1 Find $\frac{1}{6}$ of 420

$\frac{420}{6} = 70$

70

(Total for question 1 is 1 mark)

2 Find $\frac{1}{4}$ of 44

$\frac{44}{4} = 11$

11

(Total for question 2 is 1 mark)

3 Find $\frac{1}{8}$ of 72

$\frac{72}{8} = 9$

9

(Total for question 3 is 1 mark)

4 Find $\frac{1}{5}$ of 60

$\frac{60}{5} = 12$

12

(Total for question 4 is 1 mark)

5 Find $\frac{1}{3}$ of 48

$\frac{48}{3} = 16$

(Total for question 5 is 1 mark)

6 Work out $\frac{3}{4}$ of 180

$\frac{1}{4}$ of $180 = \frac{180}{4} = 45$

$\frac{3}{4}$ of $180 = 45 \times 3 = 135$

135

(Total for question 6 is 2 marks)

---

7 Work out $\frac{2}{5}$ of 140

$\frac{1}{5}$ of $140 = \frac{140}{5} = 28$

$\frac{2}{5}$ of $140 = 28 \times 2 = 56$

56

(Total for question 7 is 2 marks)

---

8 Find $\frac{2}{3}$ of 240

$\frac{1}{3}$ of $240 = \frac{240}{3} = 80$

$\frac{2}{3}$ of $240 = 80 \times 2 = 160$

160

(Total for question 8 is 2 marks)

---

9 Find $\frac{5}{6}$ of 72

$\frac{1}{6}$ of $72 = \frac{72}{6} = 12$

$\frac{5}{6}$ of $72 = 12 \times 5 = 60$

60

(Total for question 9 is 2 marks)

---

10 Work out $\frac{3}{7}$ of 56

$\frac{1}{7}$ of $56 = \frac{56}{7} = 8$

$\frac{3}{7}$ of $56 = 8 \times 3 = 24$

24

(Total for question 10 is 2 marks)

11 Holly is thinking of a number.

$\frac{3}{4}$ of Holly's number is 39.

Work out the number Holly is thinking of.

$\frac{3}{4}$ of $n = 39$

$\frac{1}{4}$ of $n = \frac{39}{3} = 13$

$n = 13 \times 4 = 52$

52

(Total for question 11 is 2 marks)

---

12 $\frac{2}{5}$ of number **n** is 18.

Find the value of **n**.

$\frac{1}{5}$ of $n = \frac{18}{2} = 9$

$n = 9 \times 5 = 45$

45

(Total for question 12 is 2 marks)

---

13 $\frac{5}{6}$ of number is 30.

Find the number.

$\frac{1}{6}$ of $n = \frac{30}{5} = 6$

$n = 6 \times 6 = 36$

36

(Total for question 13 is 2 marks)

14 Work out the difference between 25 and $\frac{2}{9}$ of 81

$81 \div 9 = 9$

$\frac{1}{9}$ of $81 = 9$

$\frac{2}{9}$ of $81 = 18$

$25 - 18 = 7$

7

(Total for question 14 is 3 marks)

15 Work out the difference between $\frac{3}{8}$ of 32 and $\frac{2}{5}$ of 40

$\frac{3}{8}$ of 32

$32 \div 8 = 4$

$3 \times 4 = 12$

$\frac{2}{5}$ of 40

$\frac{40}{5} = 8$

$2 \times 8 = 16$

$16 - 12 = 4$

4

(Total for question 15 is 3 marks)

16 Work out the difference between 20% of 90 and $\frac{3}{7}$ of 49

20% of 90

10% = 9 [90 ÷ 10]

20% = 18 [9 × 2]

$\frac{49}{7} = 7$

$\frac{1}{7}$ of $49 = 7$

$7 \times 3 = 21$

$\frac{3}{7}$ of $49 = 21$

$21 - 18 = 3$

3

(Total for question 16 is 3 marks)

17 There are 924 people in a theatre.

383 of the people are men.
356 of the people are women.

$\frac{2}{5}$ of the children are boys.

Work out how many girls are in the theatre.

$$\begin{array}{r} 383 \\ +\,356 \\ \hline 739 \end{array}$$ Adults

$$\begin{array}{r} {}^{8}\cancel{9}{}^{1}\cancel{2}{}^{1}4 \\ -\,739 \\ \hline 185 \end{array}$$ Children

$$5\overline{)185} = 37$$

$\frac{1}{5}$ of 185 = 37

37 × 3 = 111

$\frac{3}{5}$ of 185 = 111

111

(Total for question 17 is 3 marks)

---

18 The normal price of a computer game is £40

The price is reduced by $\frac{1}{5}$ in a sale.

Work out the price of the computer game in the sale.

$\frac{40}{5} = 8$

40 − 8 = 32

£32

(Total for question 18 is 2 marks)

19 There are 1100 students at a school.

540 students are girls, the rest are boys.

$\frac{1}{10}$ of the girls are left handed.

$\frac{1}{8}$ of the boys are left handed.

Work out the number of left handed students in the school.

1100 − 540 = 560 (560 Boys)

$\frac{1}{10}$ of 540 = $\frac{540}{10}$ = 54

$\frac{1}{8}$ of 560 = $\frac{560}{8}$ = $\frac{280}{4}$ = $\frac{140}{2}$ = 70

54 + 70 = 124

124

(Total for question 19 is 3 marks)

---

20 Harry has 50 sweets.

He gives $\frac{2}{5}$ of the sweets to Sandra.

He gives $\frac{3}{10}$ of the sweets to Jamie.

Harry keeps the rest of the sweets for himself.
Work out how many sweets Harry keeps.

$\frac{1}{5}$ of 50 = $\frac{50}{5}$ = 10

$\frac{2}{5}$ of 50 = 10 × 2 = 20

$\frac{1}{10}$ of 50 = $\frac{50}{10}$ = 5

$\frac{3}{10}$ of 50 = 3 × 5 = 15

He gives away
20 + 15 = 35

50 − 35 = 15

15

(Total for question 20 is 3 marks)

21 The normal price of a train ticket from Ashford to London is £34.20

Ross gets $\frac{1}{3}$ off the price of his train ticket

Work out how much Ross pays for his ticket.

$\frac{1}{3}$ of 34.20 = $\frac{34.20}{3}$

$= 11.40$

$$3\overline{)34^{1}20} \quad 11\,40$$

$$\begin{array}{r} {}^{3}{}^{1} \\ 34\,20 \\ -\ 11\,40 \\ \hline 22\,80 \end{array}$$

£ 22.80

(Total for question 21 is 2 marks)

22 Stan has an income of £2000 a month.

He spends $\frac{2}{5}$ of his income on rent.

He spends $\frac{3}{20}$ of his income on bills.

He spends $\frac{1}{10}$ of his income on food.

Stan saves the rest of his income.

Work out how much Stan saves each month.

$\frac{1}{5}$ of 2000 = $\frac{2000}{5}$ = 400

$\frac{2}{5}$ of 2000 = 2 × 400 = 800

$\frac{1}{20}$ of 2000 = $\frac{2000}{20}$ = 100

$\frac{3}{20}$ of 2000 = 100 × 3 = 300

$\frac{1}{10}$ of 2000 = $\frac{2000}{10}$ = 200

Stan spends: 800 + 200 + 300 = 1300

Stan saves: 2000 − 1300 = 700

£ 700

(Total for question 22 is 3 marks)

1 Work out $\frac{1}{10} + \frac{3}{5}$

$\frac{1}{10} + \frac{6}{10}$

$\frac{7}{10}$

(Total for question 1 is 2 marks)

2 (a) Work out $\frac{2}{3} - \frac{1}{4}$

$4 \times \frac{2}{3} - \frac{1}{4} \times 3$

$4 \times \frac{2}{3} - \frac{1}{4} \times 3$

$\frac{8}{12} - \frac{3}{12}$

$\frac{5}{12}$

(2)

(b) Work out $\frac{3}{4} \times \frac{4}{9}$

Give your answer as a fraction in its simplest form.

$\frac{12}{36} = \frac{1}{3}$

$\frac{1}{3}$

(2)

(Total for question 2 is 4 marks)

3 Work out $\frac{3}{4} \times \frac{5}{6}$

$$\frac{15}{24} = \frac{5}{8}$$

$\frac{5}{8}$

(Total for question 3 is 2 marks)

---

4 (a) Work out $\frac{1}{5} + \frac{3}{4}$

$$\frac{4 \times 1}{4 \times 5} + \frac{3 \times 5}{4 \times 5}$$

$$\frac{4}{20} + \frac{15}{20}$$

$\frac{19}{20}$

(2)

(b) Work out $\frac{4}{5} - \frac{1}{3}$

$$\frac{3 \times 4}{3 \times 5} - \frac{1}{3} \times 5$$

$$\frac{12}{15} - \frac{5}{15}$$

$\frac{7}{15}$

(2)

(Total for question 4 is 4 marks)

5 Work out $\frac{3}{4} + \frac{1}{12}$

$\times 3 \quad \frac{3}{4} + \frac{1}{12}$

$\times 3$

$\frac{9}{12} + \frac{1}{12} = \frac{10}{12} = \frac{5}{6}$

$\frac{5}{6}$

(Total for question 5 is 2 marks)

---

6 (a) Work out $\frac{4}{9} + \frac{3}{5}$

$5\times \quad \frac{4}{9} + \frac{3}{5} \quad \times 9$

$5\times \quad \times 9$

$\frac{20}{45} + \frac{27}{45} = \frac{47}{45}$ OR $1\frac{2}{45}$

$\frac{47}{45}$

(2)

(b) Work out $\frac{3}{5} \div \frac{3}{8}$

Give your answer as a mixed number in its simplest form.

$\frac{3}{5} \times \frac{8}{3} = \frac{24}{15} = \frac{8}{5} = 1\frac{3}{5}$

$1\frac{3}{5}$

(2)

(Total for question 6 is 4 marks)

7 Work out $\frac{1}{7} \div \frac{3}{4}$

$\frac{1}{7} \times \frac{4}{3} = \frac{4}{21}$

$\frac{4}{21}$

(Total for question 7 is 2 marks)

8 (a) Work out $\frac{5}{6} - \frac{1}{7}$

$7\times \frac{5}{6} - \frac{1}{7} \times 6$

$7\times \frac{5}{6} - \frac{1}{7} \times 6$

$\frac{35}{42} - \frac{6}{42} = \frac{29}{42}$

$\frac{29}{42}$

(2)

(b) Work out $1\frac{3}{4} \times 1\frac{1}{2}$

Give your answer as a mixed number in its simplest form.

$\frac{7}{4} \times \frac{3}{2} = \frac{21}{8} = 2\frac{5}{8}$

$2\frac{5}{8}$

(2)

(Total for question 8 is 4 marks)

9 Work out $\frac{1}{5} + \frac{2}{7}$

$7\times\frac{1}{7\times5} + \frac{2\times5}{7\times5}$

$\frac{7}{35} + \frac{10}{35} = \frac{17}{35}$

$\frac{17}{35}$

(Total for question 9 is 2 marks)

---

10 (a) Work out $\frac{3}{4} - \frac{7}{10}$

$5\times\frac{3}{5\times4} - \frac{7}{10}\times2$

$\frac{15}{20} - \frac{14}{20} = \frac{1}{20}$

$\frac{1}{20}$

(2)

(b) Work out $2\frac{1}{3} \times \frac{3}{5}$

Give your answer as a mixed number in its simplest form.

$\frac{7}{3} \times \frac{3}{5} = \frac{7}{5} = 1\frac{2}{5}$

$1\frac{2}{5}$

(2)

(Total for question 10 is 4 marks)

11 Work out $\frac{5}{6} - \frac{2}{5}$

$\frac{5 \times 5}{5 \times 6} - \frac{2 \times 6}{5 \times 6}$

$\frac{25}{30} - \frac{12}{30} = \frac{13}{30}$

$\frac{13}{30}$

(Total for question 11 is 2 marks)

---

12 (a) Work out $\frac{7}{8} \div \frac{3}{4}$

Give your answer as a mixed number in its simplest form.

$\frac{7}{2\cancel{8}} \times \frac{\cancel{4}^{1}}{3} = \frac{7}{6} = 1\frac{1}{6}$

$1\frac{1}{6}$

(2)

(b) Work out $1\frac{5}{6} \times \frac{2}{9}$

$\frac{11}{6} \times \frac{2}{9} = \frac{22}{54} = \frac{11}{27}$

$\frac{11}{27}$

(2)

(Total for question 12 is 4 marks)

13 Work out $1\frac{3}{5} \div \frac{3}{4}$

$\frac{8}{5} \div \frac{3}{4}$

$\frac{8}{5} \times \frac{4}{3} = \frac{32}{15}$ or $2\frac{2}{15}$

$\frac{32}{15}$

(Total for question 13 is 2 marks)

---

14 (a) Work out $2\frac{1}{5} + 1\frac{1}{7}$

$7\times \frac{11}{5} + \frac{8}{7} \times 5$

7×5

$\frac{77}{35} + \frac{40}{35} = \frac{117}{35}$ or $3\frac{12}{35}$

$\frac{117}{35}$

(2)

(b) Work out $1\frac{1}{6} \div \frac{2}{3}$

Give your answer as a mixed number in its simplest form.

$\frac{7}{6} \div \frac{2}{3}$

$\frac{7}{2\cancel{6}} \times \frac{\cancel{3}^{1}}{2} = \frac{7}{4} = 1\frac{3}{4}$

$1\frac{3}{4}$

(2)

(Total for question 14 is 4 marks)

1 Convert $\frac{2}{9}$ to a decimal.

$$9\overline{)2.0^{2}0^{2}0^{2}0} = 0.2222$$

$0.\dot{2}$

(Total for question 1 is 2 marks)

2 Convert $\frac{4}{11}$ to a decimal.

$$11\overline{)4.^{4}0^{7}0^{4}0^{6}7^{4}0} = 0.36363$$

$0.\dot{3}\dot{6}$

(Total for question 2 is 2 marks)

3 Convert $\frac{5}{6}$ to a decimal.

$$6\overline{)5.^{5}0^{2}0^{2}0^{2}0} = 0.83333$$

$0.8\dot{3}$

(Total for question 3 is 2 marks)

4 Prove algebraically that the recurring decimal $0.\dot{8}$ can be written as $\frac{8}{9}$

(1) $0.\dot{8} = x$

(2) $8.\dot{8} = 10x$

(2) − (1) $8 = 9x$

$x = 8/9$

(Total for question 4 is 2 marks)

5 Prove algebraically that the recurring decimal $0.4\dot{7}$ can be written as $\frac{43}{90}$

$0.4\dot{7} = x$

(1) $4.\dot{7} = 10x$

(2) $47.\dot{7} = 100x$

(2) − (1) $43 = 90x$

$x = \frac{43}{90}$

(Total for question 5 is 2 marks)

6 Prove algebraically that the recurring decimal $0.2\dot{3}$ can be written as $\frac{7}{30}$

$0.2\dot{3} = x$

(1) $2.\dot{3} = 10x$

(2) $23.\dot{3} = 100x$

(2) − (1) $21 = 90x$

$x = \frac{21}{90} = \frac{7}{30}$

(Total for question 6 is 2 marks)

7 Write $0.1\dot{6}$ as a fraction in its simplest form.

$0.1\dot{6} = x$

$1.\dot{6} = 10x$

$16.\dot{6} = 100x$

$15 = 90x$

$x = \frac{15}{90} = \frac{1}{6}$

$\frac{1}{6}$

(Total for question 7 is 2 marks)

8 Write $0.2\dot{7}$ as a fraction in its simplest form.

$0.2\dot{7} = x$

$2.\dot{7} = 10x$

$27.\dot{7} = 100x$

$25 = 90x$

$x = \frac{25}{90} = \frac{5}{18}$

$\frac{5}{18}$

(Total for question 8 is 2 marks)

9 Write $0.4\dot{3}$ as a fraction in its simplest form.

$0.4\dot{3} = x$

$4.\dot{3} = 10x$

$43.\dot{3} = 100x$

$39 = 90x$

$x = \frac{39}{90} = \frac{13}{30}$

$\frac{13}{30}$

(Total for question 9 is 2 marks)

10 Prove algebraically that the recurring decimal $0.\dot{6}\dot{8}\dot{1}$ can be written as $\frac{15}{22}$

$$0.\dot{6}8\dot{1} = x$$
$$6.\dot{8}\dot{1} = 10x$$
$$681.\dot{8}\dot{1} = 1000x$$
$$675 = 990x$$
$$x = \frac{675}{990} = \frac{15}{22}$$

(Total for question 10 is 2 marks)

---

11 Prove algebraically that the recurring decimal $0.\dot{2}1\dot{6}$ can be written as $\frac{8}{37}$

$$0.\dot{2}1\dot{6} = x$$
$$216.\dot{2}1\dot{6} = 1000x$$
$$216 = 999x$$
$$x = \frac{216}{999} = \frac{8}{37}$$

(Total for question 11 is 2 marks)

---

12 Prove algebraically that the recurring decimal $0.\dot{1}2\dot{6}$ can be written as $\frac{14}{111}$

$$0.\dot{1}2\dot{6} = x$$
$$126.\dot{1}2\dot{6} = 1000x$$
$$126 = 999x$$
$$x = \frac{126}{999} = \frac{14}{111}$$

(Total for question 12 is 2 marks)

13 Write $3.2\dot{5}\dot{4}$ as a fraction in its simplest form.

$3.2\dot{5}\dot{4} = x$

$32.\dot{5}\dot{4} = 10x$

$3254.\dot{5}\dot{4} = 1000x$

$3222 = 990x$

$x = \frac{3222}{990}$

$= \frac{179}{55}$ OR $3\frac{14}{55}$

$\frac{179}{55}$

(Total for question 13 is 3 marks)

14 Write $2.7\dot{4}\dot{2}$ as a fraction in its simplest form.

$2.7\dot{4}\dot{2} = x$

$27.\dot{4}\dot{2} = 10x$

$2742.\dot{4}\dot{2} = 1000x$

$2715 = 990x$

$x = \frac{2715}{990}$

$= \frac{181}{66}$ OR $2\frac{49}{66}$

$\frac{181}{66}$

(Total for question 14 is 3 marks)

15 Write $3.\dot{5}9\dot{4}$ as a fraction in its simplest form.

$3.\dot{5}9\dot{4} = x$

$3594.\dot{5}9\dot{4} = 1000x$

$3591 = 999x$

$x = \frac{3591}{999}$

$= \frac{133}{37}$ OR $3\frac{22}{37}$

$\frac{133}{37}$

(Total for question 15 is 3 marks)

16 x is an integer such that $1 \leq x \leq 9$

Prove that $0.\dot{0}\dot{x} = \frac{x}{99}$

① $0.\dot{0}\dot{x} = y$

② $\not{0}x.\dot{0}\dot{x} = 100y$

② − ① $x = 99y$

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

.....

(Total for question 16 is 2 marks)

17 Work out: $0.\dot{5}\dot{4} \times 0.\dot{5}$

$0.\dot{5}\dot{4} = x$

$54.\dot{5}\dot{4} = 100x$

$54 = 99x$

$x = \frac{54}{99} = \frac{6}{11}$

$0.\dot{5} = y$

$5.\dot{5} = 10y$

$5 = 9y$

$y = \frac{5}{9}$

$\frac{6}{11} \times \frac{5}{9} = \frac{30}{99}$

$= \frac{10}{33}$

$\frac{10}{33}$

.....

(Total for question 17 is 4 marks)

18 Work out: $0.\dot{3}\dot{9} \div 0.\dot{6}\dot{3}$

$0.\dot{3}\dot{9} = x$

$39.\dot{3}\dot{9} = 100x$

$39 = 99x$

$x = \frac{39}{99}$

$= \frac{13}{33}$

$0.\dot{6}\dot{3} = y$

$63.\dot{6}\dot{3} = 100y$

$63 = 99y$

$y = \frac{63}{99}$

$= \frac{7}{11}$

$\frac{13}{33} \div \frac{7}{11}$

$\frac{13}{\cancel{33}_{3}} \times \frac{\cancel{11}^{1}}{7} = \frac{13}{21}$

$\frac{13}{21}$

(Total for question 18 is 4 marks)

19 Work out: $0.0\dot{7} \div 0.\dot{1}\dot{8}\dot{5}$

$0.0\dot{7} = x$

$0.\dot{7} = 10x$

$7.\dot{7} = 100x$

$7 = 90x$

$x = \frac{7}{90}$

$0.\dot{1}\dot{8}\dot{5} = y$

$185.\dot{1}\dot{8}\dot{5} = 1000y$

$185 = 999y$

$y = \frac{185}{999}$

$= \frac{5}{27}$

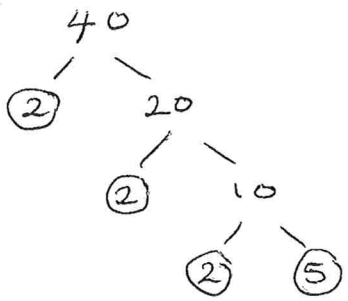
$\frac{7}{90} \div \frac{5}{27}$

$\frac{7}{\cancel{90}_{10}} \times \frac{\cancel{27}^{3}}{5} = \frac{21}{50}$

$\frac{21}{50}$

(Total for question 19 is 4 marks)

1 Write 40 as a product of its prime factors.



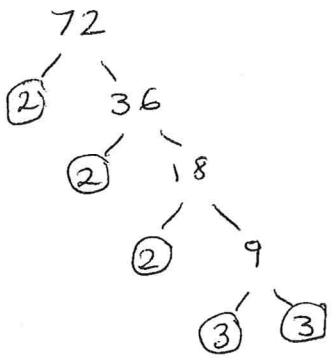
$2 \times 2 \times 2 \times 5$

OR $2^3 \times 5$

$2^3 \times 5$

(Total for question 1 is 2 marks)

2 Write 72 as a product of its prime factors.



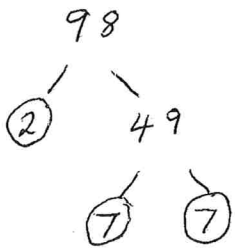
$2 \times 2 \times 2 \times 3 \times 3$

OR $2^3 \times 3^2$

$2^3 \times 3^2$

(Total for question 2 is 2 marks)

3 Write 98 as a product of its prime factors.



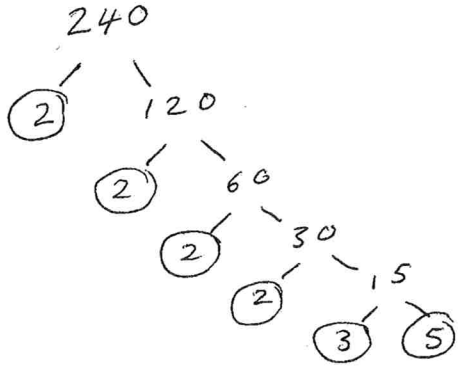
$2 \times 7 \times 7$

OR 2×7^2

2×7^2

(Total for question 3 is 2 marks)

4 Write 240 as a product of its prime factors.



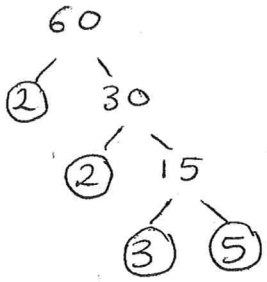
$2 \times 2 \times 2 \times 2 \times 3 \times 5$

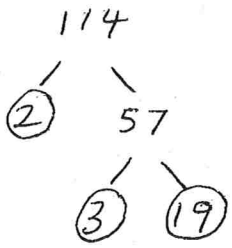
OR $2^4 \times 3 \times 5$

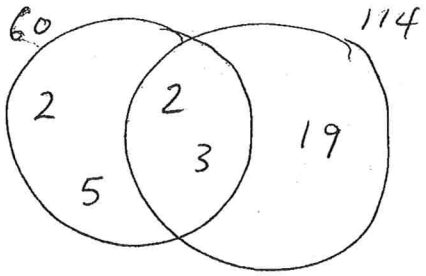
$2^4 \times 3 \times 5$

(Total for question 4 is 2 marks)

5 Find the highest common factor (HCF) of 60 and 114





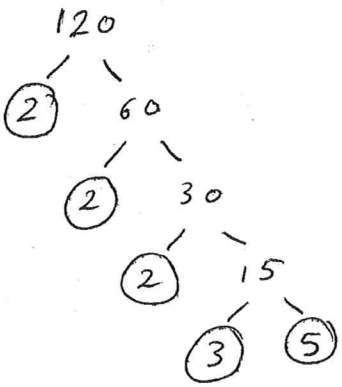


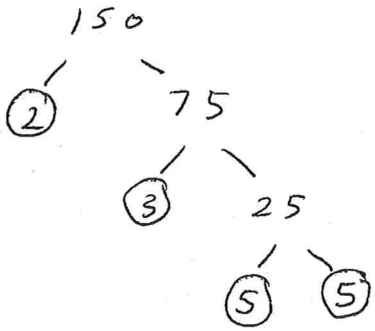
HCF = 2 × 3 = 6

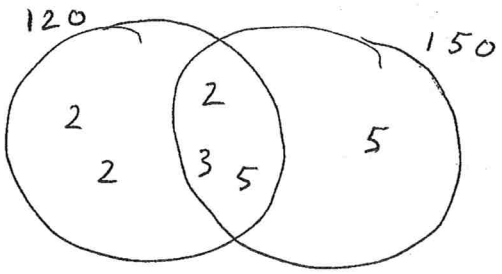
6

(Total for question 5 is 3 marks)

6 Find the lowest common multiple (LCM) of 120 and 150





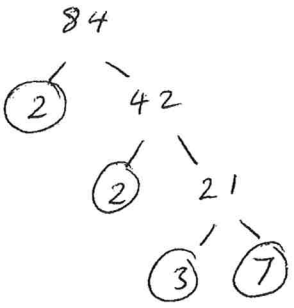


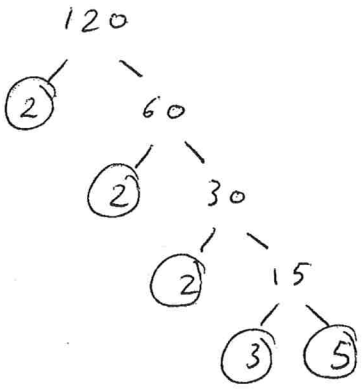
LCM = 120 × 5
= 600

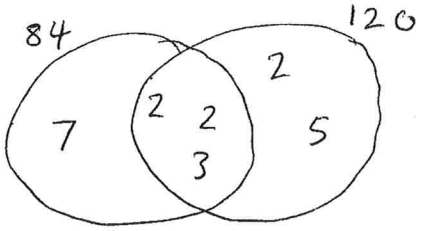
600

(Total for question 6 is 3 marks)

7 Find the highest common factor (HCF) of 84 and 120







HCF = 2 × 2 × 3

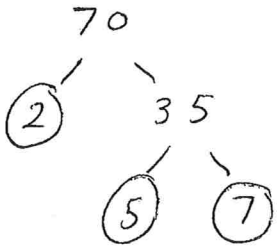
= 12

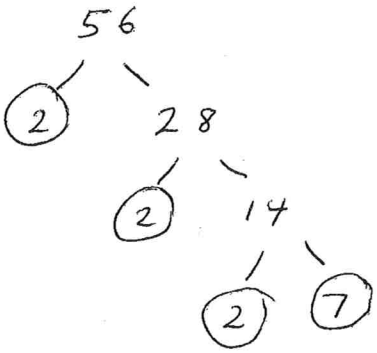
12

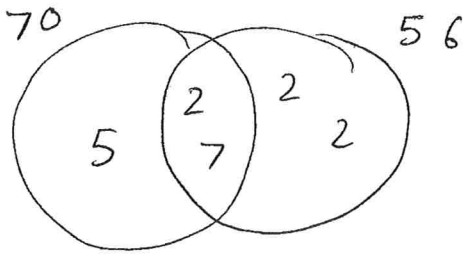
(Total for question 7 is 3 marks)

---

8 Find the lowest common multiple (LCM) of 70 and 56







LCM = 70 × 2 × 2

= 280

280

(Total for question 8 is 3 marks)

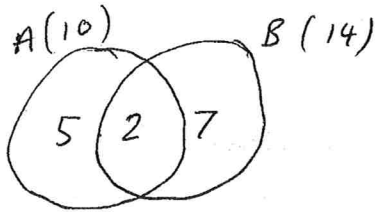
9 Two buses, bus A and bus B, both use the same bus stop.

Bus A runs every 10 minutes.
Bus B runs every 14 minutes.

$10 = 2 \times 5$
$14 = 2 \times 7$

Both buses are at the bus stop at 11 am.

What time will both buses next both be at the bus stop.



LCM $= 14 \times 5$
$= 70$

70 minutes after 11am

12:10 pm

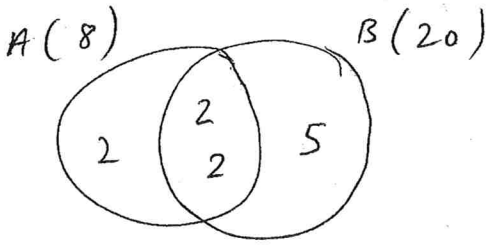
(Total for question 9 is 3 marks)

10 Light **A** flashes every 8 seconds.
Light **B** flashes every 20 seconds.

$8 = 2 \times 2 \times 2$
$20 = 2 \times 2 \times 5$

Both lights flash at the same time.

Work out how long it will take for both lights to flash at the same time again.



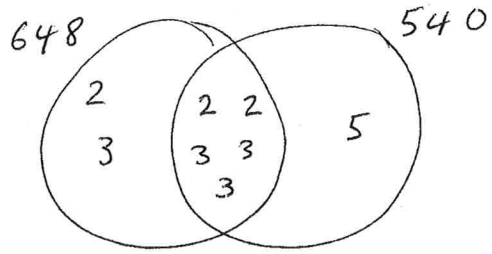
LCM $= 20 \times 2 = 40$

40 seconds

(Total for question 10 is 3 marks)

11 $648 = 2^3 \times 3^4$ $540 = 2^2 \times 3^3 \times 5$

(a) Write down the highest common factor (HCF) of 648 and 540.



2 × 2 × 3 × 3 × 3

4 × 27

108

(1)

(b) Find the lowest common multiple (LCM) of 648 and 540.

648 × 5

$\left[\frac{6480}{2} = 3240\right]$

3240

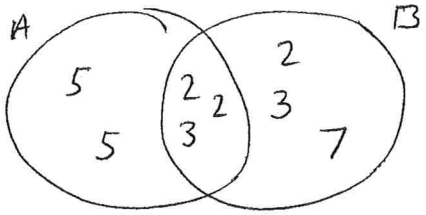
(2)

(Total for question 11 is 3 marks)

---

12 $\mathbf{A} = 2^2 \times 3 \times 5^2$ $\mathbf{B} = 2^3 \times 3^2 \times 7$

(a) Write down the highest common factor (HCF) of **A** and **B**.



2 × 2 × 3

12

(1)

(b) Find the lowest common multiple (LCM) of **A** and **B**.

2 × 2 × 2 × 3 × 3 × 5 × 5 × 7

8 × 9 × 25 × 7

72 × 175

175
× 72
350
1250
12600

12600

(2)

(Total for question 12 is 3 marks)

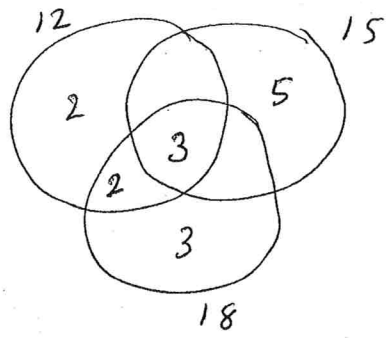
13 Find the lowest common multiple (LCM) of 12, 15 and 18.

~~12 × 2~~

$12 = 2 \times 2 \times 3$

$15 = 3 \times 5$

$18 = 2 \times 3 \times 3$



$LCM = 18 \times 2 \times 5$

$= 18 \times 10$

$= 180$

180

.....

(Total for question 13 is 3 marks)

---

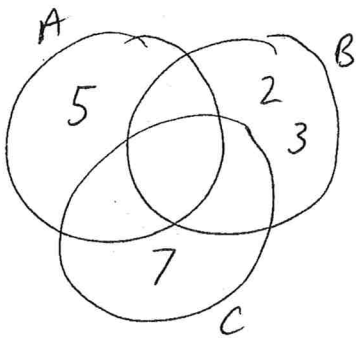
14 Light **A** flashes every 5 seconds. 5

Light **B** flashes every 6 seconds. 2×3

Light **C** flashes every 7 seconds. 7

All three lights flash at the same time.

Work out how long it will take for all three lights to flash at the same time again.



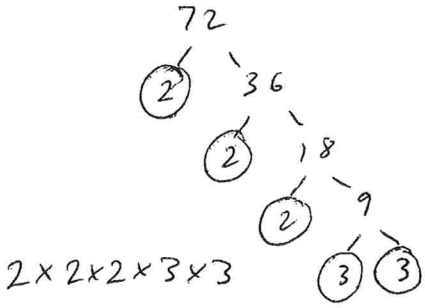
$7 \times 5 \times 6$

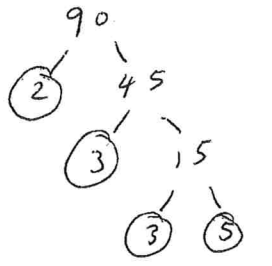
$35 \times 6 = 210$

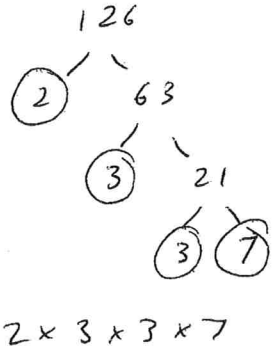
210 ..... seconds

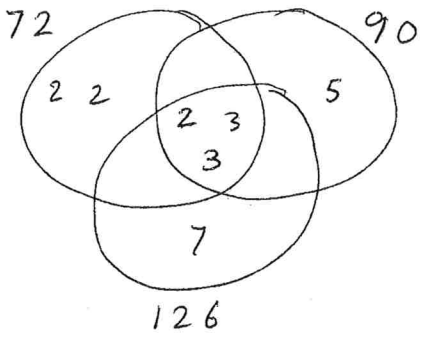
(Total for question 14 is 3 marks)

15 Find the highest common factor (HCF) of 72, 90 and 126









$HCF = 2 \times 3 \times 3$
$= 2 \times 9$
$= 18$

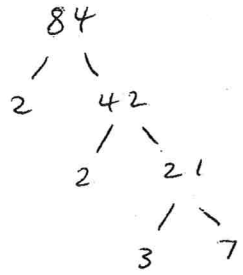
18

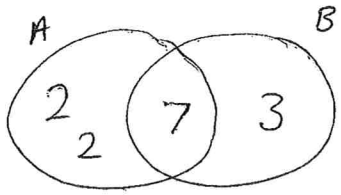
(Total for question 15 is 3 marks)

---

16 Kenny is thinking of two numbers **greater than 10**.
He says: "The highest common factor (HCF) of my two numbers is 7
The lowest common multiple (LCM) of my two numbers is 84"

Write down the two numbers that Kenny is thinking of.





$A = 2 \times 2 \times 7$
$= 28$

$B = 3 \times 7$
$= 21$

21 and 28

(Total for question 16 is 3 marks)

1 Write $\sqrt{48}$ in the form $k\sqrt{3}$, where k is an integer.

$\sqrt{16}\sqrt{3}$

$4\sqrt{3}$

$4\sqrt{3}$

(Total for question 1 is 2 marks)

2 Write $\sqrt{50}$ in the form $k\sqrt{2}$, where k is an integer.

$\sqrt{25}\sqrt{2}$

$5\sqrt{2}$

$5\sqrt{2}$

(Total for question 2 is 2 marks)

3 Write $5\sqrt{27}$ in the form $k\sqrt{3}$, where k is an integer.

$5(\sqrt{9}\sqrt{3})$

$5(3\sqrt{3})$

$15\sqrt{3}$

$15\sqrt{3}$

(Total for question 3 is 2 marks)

4 Write $7\sqrt{20}$ in the form $k\sqrt{5}$, where k is an integer.

$7(\sqrt{4}\sqrt{5})$

$7(2\sqrt{5})$

$14\sqrt{5}$

$14\sqrt{5}$

(Total for question 4 is 2 marks)

5 Expand and Simplify $(2+\sqrt{3})(2-\sqrt{3})$

$4 - 2\sqrt{3} + 2\sqrt{3} - 3$

1

1

(Total for question 5 is 2 marks)

6 Write $(3+\sqrt{5})^2$ in the form $a + b\sqrt{5}$, where a and b are integers.

$(3+\sqrt{5})(3+\sqrt{5})$

$9 + 3\sqrt{5} + 3\sqrt{5} + 5$

$14 + 6\sqrt{5}$

$14 + 6\sqrt{5}$

(Total for question 6 is 2 marks)

7 Expand and Simplify $(2+\sqrt{5})(1-\sqrt{5})$

$2 - 2\sqrt{5} + \sqrt{5} - 5$

$-3 - \sqrt{5}$

$-3 - \sqrt{5}$

(Total for question 7 is 2 marks)

8 Write $(3-\sqrt{2})^2$ in the form $a + b\sqrt{2}$, where a and b are integers.

$(3-\sqrt{2})(3-\sqrt{2})$

$9 - 3\sqrt{2} - 3\sqrt{2} + 2$

$11 - 6\sqrt{2}$

$11 - 6\sqrt{2}$

(Total for question 8 is 2 marks)

9 Expand and Simplify $(2+\sqrt{3})^2-(2-\sqrt{3})^2$

$(2+\sqrt{3})(2+\sqrt{3}) - ((2-\sqrt{3})(2-\sqrt{3}))$

$4+2\sqrt{3}+2\sqrt{3}+3-(4-2\sqrt{3}-2\sqrt{3}+3)$

$7+4\sqrt{3}-(7-4\sqrt{3})$

$7+4\sqrt{3}-7+4\sqrt{3}$

$8\sqrt{3}$

(Total for question 9 is 2 marks)

10 Rationalise the denominator $\frac{6}{\sqrt{3}}$

$\frac{6}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$

$\frac{6\sqrt{3}}{3}$

$2\sqrt{3}$

$2\sqrt{3}$

(Total for question 10 is 2 marks)

11 Rationalise the denominator $\frac{x}{\sqrt{x}}$

$\frac{x}{\sqrt{x}} \times \frac{\sqrt{x}}{\sqrt{x}}$

$\frac{x\sqrt{x}}{x}$

$\sqrt{x}$

$\sqrt{x}$

(Total for question 11 is 2 marks)

12 Rationalise the denominator $\frac{(1+\sqrt{5})}{\sqrt{2}}$

$\frac{(1+\sqrt{5})}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$

$\frac{\sqrt{2}+\sqrt{10}}{2}$

$\frac{\sqrt{2}+\sqrt{10}}{2}$

(Total for question 12 is 2 marks)

13 Simplify $\frac{(3+\sqrt{6})}{\sqrt{3}}$ $\times\sqrt{3}$ $\times\sqrt{3}$

$\sqrt{18} = \sqrt{9}\sqrt{2}$
$= 3\sqrt{2}$

$$\frac{3\sqrt{3} + \sqrt{18}}{3}$$

$$\frac{3\sqrt{3} + 3\sqrt{2}}{3}$$

~~$\frac{6\sqrt{2}}{3}$~~ $\sqrt{3} + \sqrt{2}$

~~$2\sqrt{2}$~~

(Total for question 13 is 3 marks)

14 Simplify fully $\frac{(4+2\sqrt{3})(4-2\sqrt{3})}{\sqrt{11}}$

You must show all your working.

$$\frac{16 - 8\sqrt{3} + 8\sqrt{3} - 4(3)}{\sqrt{11}}$$

$$\frac{4}{\sqrt{11}} \times\frac{\sqrt{11}}{\sqrt{11}}$$

$$\frac{4\sqrt{11}}{11}$$

(Total for question 14 is 3 marks)

15 Show that $\frac{5+2\sqrt{3}}{2+\sqrt{3}}$ can be written as $4-\sqrt{3}$

$$\frac{(5+2\sqrt{3})(2-\sqrt{3})}{(2+\sqrt{3})(2-\sqrt{3})}$$

$$\frac{10-5\sqrt{3}+4\sqrt{3}-2(3)}{4-2\sqrt{3}+2\sqrt{3}-3}$$

$$\frac{4-\sqrt{3}}{1}$$

$$4-\sqrt{3}$$

(Total for question 15 is 3 marks)

16 Show that $\frac{3\sqrt{3}+3}{3+\sqrt{3}}$ can be written as $\sqrt{3}$

$$\frac{(3\sqrt{3}+3)(3-\sqrt{3})}{(3+\sqrt{3})(3-\sqrt{3})}$$

$$\frac{9\sqrt{3}-3(3)+9-3\sqrt{3}}{9-3\sqrt{3}+3\sqrt{3}-3}$$

$$\frac{6\sqrt{3}}{6}$$

$$\sqrt{3}$$

(Total for question 16 is 3 marks)

17 Show that $\dfrac{1}{\frac{1}{\sqrt{2}}+\sqrt{2}}$ can be written as $\dfrac{\sqrt{2}}{3}$

$1 \div \dfrac{3}{\sqrt{2}}$

$1 \times \dfrac{\sqrt{2}}{3}$

$\dfrac{\sqrt{2}}{3}$

$\dfrac{1}{\sqrt{2}} + \dfrac{\sqrt{2}}{1}$ $\times\sqrt{2}$ $\times\sqrt{2}$

$\dfrac{1}{\sqrt{2}} + \dfrac{2}{\sqrt{2}}$

$\dfrac{3}{\sqrt{2}}$

(Total for question 17 is 3 marks)

18 Show that $\dfrac{2}{\frac{1}{\sqrt{3}}+1}$ can be written as $3-\sqrt{3}$

$2 \div \dfrac{1+\sqrt{3}}{\sqrt{3}}$

$2 \times \dfrac{\sqrt{3}}{1+\sqrt{3}}$

$\dfrac{2\sqrt{3}}{(1+\sqrt{3})(1-\sqrt{3})}(1-\sqrt{3})$

$\dfrac{2\sqrt{3}-2(3)}{1-\sqrt{3}+\sqrt{3}-3}$

$\dfrac{2\sqrt{3}-6}{-2} = -\sqrt{3}+3 = 3-\sqrt{3}$

$\dfrac{1}{\sqrt{3}} + \dfrac{1}{1}$ $\times\sqrt{3}$ $\times\sqrt{3}$

$\dfrac{1}{\sqrt{3}} + \dfrac{\sqrt{3}}{\sqrt{3}}$

$\dfrac{1+\sqrt{3}}{\sqrt{3}}$

(Total for question 18 is 3 marks)

19 Simplify fully $(\sqrt{a}+\sqrt{b})(\sqrt{a}-\sqrt{b})$

$a - \sqrt{ab} + \sqrt{ab} - b$

$a - b$

(Total for question 19 is 2 marks)

20 Simplify fully $(2a+\sqrt{b})^2$

$(2a+\sqrt{b})(2a+\sqrt{b})$

$4a^2 + 2a\sqrt{b} + 2a\sqrt{b} + b$

$4a^2 + 4a\sqrt{b} + b$

(Total for question 20 is 2 marks)

1 Find the value of 3^{-1} ← flip

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

$\frac{1}{3}$

.....

(Total for question 1 is 1 mark)

2 Find the value of $\left(\frac{4}{5}\right)^{-1}$

$\frac{5}{4}$

.....

(Total for question 2 is 1 mark)

3 Find the value of 5^{-1}

$\frac{1}{5}$

.....

(Total for question 3 is 1 mark)

4 Find the reciprocal of 3

$\frac{1}{3}$

.....

(Total for question 4 is 1 mark)

5 Find the value of $100^{\frac{1}{2}}$ ← square root

10

(Total for question 5 is 1 mark)

6 Find the value of $64^{\frac{1}{2}}$

8

(Total for question 6 is 1 mark)

7 Find the value of $49^{\frac{1}{2}}$

7

(Total for question 7 is 1 mark)

8 Find the value of $81^{\frac{1}{2}}$

9

(Total for question 8 is 1 mark)

9 Find the value of $36^{-\frac{1}{2}}$ ← square root and flip

$\frac{1}{6}$

(Total for question 9 is 1 mark)

10 Find the value of $64^{\frac{1}{3}}$ ← cube root

4

(Total for question 10 is 1 mark)

11 Find the value of $8^{\frac{1}{3}}$

2

(Total for question 11 is 1 mark)

12 Find the value of $27^{\frac{1}{3}}$

3

(Total for question 12 is 1 mark)

13 Find the value of $125^{\frac{1}{3}}$

5

(Total for question 13 is 1 mark)

14 Find the value of $64^{-\frac{1}{3}}$ ← cube root and flip

$\frac{1}{4}$

(Total for question 14 is 1 mark)

15 Find the value of $64^{-\frac{2}{3}}$ ← cube root, square and flip

$(4)^{-2}$

$(16)^{-1}$

$\frac{1}{16}$

(Total for question 15 is 2 marks)

16 Find the value of $125^{\frac{2}{3}}$ ← cube root and square

$(5)^{2}$

25

(Total for question 16 is 2 marks)

17 Find the value of $8^{-\frac{2}{3}}$

$(2)^{-2}$

$(4)^{-1}$

$\frac{1}{4}$

(Total for question 17 is 2 marks)

18 Find the value of $27^{-\frac{2}{3}}$

$(3)^{-2}$

$(9)^{-1}$

$\frac{1}{9}$

(Total for question 18 is 2 marks)

19 Find the value of $(8x^6)^{\frac{2}{3}}$

$(2x^2)^{2}$

$4x^4$

(Total for question 19 is 2 marks)

25 Find the value of $\sqrt[3]{4 \times 16 \times 10^{15}}$

$\sqrt[3]{64 \times 10^{15}}$

4×10^5

400000

(Total for question 25 is 2 marks)

26 Given that $3 \times \sqrt{3} = 3^n$
Find the value n.

$3^1 \times 3^{\frac{1}{2}} = 3^{\frac{3}{2}}$

$\frac{3}{2}$

(Total for question 26 is 2 marks)

27 Given that $3 \times \sqrt{27} = 3^n$
Find the value n.

$3^1 \times \sqrt{3^3}$

$3^1 \times 3^{\frac{3}{2}} = 3^{\frac{5}{2}}$

$\frac{5}{2}$

(Total for question 27 is 2 marks)

28 Given that $x = 2^p$ and $y = 2^q$
Express in terms of x and/or y,

(i) 2^{p+q}

$2^p \times 2^q$

$x \times y$

(ii) 2^{2p}

$2^p \times 2^p$

x^2

(iii) 2^{q-1}

$2^q \div 2^1$

$\frac{y}{2}$

(Total for question 28 is 3 marks)

29 Given that $3^{-n} = 0.2$
Find the value of $(3^n)^2$

$3^{-n} = \frac{1}{5}$

$3^n = 5$

$(3^n)^2 = 25$

25

(Total for question 29 is 2 marks)

30 Given that $5^{-n} = 0.5$
Find the value of $(5^n)^3$

$5^{-n} = \frac{1}{2}$

$5^n = 2$

$(5^n)^3 = 8$

8

(Total for question 30 is 2 marks)

31 Given that $4^n = 8$
Find the value of n.

$4^n = 8$

$(2^2)^n = 8$

$2^{2n} = 2^3$

$2n = 3$

$n = 1.5$

(Total for question 31 is 2 marks)

32 Given that $4^{-n} = 32$
Find the value of n.

$4^{-n} = 32$

$2^{-2n} = 2^5$

$-2n = 5$

$n = -2.5$

$n = -2.5$

(Total for question 32 is 2 marks)

1 (a) Write 1.2×10^5 as an ordinary number.

120 000

(1)

(b) Write 0.003 in standard form.

3×10^{-3}

(1)

(Total for Question 1 is 2 marks)

---

2 (a) Write 42 900 000 in standard form.

4.29×10^7

(1)

(b) Write 3.61×10^{-3} as an ordinary number.

0.00361

(1)

(Total for Question 2 is 2 marks)

---

3 (a) Write 9.516×10^6 as an ordinary number.

9516000

(1)

(b) Write 0.0724 in standard form.

7.24×10^{-2}

(1)

(c) Calculate $(8.694 \times 10^2) \div (6.21 \times 10^{-3})$
Give your answer in standard form.

Type in calculator

140000

1.4×10^5

(2)

(Total for Question 3 is 4 marks)

4 (a) Write 5.12×10^{-5} as an ordinary number.

0.0000512

(1)

(b) Write 5 600 000 in standard form.

5.6×10^{6}

(1)

(Total for Question 4 is 2 marks)

---

5 (a) Write 0.0065 in standard form.

6.5×10^{-3}

(1)

(b) Write 3×10^{4} as an ordinary number.

30 000

(1)

(Total for Question 5 is 2 marks)

---

6 (a) Write 3.08×10^{-5} as an ordinary number.

0.0000308

(1)

(b) Write 5 million in standard form.

5 000 000

5×10^{6}

~~5 00~~

(1)

(c) Calculate $(6.3 \times 10^{5}) \times (2.5 \times 10^{-2})$
Give your answer in standard form.

15750

1.575×10^{4}

(2)

(Total for Question 6 is 4 marks)

7 Work out $(8.69 \times 10^{-5}) \div (5.5 \times 10^{-7})$
Give your answer in standard form.

158

1.58×10^{2}

(Total for Question 7 is 2 marks)

---

8 (a) Write 0.00931 in standard form.

9.31×10^{-3}

(b) Write 7.429×10^{3} as an ordinary number.

(1)

7429

(1)

(Total for Question 8 is 2 marks)

---

9 (a) Write 5.2×10^{-1} as an ordinary number.

0.52

(1)

(b) Work out the value of $(3.2 \times 10^{3}) \times (6.5 \times 10^{4})$
Give your answer in standard form.

208 000 000

2.08×10^{8}

(2)

(Total for Question 9 is 3 marks)

---

10 Write 0.21×10^{6} in standard form.

$0.21 \times 10 \times 10^{5}$

2.1×10^{5}

(Total for Question 10 is 1 mark)

11 Work out $(6.7 \times 10^4) \times (3.4 \times 10^{-8})$
Give your answer as an ordinary number.

2.278×10^{-3}

0.002278

(Total for Question 11 is 2 marks)

---

12 Work out $\dfrac{0.03 \times 0.02}{0.008}$

Give your answer in standard form.

without a calculator:

$$\frac{3 \times 10^{-2} \times 2 \times 10^{-2}}{8 \times 10^{-3}}$$

$$\frac{6 \times 10^{-4}}{8 \times 10^{-3}} = 0.75 \times 10^{-1}$$

$$= 7.5 \times 10^{-2}$$

7.5×10^{-2}

(Total for Question 12 is 3 marks)

---

13 Work out $\dfrac{3.744 \times 10^9}{2.4 \times 10^5}$

Give your answer in standard form.

15600

1.56×10^4

(Total for Question 13 is 2 marks)

---

14 Work out the value of $(5 \times 10^3) \times (6 \times 10^7)$
Give your answer in standard form.

without calc: 30×10^{10}

3×10^{11}

3×10^{11}

(Total for Question 14 is 2 marks)

15 (a) Write 0.000 054 376 in standard form.

5.4376×10^{-5}

(1)

(b) Write 4.15×10^6 as an ordinary number.

4 150 000

(1)

(c) Work out $\dfrac{4.1\times10^5 \times 7.3\times10^4}{2\times10^{-6}}$

1.4965×10^{16}

(2)

(Total for Question 15 is 4 marks)

---

16 Write these numbers in order of size.
Start with the smallest number.

6.1×10^2	0.061×10^2	6100×10^{-4}	61
610	6.1	0.61	61

6100×10^{-4} 0.061×10^2 61 6.1×10^2

(Total for Question 16 is 2 marks)

---

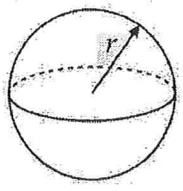
17 A sphere has a radius of 6.4×10^6 metres.
Calculate the volume of this sphere.

Give your answer in standard form to 1 decimal place.

$\frac{4}{3}\pi(6.4\times10^6)^3$

Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of sphere $= 4\pi r^2$



1.1×10^{21} m^3

(Total for Question 17 is 3 marks)

18 A large rock has a weight of 1.2×10^4 grams.

Find, in standard form, the weight of 12 of these large rocks.

$1.2 \times 10^4 \times 12$

$1.2 \times 10^4 \times 1.2 \times 10^1$

1.44×10^5 grams

(Total for Question 18 is 2 marks)

---

19 Write these numbers in order of size.
Start with the smallest number.

3.5×10^2	0.035×10^5	350×10^{-2}	35×10^0
350	3500	3.5	35

350×10^{-2} 35×10^0 3.5×10^2 0.035×10^5

(Total for Question 19 is 2 marks)

---

20 The diameter of Neptune is 5.0×10^4 km
The diameter of Mars is 6.8×10^3 km
Calculate the difference between the diameter of Neptune and the diameter of Mars.
Give your answer in standard form.

$5 \times 10^4 = 50000$

$6.8 \times 10^3 = 6800$

$50000 - 6800 = 43200$

4.32×10^4 km

(Total for Question 20 is 2 marks)

---

21 One electron has a mass of 9.1×10^{-31} grams.

Find the mass of 250 of electrons.

$9.1 \times 10^{-31} \times 250$

2.275×10^{-28} grams

(Total for Question 21 is 2 marks)

22 The area of Australia is 7.7×10^6 km^2
The area of Cyprus is 9.3×10^3 km^2
How many times larger is Australia than Cyprus.
Give your answer to the nearest whole number.

$$\frac{7.7 \times 10^6}{9.3 \times 10^3} = 827.956...$$

828

(Total for Question 22 is 2 marks)

---

23 The area of the Pacific Ocean is 3.61×10^8 km^2
The area of the Atlantic Ocean is 8.51×10^7 km^2
Find the total area of the Pacific Ocean and the Atlantic Ocean.
Give your answer in standard form.

$3.61 \times 10^8 + 8.51 \times 10^7$

446100000

4.461×10^8 km^2

(Total for Question 23 is 2 marks)

---

78 000 000

24 The distance between Earth and Mars is 78 million kilometres.
The speed of light is 3×10^5 km/s

D
S T

Calculate the time, in seconds, it takes for light to travel from Earth to Mars.
Give your answer in standard form.

$$\text{Time} = \frac{78000000}{3 \times 10^5} = \frac{780}{3} = 260$$

$= 260$

$= 2.6 \times 10^2$

2.6×10^2 s

(Total for Question 24 is 2 marks)

1 Simplify $3x + 4x - 2x$

$7x - 2x$

$5x$

(Total for question 1 is 1 mark)

---

2 Simplify $3m + 3m$

$6m$

(Total for question 2 is 1 mark)

---

3 Simplify $n + n + n$

$3n$

(Total for question 3 is 1 mark)

---

4 (a) Simplify $a \times b \times c$

abc

(1)

(b) Simplify $5p - 2p$

$3p$

(1)

(c) Simplify $\frac{6h}{3}$

$2h$

(1)

(Total for question 4 is 3 marks)

5 Simplify $k + k + 8$

$2k + 8$

(Total for question 5 is 1 mark)

---

6 (a) Simplify $4 \times 3x$

$12x$

(1)

(b) Simplify $7a - 3a + 6a$

$4a + 6a$

$10a$

(1)

(Total for question 6 is 2 marks)

---

7 Simplify $8g + 6h - 3g + h$

$5g + 7h$

(Total for question 7 is 2 marks)

---

8 (a) Simplify $3 \times b \times 9$

$27b$

(1)

(b) Simplify $2x - 3y - 6x - 4y$

$-4x - 7y$

(2)

(Total for question 8 is 3 marks)

9 Simplify $8c + 3d - c + 2d$

$7c + 5d$

(Total for question 9 is 2 marks)

---

10 (a) Simplify $f+f+f+f+f$

$5f$

(1)

(b) Simplify $5a + 3b + 2a + 2b$

$7a + 5b$

(2)

(Total for question 10 is 3 marks)

---

11 (a) Simplify $2a \times 3b$

$6ab$

(1)

(b) Simplify $2p \times 2p$

$4p^2$

(1)

(c) Simplify $\frac{7x + 5x}{4}$

$\frac{12x}{4}$

$3x$

(1)

(Total for question 11 is 3 marks)

12 Simplify $11c - 8d + 5c - d$

$16c - 9d$

(Total for question 12 is 2 marks)

---

13 (a) Simplify $3a \times 4b$

$12ab$

(1)

(b) Simplify $3x + 2y + 6x - y$

$9x + y$

(2)

(Total for question 13 is 3 marks)

---

14 (a) Simplify $a \times b \times 3$

$3ab$

(1)

(b) Simplify $y \times y \times y$

y^3

(1)

(c) Simplify $\frac{10d}{d}$

10

(1)

(Total for question 14 is 3 marks)

15 (a) Simplify $a \times 2 \times 5$

$10a$

(1)

(b) Simplify $b \times b$

b^2

(1)

(c) Simplify $\dfrac{2y + 6y}{2}$

$\dfrac{8y}{2}$

$4y$

(1)

(Total for question 15 is 3 marks)

---

16 (a) Simplify $2t \times 7s$

$14st$

(1)

(b) Simplify $7a + 4b - 3a - 5b$

$4a - b$

(2)

(Total for question 16 is 3 marks)

---

17 (a) Simplify $6f - f$

$5f$

(1)

(b) Simplify $7x^2 - 3x + 3x^2 + 6x$

$10x^2 + 3x$

(2)

(Total for question 17 is 3 marks)

18 Simplify $2 \times n \times 6 \times m$

12mn

12mn

(Total for question 18 is 1 mark)

---

19 (a) Simplify $6j \times 5k$

30jk

(1)

(b) Simplify $7a - 6b + 5a + 4b$

12a - 2b

(2)

(Total for question 19 is 3 marks)

---

20 (a) Simplify $4n - 3n + 5n$

n + 5n

6n

(1)

(b) Simplify $p^2 + p^2 + p^2$

$3p^2$

(1)

(c) Simplify $5 + 2a + 7b - 6a + b$

5 - 4a + 8b

(2)

(Total for question 20 is 4 marks)

21 (a) Simplify $a^2 + a^2 + a^2$

$3a^2$

(1)

(b) Simplify $2rs - 5rs + 4rs$

$-3rs + 4rs$

rs

(1)

(c) Simplify $4a + 2 - 7a + a - 6$

$-2a - 4$

(2)

(Total for question 21 is 4 marks)

---

22 (a) Simplify $n + n + n - n$

$3n - n$

$2n$

(1)

(b) Simplify $3xy + 2xy - xy$

$5xy - xy$

$4xy$

(1)

(c) Simplify $4a + 3b - a + 3b + 6$

$3a + 6b + 6$

(2)

(Total for question 22 is 4 marks)

1 (a) Expand $7(2x + 7)$

$14x + 49$

(1)

(b) Factorise $3y + 12$

$3(y + 4)$

(1)

(Total for Question 1 is 2 marks)

---

2 (a) Expand $5a(a - 6)$

$5a^2 - 30a$

(2)

(b) Solve $4(b + 2) = 24$

$4b + 8 = 24$

$4b = 16$

$b = 4$

$b =$ 4

(2)

(Total for Question 2 is 4 marks)

---

3 (a) Factorise fully $12m + 8m^2$

$4m(3 + 2m)$

(2)

(b) Solve $3(n - 5) = 27$

$3n - 15 = 27$

$3n = 42$

$n = 14$

$n =$ 14

(2)

(Total for Question 3 is 4 marks)

4 (a) Expand $8(3s - 2)$

$24s - 16$

(1)

(b) Factorise $4t + 20$

$4(t + 5)$

(1)

(Total for Question 4 is 2 marks)

---

5 (a) Factorise fully $5a^2b + 15ab^2$

$5ab(a + 3b)$

(2)

(b) Solve $6(c - 8) = 42$

$6c - 48 = 42$

$6c = 90$

$c = 15$

$c =$ 15

(2)

(Total for Question 5 is 4 marks)

---

6 (a) Factorise $18x + 24$

$6(3x + 4)$

(1)

(b) Expand $3(2y - 4)$

$6y - 12$

(1)

(Total for Question 6 is 2 marks)

7 (a) Expand $p(p-3)$

$p^2 - 3p$

(1)

(b) Factorise $16q + 8$

$8(2q + 1)$

(1)

(Total for Question 7 is 2 marks)

---

8 (a) Factorise fully $6x^2 - 4xy$

$2x(3x - 2y)$

(2)

(b) Solve $2(w-4) = 13$

$2w - 8 = 13$

$2w = 21$

$w = \frac{21}{2}$

$w = \frac{21}{2}$ OR 10.5

(2)

(Total for Question 8 is 4 marks)

---

9 (a) Factorise $x^2 - 9x$

$x(x - 9)$

(1)

(b) Expand $6(5y + 1)$

$30y + 6$

(1)

(Total for Question 9 is 2 marks)

10 (a) Expand $3(5x - 8)$

$15x - 24$

(1)

(b) Factorise $18y + 15$

$3(6y + 5)$

(1)

(Total for Question 10 is 2 marks)

---

11 (a) Expand $7(2h - 3)$

$14h - 21$

(1)

(b) Expand and Simplify $4(g + 5) + 3(g - 2)$

$4g + 20 + 3g - 6$

$7g + 14$

(2)

(Total for Question 11 is 3 marks)

---

12 (a) Factorise fully $7xy + 21x$

$7x(y + 3)$

(2)

(b) Solve $6(p + 3) = 42$

$6p + 18 = 42$

$6p = 24$

$p = 4$

$p =$ 4

(2)

(Total for Question 12 is 4 marks)

---

13 (a) Expand $a(a + b)$

$a^2 + ab$

(1)

(b) Factorise $15y - 6$

$3(5y - 2)$

(1)

(Total for Question 13 is 2 marks)

---

14 (a) Expand $9x(3y - 8)$

$27xy - 72x$

(2)

(b) Expand and Simplify $7(t - 4) + 5(t - 2)$

~~$7t - 28 + 5t - 10$~~

$7t - 28 + 5t - 10$

$12t - 38$

(2)

(Total for Question 14 is 4 marks)

---

15 (a) Factorise fully $30x^3 + 12x$

$6x(5x^2 + 2)$

(2)

(b) Solve $5(f - 2) = 22$

$5f - 10 = 22$

$5f = 32$

$f = \frac{32}{5}$

$f = \frac{32}{5}$ OR 6.4

(2)

(Total for Question 15 is 4 marks)

16 (a) Expand $x(8x + 1)$

$8x^2 + x$

(1)

(b) Factorise $18 + 63y$

$9(2 + 7y)$

(1)

(Total for Question 16 is 2 marks)

---

17 (a) Expand $2x^2(4x - 9)$

$8x^3 - 18x^2$

(2)

(b) Expand and Simplify $6(y + 3) - 5(y - 4)$

$6y + 18 - 5y + 20$

$y + 38$

(2)

(Total for Question 17 is 4 marks)

---

18 (a) Factorise fully $30a^2 + 40ab$

$10a(3a + 4b)$

(2)

(b) Solve $3(g + 9) = 21$

$3g + 27 = 21$

$3g = -6$

$g = -2$

$g = -2$

(2)

(Total for Question 18 is 4 marks)

19 (a) Expand $n(5n + 1)$

$5n^2 + n$

(1)

(b) Factorise $18m + mn$

$m(18 + n)$

(1)

(Total for Question 19 is 2 marks)

---

20 (a) Expand $3x(7x^2 - y)$

$21x^3 - 3xy$

(2)

(b) Expand and Simplify $3(6y + 5) - 2(4y - 1)$

$18y + 15 - 8y + 2$

$10y + 17$

(2)

(Total for Question 20 is 4 marks)

---

21 (a) Factorise fully $18a^2bc + 30abc^2$

$6abc(3a + 5c)$

(2)

(b) Expand and Simplify $4(2y - 7) - 3(5y - 3)$

$8y - 28 - 15y + 9$

$-7y - 19$

(2)

(Total for Question 21 is 4 marks)

1 Expand and simplify $(x + 7)(x - 3)$

$x^2 - 3x + 7x - 21$

$x^2 + 4x - 21$

(Total for Question 1 is 2 marks)

---

2 (a) Expand and simplify $(2p - 3)(p - 5)$

$2p^2 - 10p - 3p + 15$

$2p^2 - 13p + 15$

(2)

(b) Factorise $a^2 + 15a + 36$

36

1	36
2	18
3	12
4	9
6	6

$(a + 3)(a + 12)$

$(a + 3)(a + 12)$

(2)

(Total for Question 2 is 4 marks)

---

3 (a) Expand and simplify $(x + 3)(x - 3)$

$x^2 - 3x + 3x - 9$

$x^2 - 9$

(2)

(b) Factorise $x^2 - 8x + 7$

7

1	7

$(x - 1)(x - 7)$

(2)

(Total for Question 3 is 4 marks)

4 Expand and simplify $(m + 3)(m + 4)$

$m^2 + 4m + 3m + 12$

$m^2 + 7m + 12$

(Total for Question 4 is 2 marks)

---

5 (a) Expand and simplify $(2x + 3)(3x - 1)$

$6x^2 - 2x + 9x - 3$

$6x^2 + 7x - 3$

(2)

(b) Factorise $x^2 + 10x + 25$

25

1 25

5 5

$(x + 5)(x + 5)$

(1)

(Total for Question 5 is 3 marks)

---

6 (a) Expand and simplify $(4y + 3)(2y - 3)$

$8y^2 - 12y + 6y - 9$

$8y^2 - 6y - 9$

(2)

(b) Factorise $x^2 + 7x + 6$

6

1 6

2 3

$(x + 1)(x + 6)$

(2)

(Total for Question 6 is 4 marks)

7 Expand and simplify $(x-2)(x-9)$

$x^2 - 9x - 2x + 18$

$x^2 - 11x + 18$

(Total for Question 7 is 2 marks)

---

8 (a) Expand and simplify $(5h+2)(h+4)$

$5h^2 + 20h + 2h + 8$

$5h^2 + 22h + 8$

(2)

(b) Factorise $x^2 - 49$

$(x+7)(x-7)$

(1)

(Total for Question 8 is 3 marks)

---

9 (a) Expand and simplify $(3x-5)(2x-3)$

$6x^2 - 9x - 10x + 15$

$6x^2 - 19x + 15$

(2)

(b) Factorise $n^2 - 3n - 18$

	18
1	18
2	9
3	6

$(n+3)(n-6)$

(2)

(Total for Question 9 is 4 marks)

10 Expand and simplify $(x + 6)(3x + 8)$

$3x^2 + 8x + 18x + 48$

$3x^2 + 26x + 48$

(Total for Question 10 is 2 marks)

---

11 (a) Expand and simplify $(x - 6)(x - 7)$

$x^2 - 7x - 6x + 42$

$x^2 - 13x + 42$

(2)

(b) Factorise $x^2 - 16$

$(x + 4)(x - 4)$

(1)

(Total for Question 11 is 3 marks)

---

12 (a) Expand and simplify $(2x + 1)(5x - 9)$

$10x^2 - 18x + 5x - 9$

$10x^2 - 13x - 9$

(2)

(b) Factorise $x^2 - 13x + 36$

36	
1	36
2	18
3	12
4	9
6	6

$(x - 4)(x - 9)$

(2)

(Total for Question 12 is 4 marks)

13 Expand and simplify $(a-7)^2$

$(a-7)(a-7)$

$a^2 - 7a - 7a + 49$

$a^2 - 14a + 49$

(Total for Question 13 is 2 marks)

---

14 (a) Expand and simplify $(2x-1)(x+4)$

$2x^2 + 8x - x - 4$

$2x^2 + 7x - 4$

(2)

(b) Factorise $x^2 - 100$

$(x+10)(x-10)$

(1)

(Total for Question 14 is 3 marks)

---

15 (a) Expand and simplify $(3d-2)(d+7)$

$3d^2 + 21d - 2d - 14$

$3d^2 + 19d - 14$

(2)

(b) Factorise $x^2 - 3x - 40$

40

1	40
2	20
4	10
5	8

$(x+5)(x-8)$

(2)

(Total for Question 15 is 4 marks)

16 Factorise $n^2 + 3n - 28$

28
1 28
2 14
4 7

$(n+7)(n-4)$

(Total for Question 16 is 2 marks)

17 (a) Expand and simplify $(a-5)(a+6)$

$a^2 + 6a - 5a - 30$

$a^2 + a - 30$

(2)

(b) Factorise $b^2 - 81$

$(b+9)(b-9)$

(1)

(Total for Question 17 is 3 marks)

18 (a) Expand and simplify $(2x+5)(x+9)$

$2x^2 + 18x + 5x + 45$

$2x^2 + 23x + 45$

$2x^2 + 23x + 45$

(2)

(b) Factorise $y^2 - 7y + 12$

12
1 12
2 6
3 4

$(y-3)(y-4)$

(2)

(Total for Question 18 is 4 marks)

19 Factorise $m^2 - m - 30$

30
1 30
2 15
3 10
5 6

$(m + 5)(m - 6)$

(Total for Question 19 is 2 marks)

---

20 (a) Expand and simplify $(5a - 1)(2a - 7)$

$10a^2 - 35a - 2a + 7$

$10a^2 - 37a + 7$

(2)

(b) Factorise $b^2 - 144$

$(b + 12)(b - 12)$

(1)

(Total for Question 20 is 3 marks)

---

21 (a) Expand and simplify $(7x + 1)(x + 5)$

$7x^2 + 35x + x + 5$

$7x^2 + 36x + 5$

(2)

(b) Factorise $y^2 + 13y + 30$

1 30
2 15
3 10
5 6

$(y + 3)(y + 10)$

(2)

(Total for Question 21 is 4 marks)

1 Simplify fully $\dfrac{x^2 + 5x}{x^2 + 7x + 10}$

$$\frac{x(x+5)}{(x+2)(x+5)}$$

$$\frac{x}{x+2}$$

(Total for question 1 is 2 marks)

2 Simplify fully $\dfrac{x^2 - x - 12}{x^2 - 9x + 20}$

$$\frac{(x+3)(x-4)}{(x-5)(x-4)}$$

$$\frac{x+3}{x-5}$$

(Total for question 2 is 2 marks)

3 Simplify fully $\dfrac{3x^2 + 9x}{x^2 - 9}$

$$\frac{3x(x+3)}{(x-3)(x+3)}$$

$$\frac{3x}{x-3}$$

(Total for question 3 is 2 marks)

4 Simplify fully $\dfrac{x + 4}{x^2 - 16}$

$$\frac{1(x+4)}{(x+4)(x-4)}$$

$$\frac{1}{x-4}$$

(Total for question 4 is 2 marks)

5 Write $\frac{3x^2 + 11x - 4}{x^2 + 3x - 4}$ in the form $\frac{ax + b}{x + c}$ where a, b, and c are integers.

$$\frac{(3x-1)(x+4)}{(x+4)(x-1)}$$

$\frac{3x-1}{x-1}$

(Total for question 5 is 3 marks)

6 Write $\frac{x^2 + 7x - 18}{2x^2 - x - 6}$ in the form $\frac{x + a}{bx + c}$ where a, b, and c are integers.

$$\frac{(x+9)(x-2)}{(2x+3)(x-2)}$$

$\frac{x+9}{2x+3}$

(Total for question 6 is 3 marks)

7 Simplify fully $\frac{3x+6}{x-4} \div \frac{2x^2+9x+10}{x^2-4x}$

$\frac{(3x+6)}{(x-4)} \times \frac{x^2-4x}{2x^2+9x+10}$

$\frac{(3x+6)(x^2-4x)}{(x-4)(2x^2+9x+10)}$

$\frac{3(x+2) \times x(x-4)}{(x-4)(2x+5)(x+2)}$

$\frac{3x}{2x+5}$

$\frac{3x}{2x+5}$

(Total for question 7 is 3 marks)

8 Simplify fully $\frac{2x-2}{x+5} \div \frac{x^2-4x+3}{2x^2+13x+15}$

$\frac{2(x-1)}{x+5} \times \frac{2x^2+13x+15}{x^2-4x+3}$

$\frac{2(x-1)}{(x+5)} \times \frac{(2x+3)(x+5)}{(x-3)(x-1)}$

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

$\frac{2(2x+3)}{x-3}$

(Total for question 8 is 3 marks)

9 Solve $\frac{8}{x+3}+\frac{3}{x+8}=1$

$$\frac{8(x+8)}{(x+3)(x+8)}+\frac{3(x+3)}{(x+3)(x+8)}=1$$

$$\frac{8(x+8)+3(x+3)}{(x+3)(x+8)}=1$$

$$8(x+8)+3(x+3)=(x+3)(x+8)$$

$$8x+64+3x+9=x^2+8x+3x+24$$

$$11x+73=x^2+11x+24$$

$$73=x^2+24$$

$$0=x^2-49$$

$$(x+7)(x-7)=0$$

$x=-7$ or 7

$x=-7$ or 7

(Total for question 9 is 4 marks)

10 Solve $\frac{8}{3x-2}+\frac{6}{x+1}=2$

$$\frac{8(x+1)}{(3x-2)(x+1)}+\frac{6(3x-2)}{(3x-2)(x+1)}=2$$

$$\frac{8(x+1)+6(3x-2)}{(3x-2)(x+1)}=2$$

$$8(x+1)+6(3x-2)=2(3x-2)(x+1)$$

$$8x+8+18x-12=2(3x^2+3x-2x-2)$$

$$26x-4=2(3x^2+x-2)$$

$$26x-4=6x^2+2x-4$$

$$0=6x^2-24x$$

$$0=6x(x-4)$$

$x=0$ or $x=4$

$x=0$ or 4

(Total for question 10 is 4 marks)

11 Solve $\frac{2}{5-x}+\frac{3}{x+7}=1$

$$\frac{2(x+7)}{(5-x)(x+7)}+\frac{3(5-x)}{(5-x)(x+7)}=1$$

$$\frac{2(x+7)+3(5-x)}{(5-x)(x+7)}=1$$

$$2(x+7)+3(5-x)=(5-x)(x+7)$$

$$2x+14+15-3x=5x+35-x^2-7x$$

$$29-x=35-2x-x^2$$

$$x^2+x-6=0$$

$$(x+3)(x-2)=0$$

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

$x = -3$ or 2

(Total for question 11 is 4 marks)

12 Solve $\frac{7}{x+1}-\frac{4}{3x-2}=1$

$$\frac{7(3x-2)}{(x+1)(3x-2)}-\frac{4(x+1)}{(x+1)(3x-2)}=1$$

$$\frac{7(3x-2)-4(x+1)}{(x+1)(3x-2)}=1$$

$$7(3x-2)-4(x+1)=(x+1)(3x-2)$$

$$21x-14-4x-4=3x^2-2x+3x-2$$

$$17x-18=3x^2+x-2$$

$$0=3x^2-16x+16$$

$$(3x-4)(x-4)=0$$

$$x=\frac{4}{3} \quad x=4$$

$x = \frac{4}{3}$ or 4

(Total for question 12 is 4 marks)

13 Given that

$$2x+1 : x+2 = x+8 : 3x-4$$

Find the possible values of x.

$$\frac{2x+1}{x+2} = \frac{x+8}{3x-4}$$

$$(2x+1)(3x-4) = (x+8)(x+2)$$

$$6x^2 - 8x + 3x - 4 = x^2 + 2x + 8x + 16$$

$$6x^2 - 5x - 4 = x^2 + 10x + 16$$

$$5x^2 - 15x - 20 = 0$$

$$x^2 - 3x - 4 = 0$$

$$(x-4)(x+1) = 0$$

$x = 4$ $x = -1$

$x = 4$ or $x = -1$

(Total for question 13 is 4 marks)

14 Given that

$$x-1 : 2x-3 = x+2 : 3x-2$$

Find the possible values of x.

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

$$(x-1)(3x-2) = (x+2)(2x-3)$$

$$3x^2 - 2x - 3x + 2 = 2x^2 - 3x + 4x - 6$$

$$3x^2 - 5x + 2 = 2x^2 + x - 6$$

$$x^2 - 6x + 8 = 0$$

$$(x-2)(x-4) = 0$$

$x = 2$ $x = 4$

$x = 2$ or $x = 4$

(Total for question 14 is 4 marks)

15 Given that

$$x+9 : 5x-1 = x+7 : 2x-3$$

Find the possible values of x.

$$\frac{x+9}{5x-1} = \frac{x+7}{2x-3}$$

$$(x+9)(2x-3) = (x+7)(5x-1)$$

$$2x^2-3x+18x-27 = 5x^2-x+35x-7$$

$$2x^2+15x-27 = 5x^2+34x-7$$

$$0 = 3x^2+19x+20$$

$$0 = (3x+4)(x+5)$$

$$x = -4/3 \quad x = -5$$

$x = -4/3$ or $x = -5$

(Total for question 15 is 4 marks)

16 Given that

$$5-3x : 9-x = 3x+7 : 4-x$$

Find the possible values of x.

$$\frac{5-3x}{9-x} = \frac{3x+7}{4-x}$$

$$(5-3x)(4-x) = (3x+7)(9-x)$$

$$20-5x-12x+3x^2 = 27x-3x^2+63-7x$$

$$3x^2-17x+20 = 20x-3x^2+63$$

$$6x^2-37x-43 = 0$$

$$(6x-43)(x+1) = 0$$

$$x = \frac{43}{6} \quad x = -1$$

$x = \frac{43}{6}$ or $x = -1$

(Total for question 16 is 4 marks)

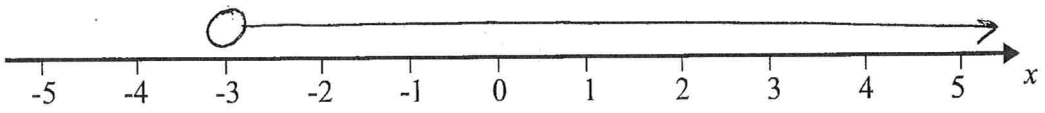
1 n is an integer such that $-2 \leq n < 3$

Write down all the possible values of n.

-2, -1, 0, 1, 2

(Total for question 1 is 2 marks)

2 (a) On the number line, show the inequality $x > -3$



(2)

$1 \leq y < 5$ where y is an integer.

(b) Write down all the possible values of y.

1, 2, 3, 4

(2)

(c) Solve $4t + 7 \leq 19$

$-7 \quad -7$

$4t \leq 12$

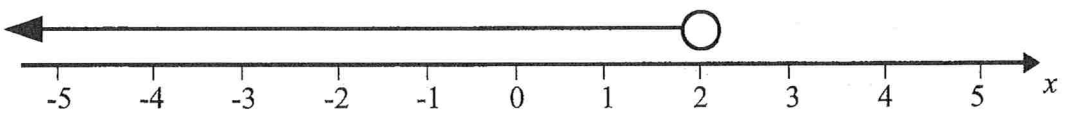
$t \leq 3$

$t \leq 3$

(2)

(Total for question 2 is 6 marks)

3 Write down the inequality shown on the number line.



$x < 2$

(Total for question 3 is 2 marks)

4 (a) $-1 < n \leq 3$ where n is an integer.

(b) Write down all the possible values of n.

0, 1, 2, 3

(2)

(c) Solve $2x - 5 > 8$

$+5 \quad +5$

$2x > 13$

$x > \frac{13}{2}$

$x > \frac{13}{2}$

(2)

(Total for question 4 is 4 marks)

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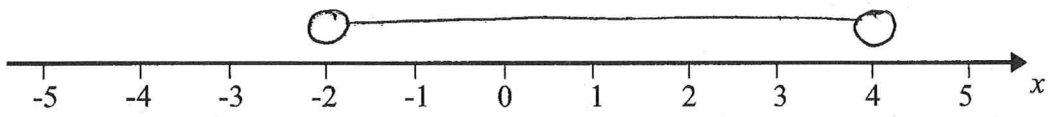
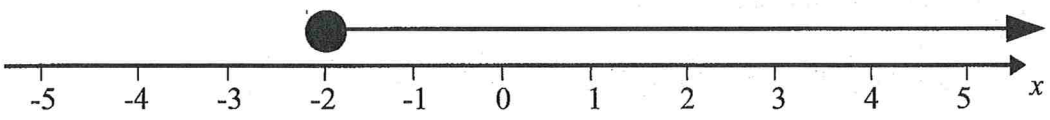
5 (a) On the number line, show the inequality $-2 < x < 4$



(2)

(b) Write down the inequality shown on the number line.

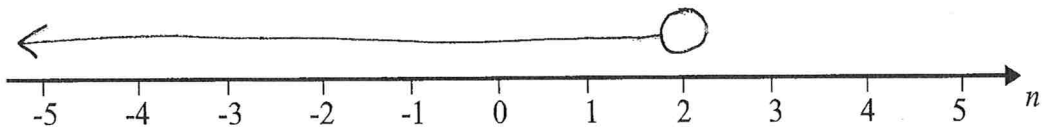


$x \geqslant -2$

(2)

(Total for question 5 is 4 marks)

6 (a) On the number line, show the inequality $n < 2$.



(2)

$4 \leq y < 8$ where y is an integer.

(b) Write down all the possible values of y.

4, 5, 6, 7

(2)

(c) Solve $4x + 6 \leq x + 21$

$-x \quad -x$

$3x + 6 \leq 21$

$-6 \quad -6$

$3x \leq 15$

$x \leq 5$

$x \leq 5$

(3)

(Total for question 6 is 7 marks)

---

7 Solve $4x \leq x + 6$

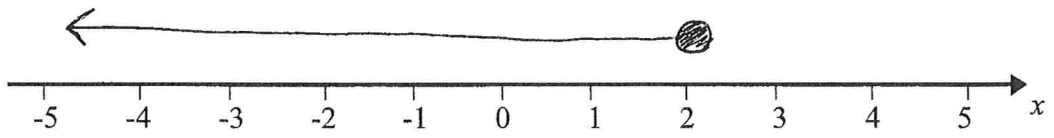
Show your answer on the number line.

$4x \leq x + 6$

$-x \quad -x$

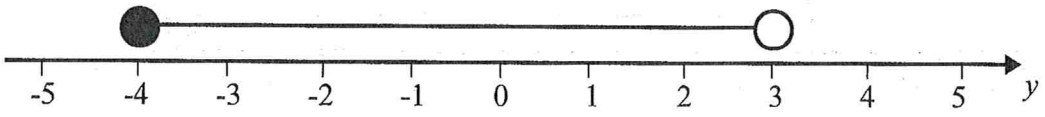
$3x \leq 6$

$x \leq 2$



(Total for question 7 is 3 marks)

8 Write down the inequality shown on the number line.

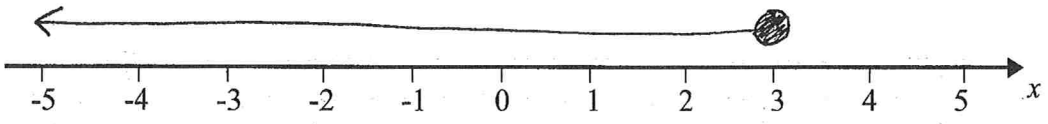


$-4 \leqslant y < 3$

(Total for question 8 is 2 marks)

9 (a) On the number line, show the inequality $x + 1 \leq 4$

$x \leqslant 3$



(2)

$5 < 2y < 12$ where y is an integer.

(b) Write down all the possible values of y.

$2.5 < y < 6$

3, 4, 5

(2)

(c) Solve $4 > 19 - 3x$

$+3x \quad +3x$

$3x + 4 > 19$

$-4 \quad -4$

$3x > 15$

$x > 5$

$x > 5$

(2)

(Total for question 9 is 6 marks)

10 n is an integer such that $-8 < 3n < 10$
Write down all the possible values of n.

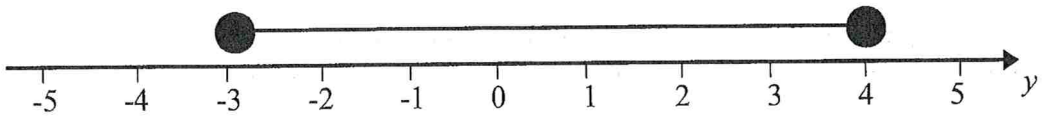
$\frac{-8}{3} < n < \frac{10}{3}$

$-2.\dot{6} < n < 3.\dot{3}$

$-2, -1, 0, 1, 2, 3$

(Total for question 10 is 2 marks)

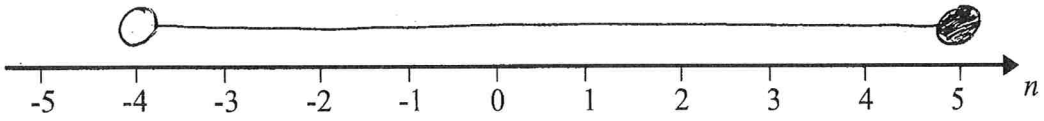
11 Write down the inequality shown on the number line.



$-3 \leqslant y \leqslant 4$

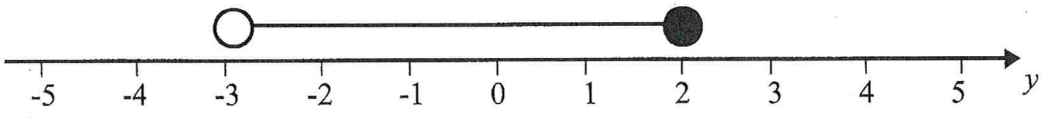
(Total for question 11 is 2 marks)

12 (a) On the number line, show the inequality $-4 < n \leq 5$



(2)

(b) Write down the inequality shown on the number line.



$-3 < y \leqslant 2$

(2)

(Total for question 12 is 4 marks)

13 Solve $2(3n - 5) > 12$

$6n - 10 > 12$

$+10 \quad +10$

$6n > 22$

$n > \frac{22}{6}$

$n > \frac{11}{3}$

$n > \frac{11}{3}$

(Total for question 13 is 2 marks)

14 n is an integer such that $-3 < 2n < 6$
Write down all the possible values of n.

$\frac{-3}{2} < n < 3$

$-1.5 < n < 3$

$-1, 0, 1, 2$

(Total for question 14 is 2 marks)

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15 Solve $3(n + 1) < 24$

$3n + 3 < 24$
$\quad -3 \quad -3$

$3n < 21$

$n < 7$

$n < 7$

(Total for question 15 is 2 marks)

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16 Solve $4(2x + 1) > 9$

$8x + 4 > 9$

$8x > 5$

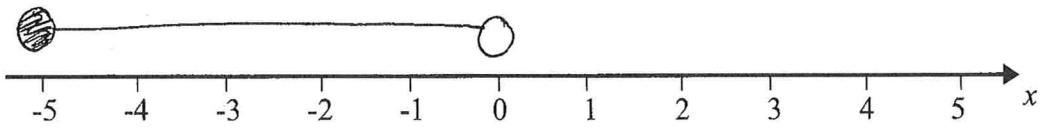
$x > \frac{5}{8}$

$x > \frac{5}{8}$

(Total for question 16 is 2 marks)

17 (a) On the number line, show the inequality $-3 \leq x + 2 < 2$

$-5 \leq x < 0$



(3)

$1 \leq 2y - 3 < 9$ where y is an integer.

+3 +3 +3

(b) Write down all the possible values of y.

$4 \leq 2y < 12$

$2 \leq y < 6$

2, 3, 4, 5

(3)

(c) Solve $4x - 4 \leq 7x - 19$

-4x -4x

$-4 \leq 3x - 19$

+19 +19

$15 \leq 3x$

$5 \leq x$

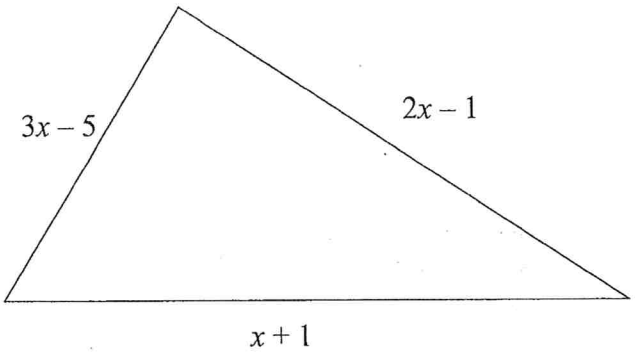
$x \geqslant 5$

$x \geqslant 5$

(3)

(Total for question 17 is 9 marks)

1 The lengths, in cm, of the sides of a triangle are $3x - 5$, $2x - 1$ and $x + 1$



(a) Write down an expression, in terms of x, for the perimeter of the triangle.

$3x - 5 + 2x - 1 + x + 1$

$6x - 5$ cm

(2)

The perimeter of the triangle is 31 cm.

(b) Work out the value of x.

$6x - 5 = 31$

$6x = 36$

$x = 6$

6 [cm]

(2)

(Total for question 1 is 4 marks)