



CATHOLIC HIGH SCHOOL

Year End Examination 2006

Subject : Mathematics Date : 12 October 2006
Level : Secondary 1 Time : 2 hours
Name : _____ ()
Class : Sec 1 - _____
Parent's Signature :

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class in the spaces provided at the top of this page.
Write in dark blue or black pen in the spaces provided on the Question Paper.
You may use a pencil for any diagrams.

Answer all questions.

The number of marks is given in brackets [] at the end of each question or part question.

If working is needed for any question, it must be shown in the space below that question.
Omission of essential working will result in loss of marks.

The total of the marks for this paper is 80.

You are expected to use an electronic calculator to evaluate explicit numerical expressions.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142, unless the question specifies otherwise.

For Examiner's Use

/ 80

1 Complete the statements in the answer spaces.

(a) 4872 correct to 1 significant figure is _____.

(b) 4872 correct to ___ significant figure is 4870.

Answer (a) [1]

(b) [1]

2 With the use of a calculator, evaluate

(a) $\frac{\frac{6}{7} - \frac{1}{3}}{\frac{2}{5} \times \frac{4}{9}}$,

(b) $\sqrt{(6-2)^2 + (-5-4)^2}$,

(c) $\frac{-(-4) + \sqrt{(-4)^2 - 4 \times 3 \times (-5)}}{2 \times 3}$, giving your answer correct to two decimal places.

Answer (a) [1]

(b) [1]

(c) [2]

3 Find the smallest positive integer which can be divided exactly by 2, 3, 4 and 5.

Answer [1]

4 Express

(a) \$2.25 as a percentage of \$3.60,

(b) 15 m/s in km/h.

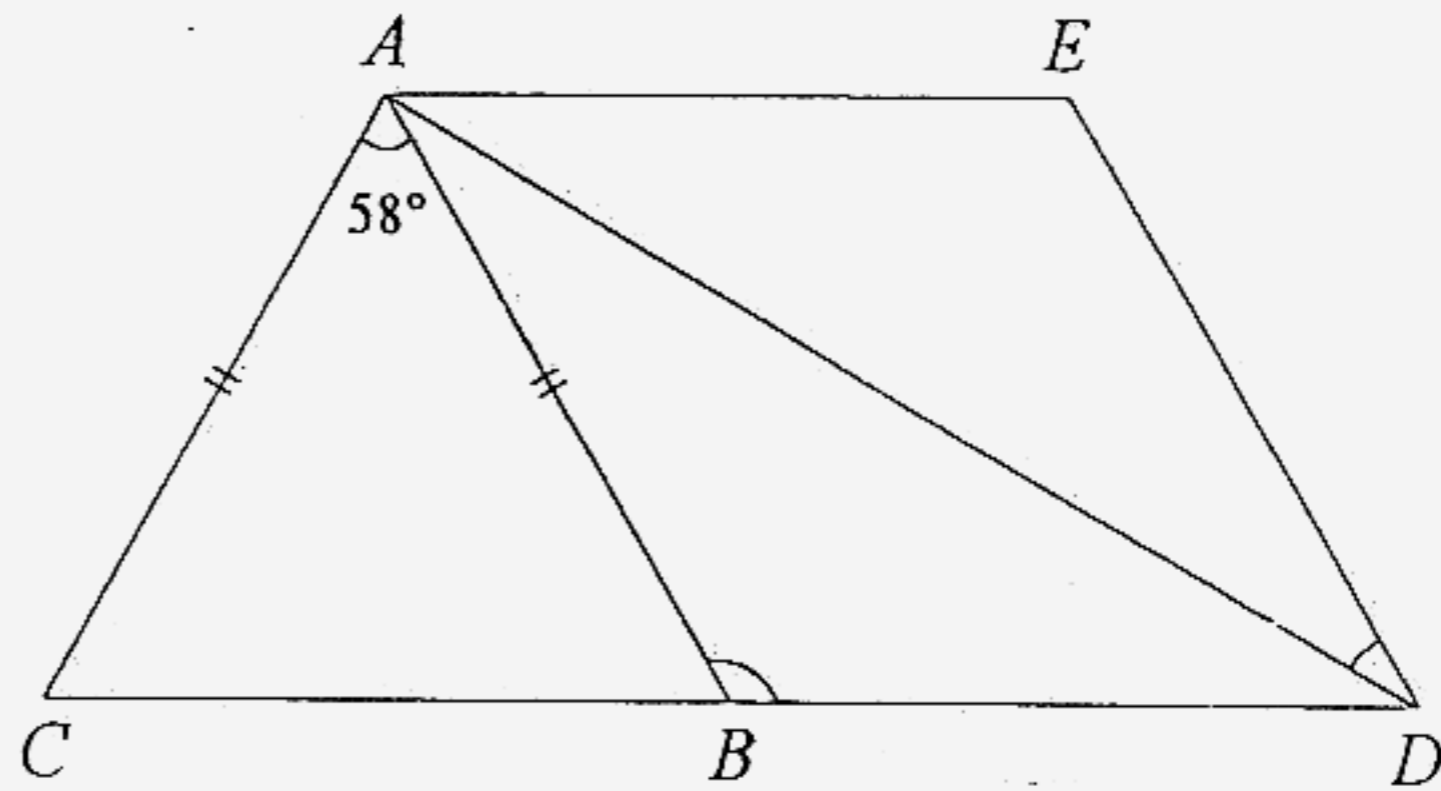
Answer (a) % [1]

(b) km/h [1]

5 In the diagram, $ABDE$ is a rhombus. C is a point on DB produced such that $AB = AC$ and $\hat{BAC} = 58^\circ$, find with reasons

(a) \hat{ABD} ,

(b) \hat{ADE} .



Answer (a) $\hat{ABD} =$ [2]

(b) $\hat{ADE} =$ [2]

- 6 The following data shows the water level, in m, in a reservoir over a certain period of time:

-2.3, -1.6, -0.4, 0.1, -0.5, 0.3, -1.2

From these reading, find, in m,

- (a) the difference between the highest and lowest water levels,
(b) the median,
(c) the mean.

Answer (a) m [1]

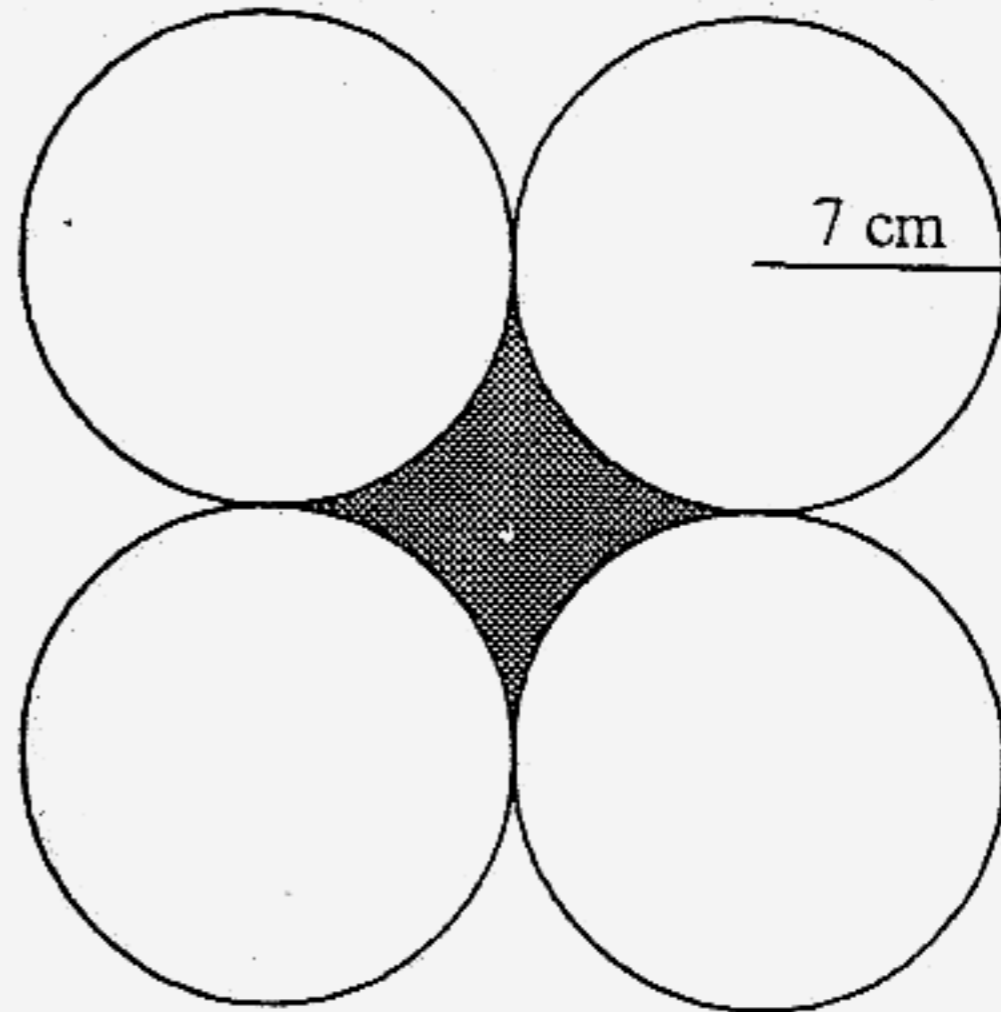
(b) m [1]

(c) m [1]

- 7 Subtract the sum of $2x^2 + 1$ and $x^2 - 3x$ from $5x^2 - 7x - 13$.

Answer [3]

- 8 In the diagram, four equal circles with radius 7 cm are arranged together. Find the shaded area between these circles. [Take $\pi = \frac{22}{7}$]

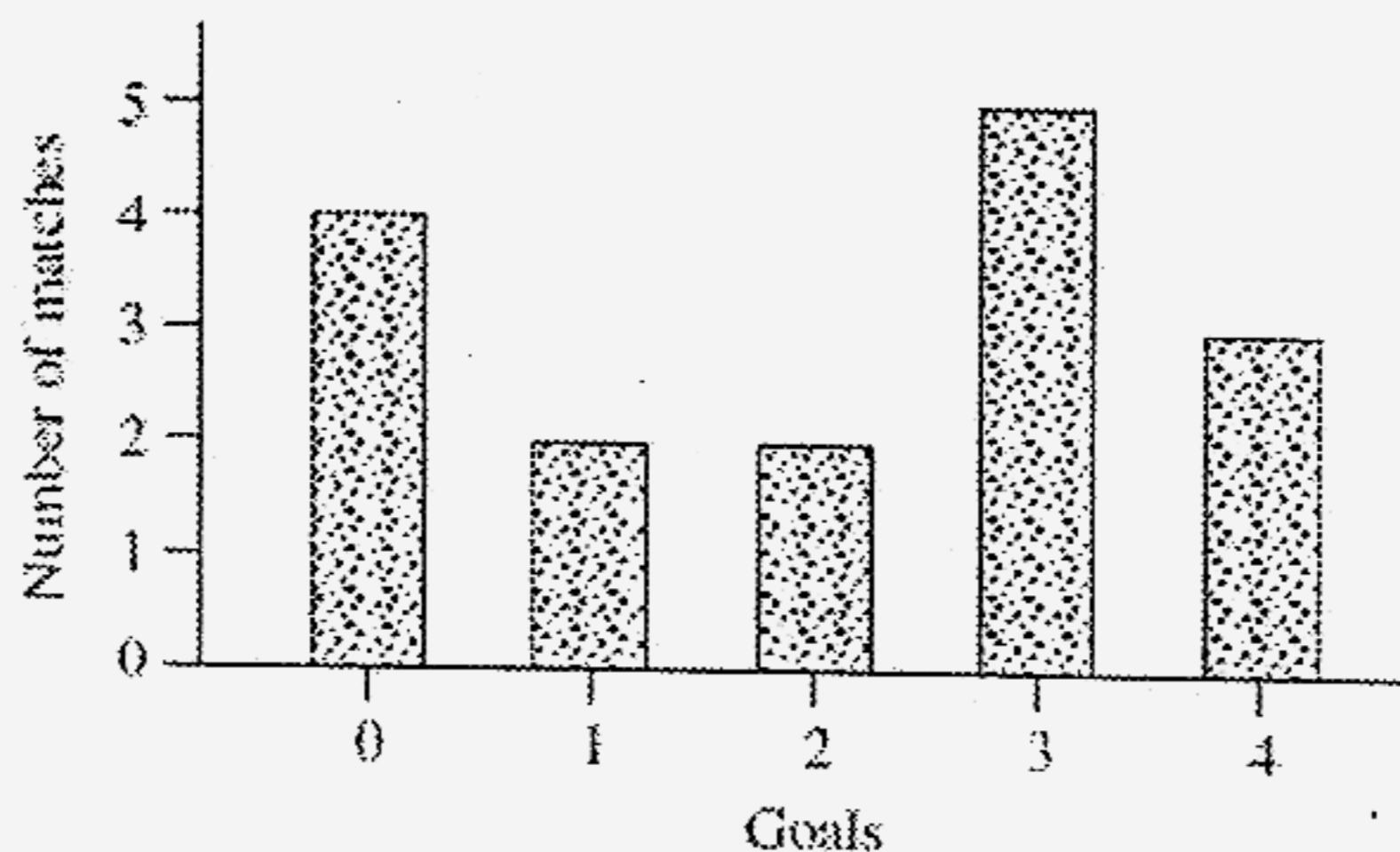


Answer cm² [5]

- 9 A rectangular block of metal with dimensions 20 cm by 30 cm by 40 cm will be used to cast into cylindrical bars with the length of 3.18 m each. The radius of the bar is 2 cm. Find the maximum number of such bars can be made.

Answer [5]

- 10 The graph shows the number of goals scored by the United soccer team in its matches over the season.



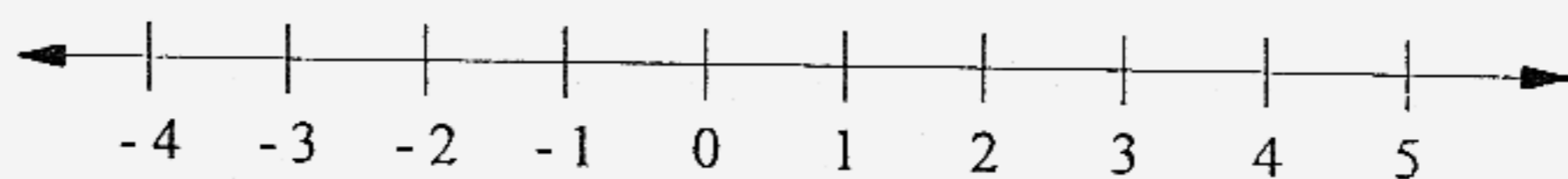
- (a) Find the total number of matches throughout the season.
- (b) A pie chart is drawn to represent the data distribution. Find the angle of the sector of the pie chart representing the goal score of '3'.

Answer (a) [1]

(b) [2]

- 11 Solve $18 - x < 21$ and show the range of x on the number line in the answer space.

Answer



[2]

- 12 The diameter of a Singapore dollar coin is 22.4 mm and the thickness is 2.4 mm. It is made by metal of density 6.66 g/cm^3 . Find the weight of coins with value \$25 (that is 25 coins).

Answer g [4]

- 13 Two six-sided dice are numbered using the numbers 1, 2, 3, 5, 7 and 11. The two dice are thrown and the numbers shown on the dice are added.

(a) The table below shows the possible sums of the two dice. Complete the table.

Answer (a)

+	1	2	3	5	7	11
1	2	3	4	6	8	12
2	3	4	5			13
3	4	5	6			14
5	6	7	8	10	12	16
7	8	9	10	12	14	18
11	12	13	14	16	18	22

[1]

- (b) List all the prime number(s) greater than 11 in the table.
- (c) Out of the 36 possible outcomes, what fraction of the sums in the table are perfect squares?

Answer (b) [1]

(c) [1]

14 (a) Solve $3(2x+1)=17$.

(b) Expand and simplify $a(b-c) - b(a-c) - c(a-b)$.

(c) Simplify $\frac{h-2}{6} - \frac{2-h}{9}$ into a single fraction.

Answer (a) $x = \dots\dots\dots$ [2]

(b) $\dots\dots\dots$ [2]

(c) $\dots\dots\dots$ [3]

- 15 Square chips are to be pasted on a rectangular board measuring 600 cm by 240 cm. All the square chips are of the same size. Find
- the highest common factor (HCF) and the least common multiple (LCM) of 600 and 240,
 - the largest possible length of the sides of each square chip such that the square chips will cover the board completely and without overlap.

Answer (a) HCF = [1]

LCM = [1]

(b) cm [1]

- 16 Given that $3x+1 \leq 2x+13$ and $-4 \leq \frac{y}{8} < 3$, find

- the greatest value of x ,
- the greatest integer value of y ,
- the smallest integer value of $y - x$,
- the smallest value of y^2 .

Answer (a) [1]

(b) [1]

(c) [1]

(d) [1]

- 17 Mr Choy opens an account with a certain investment scheme in which after a period of 3 years, the amount of interest \$ i is given by the formula

$$i = m(1+r)^3 - a^2 - m$$

where \$ m is the amount of money he invests, r is the fixed interest rate per annum and \$ a is a negative number representing the administrative fees.

Given that at the time of investment, $r = 0.02$ and $a = -5$, find

- (a) the amount of interest Mr Choy will receive after 3 years if he invests \$25 000,
(b) how much money Mr Choy needs to invest if he wants to earn at least \$2 000 interest after 3 years.

Answer (a) \$ [2]

(b) \$ [3]

18 Factorise fully

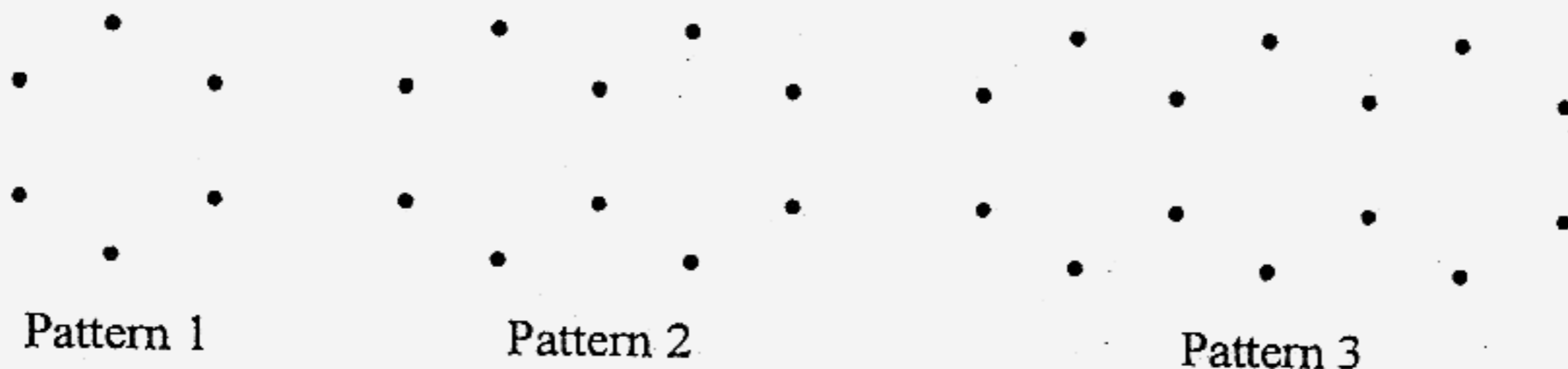
(a) $12a^2b^2 - 21a^3$,

(b) $5cd - 7c^2 + 5d^2 - 7cd$.

Answer (a) [2]

(b) [2]

19



Counters are used to make patterns as shown above. Pattern 1 contains 6 counters. The numbers of counters needed to make each pattern form a number sequence.

- (a) Write down the first four terms of this sequence.
- (b) The number of counters needed to make Pattern n is $An + 2$. Find the value of A .
- (c) Mary has 500 counters. She uses as many of these counters as she can to form Pattern m , find
 - (i) the value of m ,
 - (ii) how many counters are not used.

Answer (a) [1]

(b) $A =$ [1]

(c)(i) $m =$ [1]

(ii) [1]

- 20 A charity event on television requests viewers to make telephone calls in order to make donations.

Viewers who call 1900-GIVE-020 donate \$20 while viewers who call 1900-GIVE-050 donate \$50. However, each call-in donation is **inclusive** of a 20¢ administration charge to be paid to the phone company.

The event collected a total of 70 000 phone donations.

- (a) If the number of calls to 1900-GIVE-020 was x , write down an expression for the total number of calls to 1900-GIVE-050.
- (b) The total amount collected through phone donations, in dollars, after deducting the administration charges of the phone company can be expressed as $\$(3\,486\,000 - Ax)$. Find the value of A .
- (c) The total amount collected through phone donations after deducting the administration charges of the phone company was \$1 863 000. Form an equation in x and solve it to find the number of phone calls made to each of the two donation phone lines.

Answer (a) [1]

(b) A = [1]

(c) 1900-GIVE-020 received calls while

1900-GIVE-050 received calls. [3]

- 21 (a) In the answer space, construct and label a quadrilateral $PQRS$ such that $\hat{PQR} = 85^\circ$, $\hat{QRS} = 65^\circ$, $PQ = 6$ cm, $QR = 8.3$ cm and $RS = 6.5$ cm.

Answer (a)

[4]

(b) On the same diagram, construct

(i) the angle bisector of \hat{QPS} ,

[1]

(ii) the perpendicular bisector of side QR .

[1]

(c) The two bisectors intersect at T , measure and write down the size of \hat{SPT} .

(c) $\hat{SPT} = \dots\dots\dots$ [1]

Answers

1. (a) 5000 (b) 3
2. (a) $2\frac{53}{56}$ or 2.95 (b) 9.85 (c) 2.12
3. 60
4. (a) 62.5 (b) 54
5. (a) 119 (b) 30.5
6. (a) 2.6 (b) -0.5 (c) -0.8
7. $2x^2 - 4x - 14$
8. 42
9. 6
10. (a) 16 (b) 112.5
11. $x > -3$
12. 157
13. (a) 13 (b) $\frac{7}{36}$
14. (a) $2\frac{1}{3}$ (b) $2bc - 2ac$ (c) $\frac{5h-10}{18}$
15. (a) 120, 1200 (b) 120
16. (a) 12 (b) 23 (c) -44 (d) 0
17. (a) 1505.20 (b) 33100
18. (a) $3a^2(4b^2 - 7a)$ (b) $(5d - 7c)(c + d)$
19. (a) 6, 10, 14, 18 (b) 4 (c) (i) 124 (ii) 2
20. (a) $70000 - x$ (b) 30 (c) 54100, 15900
21. (c) 47