

- 1 (a) Find the largest multiple of 7 that is less than $5^2 + 6^3 + \sqrt{169}$.
- (b) Given that 11 is a prime factor of a four-digit number, '310a', determine the digit 'a'.

Answer (a)..... [3]

(b)..... [1]

- 2 Given the set of numbers $\sqrt[3]{27}$, $0.\dot{3}$, $\sqrt[3]{64}$, $\frac{-4}{-2}$, $\sqrt{2}$

- (a) write down the prime numbers,
- (b) find the difference between the smallest rational number and the largest rational number,
- (c) write down the irrational number/(s).

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

(b)..... [1]

(c)..... [1]

- 3 (a) Express 2744 as a product of its prime factors in index notation.
(b) Hence find $\sqrt[3]{2744}$.

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

(b)..... [1]

- 4 Express $100 \times \frac{5}{11}$ as a repeating/recurring decimal.

Answer [2]

5 Write

- (a) 532.0043 correct to the nearest hundredth,
(b) 293.12 cm correct to the nearest m,
(c) 9 162 708 correct to the nearest 1000.

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

(b)..... m [1]

(c)..... [1]

6 Evaluate the following.

(a) $0.9^2 - 3 \times 2$,

(b) $[-8 + (-9) \times 2] \div [-(-23) - 5 \times 2]$.

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

(b)..... [3]

7 (a) Express, correct to 2 significant figures

(i) 253.78,

(ii) 0.03985,

(iii) 0.999.

(b) Hence, estimate, correct to 1 significant figure, the value of $\frac{253.78}{0.03985 \times 0.999}$.

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

(ii)..... [1]

(iii)..... [1]

(b)..... [2]

8 Given that $a = -2$, $b = 1$ and $c = 5$, evaluate

(a) $(a + 2c)(b - 2a)$,

(b) $\frac{abc}{(3a)^2}$.

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

(b)..... [2]

9 (a) Factorise $bx - by$,

(b) Hence, calculate $138 \times 74.19 - 128 \times 74.19$. Show all working clearly.

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

(b)..... [2]

10 Simplify $23mn^2 - 16mn^3 \div 2n$.

Answer [2]

11 Solve

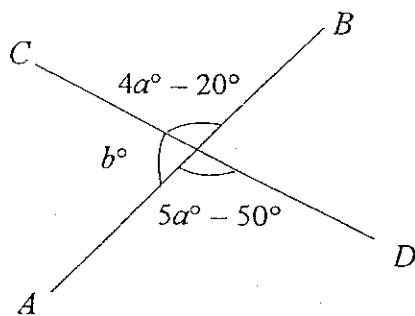
(a) $2x + 4 = 10$,

(b) $\frac{1}{3}x - \frac{2}{9} = \frac{3}{2}$.

Answer (a) [1]

(b) [2]

- 12 In the figure, AB and CD are straight lines. Find the value of a and of b .
State your reasons clearly in your working.



Answer $a =$ [2]

$b =$ [2]

- 13 Find, in its simplest form, the fraction which is exactly halfway between $\frac{3}{5}$ and $\frac{4}{7}$.

Answer [2]

14 Evaluate the following, leaving each answer as a fraction in its lowest terms.

(a) $\sqrt[3]{\frac{8}{27}} - \sqrt{\frac{81}{36}}$,

(b) $-2\frac{2}{3} \times \frac{5}{7} + \frac{2}{7}$,

(c) $\left[-\frac{1}{5} - \left(-\frac{5}{6}\right)\right] \div \left(-\frac{1}{2} - \frac{1}{3}\right)$.

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

(b)..... [2]

(c)..... [3]

END OF PART 1

Marking Scheme

- 1 (a) 252
(b) 2
- 2 (a) 2, 3
(b) $3\frac{2}{3}$
(c) $\sqrt{2}$
- 3 (a) $2^3 \times 7^3$
(b) 14
- 4 45.45
- 5 (a) 532.00
(b) 3
(c) 9 163 000
- 6 (a) - 5.19
(b) - 2
- 7 (a) (i) 250
(ii) 0.040
(iii) 1.0
(b) 600
- 8 (a) 40
(b) $-\frac{5}{18}$
- 9 (a) $b(x-y)$
(b) 741.9
- 10 $15mn^2$
- 11 (a) $x = 3$
(b) $x = 5\frac{1}{6}$
- 12 $a = 30^\circ, b = 80^\circ$
- 13 $\frac{41}{35}$
- 5 (a) $-\frac{5}{6}$
(b) $-1\frac{13}{21}$
(c) $-\frac{19}{25}$

1 Use a calculator to evaluate

(a) $\frac{31.87 + (78 \times 1.23^2)}{6.58}$, giving your answer correct to 2 decimal places,

(b) $\sqrt[3]{247 + \sqrt{123 - (-18)^3}}$, giving your answer correct to 3 significant figures.

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

(b)..... [1]

2 Arrange the following numbers in ascending order.

1.5714, 1.5714, 1.5714, 1.571, $\frac{11}{7}$

Answer..... [2]

- 3 Kenny bought 5 pens at \$1.82 each, 3 vanguard sheets for \$2.08 and 4 files at \$4.99 each.
- (a) Estimate the total amount Kenny has to pay by rounding the prices to the nearest dollar.
 - (b) Calculate the difference between the actual amount to be paid and the estimated amount.

Answer (a) \$ [2]

(b) \$ [2]

4 Factorise

(a) $21ab - 7b - 14bd + 35bc$,

(b) $bx + 2x - by - 2y$.

Answer (a) [1]

(b) [2]

69

5 Ahmad bought 3 kinds of lollipops at the supermarket. There were 120 chocolate flavoured lollipops, 109 orange flavoured lollipops and 85 cola flavoured lollipops. He ate one orange flavoured lollipop and one cola flavoured lollipop and packed the remaining lollipops into smaller packets. The packets are identical, each containing the same number of each type of lollipop.

Find the largest possible number of packets Ahmad could have packed and hence, the number of cola-flavoured lollipops there would be in each packet.

.....packets [2]
.....cola flavoured lollipops [1]

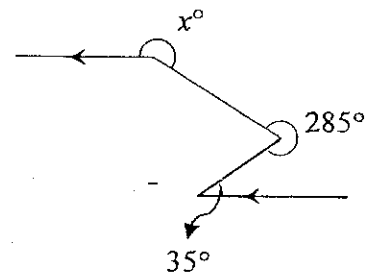
6 Amber hotel provides 3 free shuttle bus services to Orchard Road, the Zoo and the Esplanade. Bus A leaves the hotel at 12-minute intervals. Bus B leaves at 30-minute intervals. Bus C leaves at 1-hour intervals. The three bus services start at 0930. Find the time when the buses for the three services next leave the hotel at the same time.

Answer [2]

- 7 The average of 6 numbers is a . When a seventh number is added, the average is 9. Express the seventh number in terms of a .

Answer [2]

- 8 Find the value of x in the figure below.



Answer $x =$ [3]

- 9 Subtract $(4a^3 + 6a^2 - 5)$ from the sum of $(a^3 - 4a + 3)$ and $(3a - 6a^3 + 2)$.

Answer [3]

70

10 Alex has one-dollar, fifty-cent and ten-cent coins in his piggy bank. There are x one-dollar coins and 20 more ten-cent coins than fifty-cent coins. The number of fifty-cent coins is two times the number of one-dollar coins.

- (a) Write down an expression in terms of x , in the simplest form, for the
 - (i) number of fifty-cent coins,
 - (ii) number of ten-cent coins.
- (b) If Alex has a total of \$68 in the piggy bank, form an equation in x and solve it.
- (c) Find the number of ten-cent coins in the piggy bank.

Answer (a) (i) [1]

(ii) [1]

(b) $x =$ [2]

(c) ten-cent coins [1]

11 Simplify

(a) $22a \times a + 3a(b + 2a)$,

(b) $\frac{-2b}{3} - \frac{3(a - 2b)}{5}$.

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

(b)..... [3]

71

12 A series of diagrams of squares is shown below.

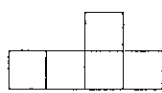


Diagram 1

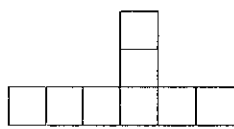


Diagram 2



Diagram 3

(a) Draw Diagram 4 in the space below.

[1]

Answer (a)

(b) Complete the following table.

[2]

Diagram	1	2	3	4	...	10
Number of squares	$2+1 \times 3$ $= 5$	$2+2 \times 3$ $= 8$	$2+3 \times 3$ $= 11$...	

(c) Find an expression, in terms of N , for the number of squares for Diagram N .

(d) Diagram K has 65 squares. Find the value of K .

Answer (c) squares [1]

(d) $K =$ [1]

- 13 Construct a triangle ABC such that $AB = 8.9$ cm, $AC = 5.7$ cm and $\angle BAC = 48^\circ$. [2]
- Measure and write down $\angle BCA$. [1]
- On the same diagram, construct
- (a) the perpendicular bisector of AB , [1]
- (b) the angle bisector of $\angle ABC$. [1]

14 Solve

(a) $\frac{2x + 3}{4} - \frac{x + 3}{5} = 0,$

(b) $\frac{14}{2x + 3} = \frac{4}{3}.$

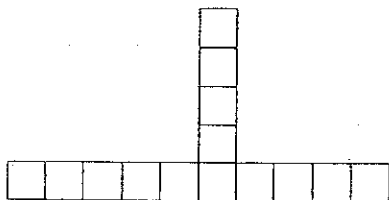
Answer (a) $x =$ [3]

(b) $x =$ [3]

END OF PART 2

Marking Scheme

- 1 (a) 22.78
(b) 6.87
- 2 (a) 1.571, 1.5714, $\frac{11}{7}$, 1.5714, 1.5714
- 3 (a) \$36
(b) \$0.70
- 4 (a) $7b(3a - 1 - 2d + 5c)$
(b) $(b + 2)(x - y)$
- 5 (a) 12 packets
(b) 7 cola lollipops
- 6 1030
- 7 $63 - 6a$
- 8 220°
- 9 $-9a^3 - 6a^2 - a + 10$
- 10 (a) (i) $2x$
(ii) $2x + 20$
(b) $x = 30$
(c) 80
- 11 (a) $28a^2 + 3ab$
(b) $\frac{8b - 9a}{15}$
- 12 (a)



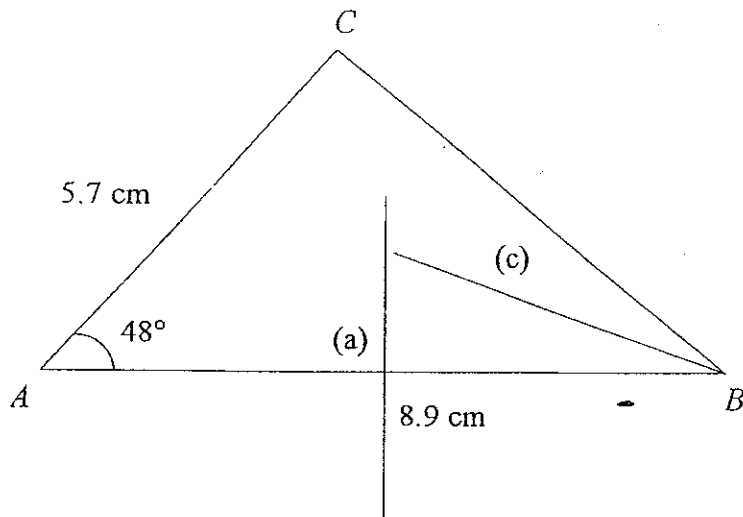
(b)

Diagram	4	...	10
Number of squares	$2 + 4 \times 3 = 14$...	$2 + 10 \times 3 = 32$

- (c) $2 + (N \times 3)$
(d) 21

Marking Scheme

13 $\angle BCA = 92^\circ$



14 (a) $x = -\frac{1}{2}$

(b) $x = 3\frac{3}{4}$