 \text{ min.} \quad \left. \vphantom{\text{LCM}} \right\} \text{M1}$$

$$\text{Time} = 4:15 \text{ p.m.} / 1615 \quad \text{A1}$$

(3)

$$b) \quad 8 \text{ min B1}$$

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

$$b) \quad \text{change} = 1000 - 71(14) \\ = 1000 - 994 \\ = 6 \phi \quad \text{A1}$$

$$\text{or } \frac{3}{7} \times 14 = 6$$

$$= 6 \phi \quad \text{A1} \quad (3)$$

$$11. a) \quad i) \quad 4.879 = 5 \quad \text{B1}$$

$$ii) \quad 39.61 = 40 \quad \text{B1}$$

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

(3)

$$14. \quad \$3 \rightarrow 30-x$$

$$\$18 \rightarrow x$$

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

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

$$15x = 75$$

$$x = 5 \quad M1$$

$\therefore$  he bought  $30-5$   
 $= 25$  \$3 books A1

(4)

$$\begin{aligned} 15. a) \quad & 4(3a-2b) - 5(3a-4b+2) \\ & = 12a - 8b - 15a + 20b - 10 \quad M1 \\ & = -3a + 12b - 10 \quad A1 \end{aligned}$$

$$\begin{aligned} b) \quad & \frac{x+3}{4} - \frac{2(x+5)}{6} + \frac{3(x+1)}{2} \\ & = \frac{3(x+3) - 4(x+5) + 18(x+1)}{12} \quad M1 \\ & = \frac{3x+9 - 4x-20 + 18x+18}{12} \quad M1 \\ & = \frac{17x+7}{12} \quad A1 \end{aligned}$$

(5)

$$\begin{aligned} 16. a) \quad & 7x+5 = 2x-15 \\ & 5x = -20 \quad M1 \rightarrow \text{either side correct.} \\ & x = -4 \quad A1 \end{aligned}$$

$$\begin{aligned} b) \quad & 2x - \frac{10x+3}{2} = \frac{1}{3} \\ & 12x - 3(10x+3) = 2 \quad M1 \\ & 12x - 30x - 9 = 2 \quad M1 \\ & -18x = 11 \\ & x = -\frac{11}{18} \quad A1 \end{aligned}$$

or

$$\begin{aligned} & -\frac{10x+3}{2} + 2x = \frac{1}{3} \\ & -3(10x+3) + 12x = 2 \quad M1 \\ & -30x - 9 + 12x = 2 \quad M1 \\ & -18x = 11 \\ & x = -\frac{11}{18} \quad A1 \end{aligned}$$

(5)

12.

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

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

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

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

$$28 + 7g = 2$$

$$7g = -26$$

$$g = \frac{-26}{7} / -3\frac{5}{7} \quad \text{A1}$$

(3)

$$13. a) \quad 45am + 15a^2m^2 + 5a^2m \\ = 5am(9 + 3am + a) \quad \text{A1}$$

$$b) \quad 2x(y+2) - 4w(2+y) \\ = (y+2)(2x-4w) \quad \text{M1} \\ = 2(y+2)(x-2w) \quad \text{A1}$$

(3)

14.

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

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

$$a) \quad \text{HCF} = 2^2 \times 3^2 \times 5 \quad \text{M1} \\ = 180 \quad \text{A1}$$

$$b) \quad \text{LCM} = 2^2 \times 3^4 \times 5^2 \times 7 \quad \text{M1} \\ = 56700 \quad \text{A1}$$

(4)

$$\begin{aligned}
 \text{7a)} \quad & \frac{1}{3} [6a - 2(\frac{3}{2}a - 4b)] \\
 & = \frac{1}{3} [6a - 3a + 8b] \quad M1 \\
 & = \frac{1}{3} [3a + 8b] \\
 & = a + \frac{8}{3}b \quad A1
 \end{aligned}$$

$$\begin{aligned}
 \text{b)} \quad & 4x + 15m + 10(3m+2) + 6(2x) \quad M1 \\
 & = 4x + 15m + 30m + 20 + 12x \quad M1 \\
 & = 16x + 45m + 20 \quad A1
 \end{aligned}$$

$$\begin{aligned}
 \text{c)} \quad & -\frac{3x^2}{4y} \\
 & = -\frac{3(-5)^2}{4(\frac{3}{2})} \\
 & = \frac{-3(25)}{6} = -\frac{75}{6} \quad M1 \\
 & = -\frac{25}{2} \quad | \quad -12\frac{1}{2} \quad A1
 \end{aligned}$$

(7)

18. Refer to graph paper. (9)

18. spent  $\frac{3}{5}$ , saved  $\left(\frac{2}{5}\right)$  M1

$$\begin{aligned} \text{Food} &= \frac{5}{8} \times \frac{3}{5} \\ &= \left(\frac{3}{8}\right) \text{ M1} \end{aligned}$$

$$\begin{aligned} \text{other items} &= \frac{3}{5} - \frac{3}{8} \\ &= \left(\frac{9}{40}\right) \text{ M1} \end{aligned}$$

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

$$\begin{aligned} \frac{2}{5} \rightarrow \$600 \div \frac{3}{20} \times \frac{2}{5} \\ = \$1600 \text{ A1} \end{aligned}$$

(5)

19. see graph paper (7)

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 60
 

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18.

$$y = 2x + 3$$

x	-2	0	3
y	-1	3	9

B1+B1

Name \_\_\_\_\_ Index No. \_\_\_\_\_

Subject \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

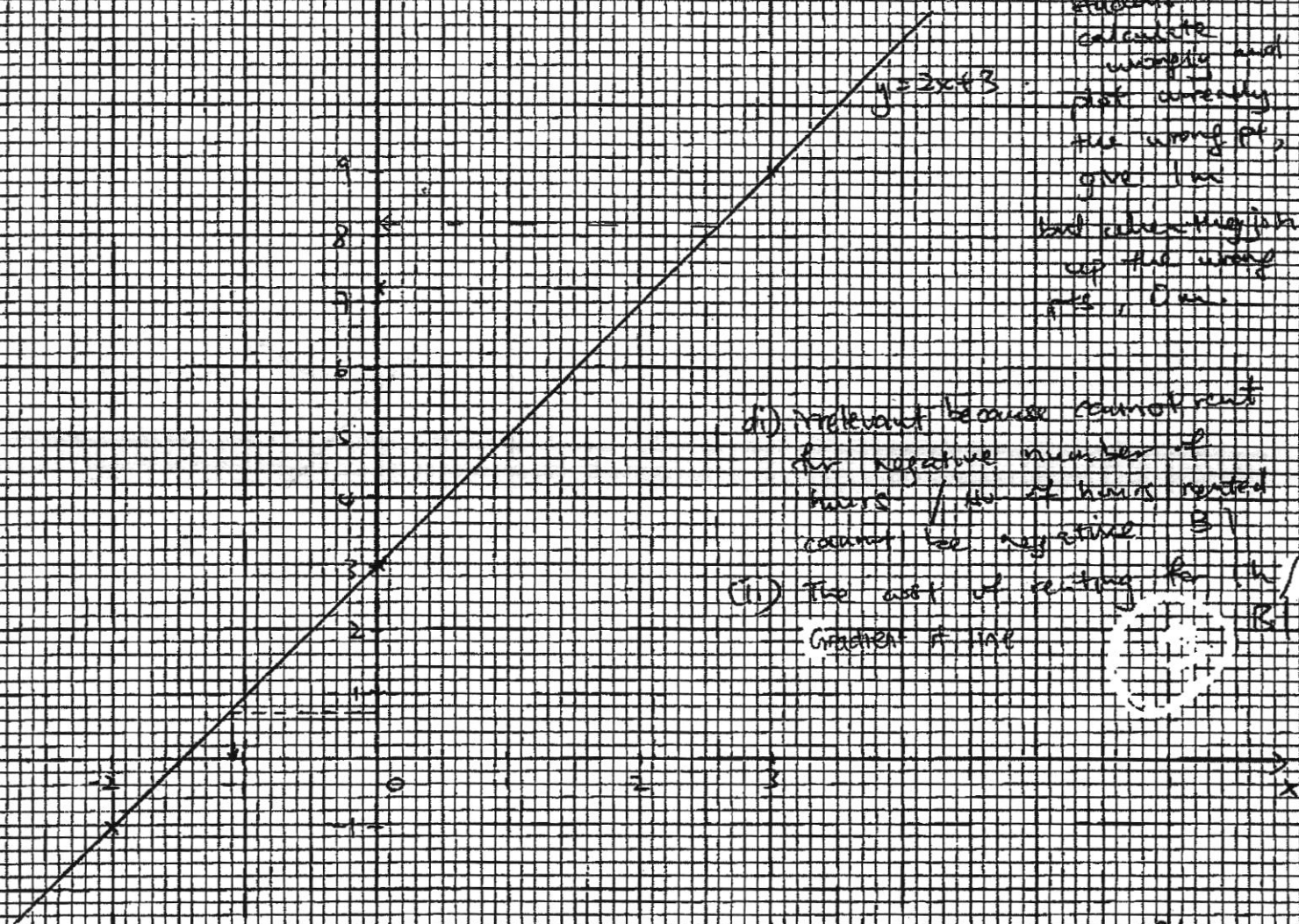
xy

labelling of axes and correct scale } 1 m

plotting of the 3 pts → 1 m  
join pts with line → 1 m

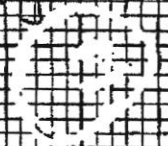
Note: if students calculate wrongly and plot wrongly the wrong pt, give 1 m but deducting join up the wrong pts, 0 m.

$$y = 2x + 3$$



(i) irrelevant because cannot rent for negative number of hours / no. of hours rented cannot be negative B1

(ii) The cost of renting for the Gradient of line



(i) when  $y = 0$ ,  $x = -1.5$  (accept -1.1, -1, -1.2, -1.05, -1.15)

(ii) when  $x = 6$ ,  $y = 15$  (accept 8.2, 8, 8.4, 8.1, 8.3)

(5)