

Barbados S.D.A. Secondary School
Qualifying Exam 2005
Mathematics

Time: 2 hr 30 min

Answer ALL questions on foolscap paper.
Silent calculators may be used.
ALL working must be clearly shown.

1. (a) Calculate the exact value of
- $$\frac{3\frac{1}{4} - 2\frac{1}{3}}{1\frac{5}{6}} \quad (3 \text{ marks})$$
- (b) Write the value of $(11.2)^2 - (0.375 \div 3)$
- (i) exactly
 - (ii) to two significant figures
 - (iii) in standard form. (5 marks)
- (c) A metal is made from copper, zinc and lead in the ratio 13: 6: 1. The mass of the zinc is 90 kg. Calculate the mass of the metal. (4 marks)
- (d) Write 4768 correct to 3 significant figures. (2 marks)
- (e) The hire purchase price for a refrigerator is \$6500. A deposit of \$500 is made and the remainder is paid in equal monthly payments of \$250.
- (i) Calculate the number of monthly payments that must be made.
 - (ii) If the cash price is \$4000, express as a percentage of the cash price, the extra cost of buying on hire purchase. (5 marks)
2. (a) Simplify
- (i) $3m - 2(m + 1)$
 - (ii) $\frac{3}{y} - \frac{2}{y-2}$ (5 marks)
- (b) Solve the equation
- $$2(x-1) = \frac{5}{2}$$

marks)

(3

(c) Solve the simultaneous equations

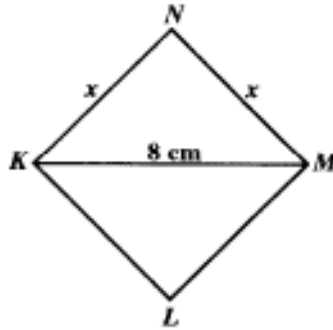
$$3a - 2b = 12$$

$$2a + b = 1$$

(4

marks)

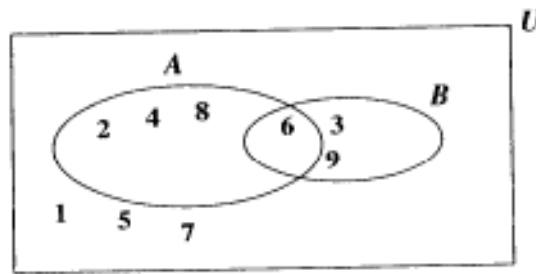
3. (a)



The diagram above, not drawn to scale, shows a square $KLMN$, where $KM = 8$ cm and $KN = MN = x$ cm.

Show that $x^2 = 32$. (2 marks)

4. (a)

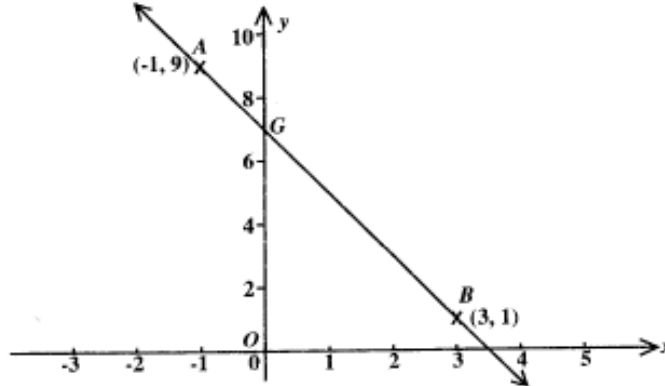


In the Venn diagram above,

$U = \{\text{whole numbers less than } 10\}$, and A and B are subsets of U .

- Describe A and B in words.
- List the members of $A \cap B$ and describe the set, in words, in relation to A and B .
- Determine $n(A \cup B)$. (5 marks)

(b)



In the diagram above, not drawn to scale, AB is the straight line joining $A(-1, 9)$ and $B(3, 1)$.

- (i) Calculate the gradient of the line, AB .
- (ii) Determine the equation of the line, AB .
- (iii) Write the coordinates of G , the point of intersection of AB and the y -axis.
- (iv) Write the equation of the line through O , the origin, that is perpendicular to AB .
- (v) Write the equation of the line through O that is parallel to AB .

(7
marks)

5. The functions f and g , are defined by

$$f(x) = \frac{x}{3} + 1 \quad \text{and}$$

$$g(x) = 2x - 1.$$

(a) Calculate $g(-3)$. (1
mark)

(b) Find, in its simplest form,

(i) $f^{-1}(x)$

(ii) $g^{-1}(x)$

(iii) $fg(x)$ (5

marks)

6. (a) Given that $A = \begin{pmatrix} 1 & 4 \\ -1 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & 3 \\ 2 & 5 \end{pmatrix}$

Calculate A^2 (i.e. $A \times A$)

Evaluate $A^2 + B$. (4

marks)

(b) Factorize completely:

(i) $y^2 - 3y$

(ii) $9x^2 - 1$

(iii) $8a^2 - 2a - 1$

(4

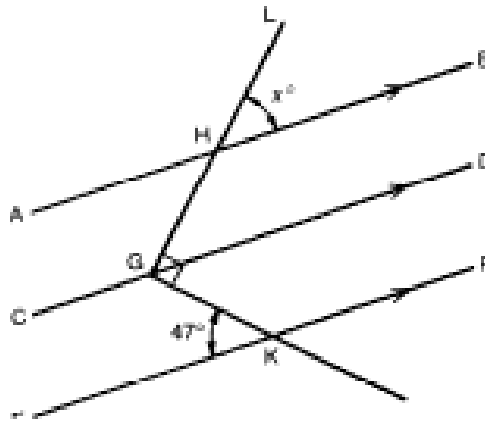
marks)

(c) Solve the equation $\frac{2x-3}{2} - \frac{x+4}{4} = 1$

(4

marks)

(d)



The straight lines AB, CD and EF are parallel. Given that angle EKG = 47° and that the straight line LHG is at right angles to GK, calculate the size of the angle marked x in the diagram.

Barbados S.D.A. Secondary School
 Qualifying Exam 2005
 Mathematics
 Paper 1

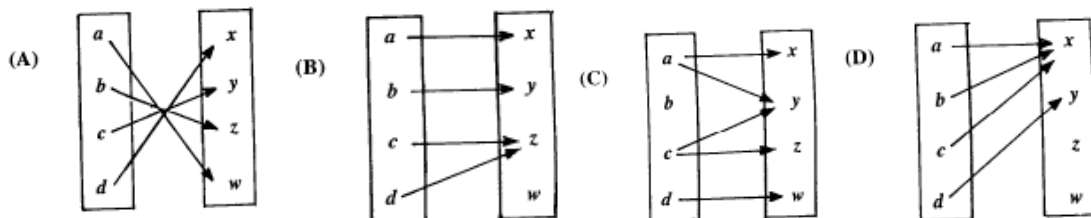
Time: 45 minutes

No calculators allowed in this paper.

Item 1 refers to the chart below which gives details of a special offer for a weekend holiday in Martinique.

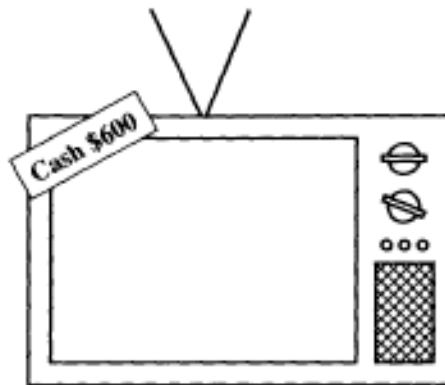
Air Fare	
Adults	- \$75
Children under 15 yrs	- \$40
Accommodation	
\$100 each	
OR	
\$350 for a family of 4	

1. A man, his wife, and two children, aged 16 years and 14 years, wish to spend the weekend in Martinique. What is the least cost to the family for the visit?
 (A) \$585 (B) \$615 (C) \$635 (D) \$665
2. Which of the following is the closest approximation for 6150×2.95 ?
 (A) 12000 (B) 15000 (C) 18000 (D) 21000
3. The co-ordinates of the mid-point of the line joining the points (3, 6) and (7, 5) are
 (A) (5.5, 5) (B) (4, 6.5) (C) (4.5, 6) (D) (5, 5.5)
4. Which of the following relations represents a one-to-one mapping?



5. What is 10 per cent of 15 per cent of \$500?
 (A) \$ 0.75 (B) \$ 7.50 (C) \$ 12.50 (D) \$ 125.00
6. The cost price of an article is \$40 and the profit is 20 per cent of the cost price. What is the selling price of the article?

- (A) \$40.20 (B) \$48.00 (C) \$50.00 (D) \$60.00
7. When expressed to the nearest hundred, 3754 becomes
 (A) 3 700 (B) 3 750 (C) 3 800 (D) 4000
8. Pineapples are sold at d cents per pound. The total weight of 3 pineapples is 5 pounds. What is the average cost of 1 pineapple?
 (A) $\frac{3d}{5}$ cents (B) $\frac{5d}{3}$ cents (C) $5d$ cents (D) $15d$ cents
9. If m , a and c are constants, then the equation of a straight line may be written as
 (A) $y = mx + c$ (B) $y = \frac{c}{x}$ (C) $x^2 + y^2 = a^2$ (D) $y^2 = 4ax$
10. What is the value of $\frac{(5+2)^3}{5^2-2^2}$ in its simplest form?
 (A) $\frac{8}{21}$ (B) $\frac{7}{3}$ (C) $\frac{7}{2}$ (D) $\frac{49}{3}$
11. How much simple interest is due on a loan of \$120 for one year if the annual rate of interest is $6\frac{3}{4}$ per cent?
 (A) \$0.81 (B) \$1.20 (C) \$7.50 (D) \$8.10



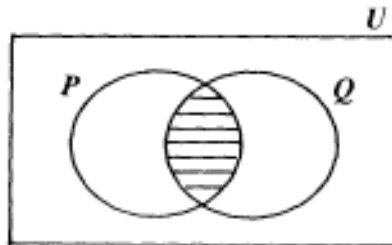
Hire Purchase Plan:

Pay down \$60
\$55 monthly for 12 months

- Mr Jones purchases the TV advertised in the diagram by using the hire purchase plan instead of paying cash. How much more than \$600 does Mr Jones pay by using the hire purchase plan?
- (A) \$ 60 (B) \$ 105 (C) \$ 115 (D) \$ 120
12. If a 6 per cent purchase tax is charged, what is the total cost of a shirt marked at \$30?
 (A) \$ 28.20 (B) \$31.80 (C) \$33.84 (D) \$36.00

13. If a customer spends more than \$20, he receives a 10 per cent discount on his total bill. How much is paid by a customer whose bill is \$80?
 (A) \$54 (B) \$70 (C) \$72 (D) \$74

14.



In the Venn diagram above, the shaded portion represents?

- (A) $P \cap Q$ (B) $P - Q$ (C) $P' \cap Q$ (D) $P \cup Q$
- 15.

Item 16 refers to the chart shown below.

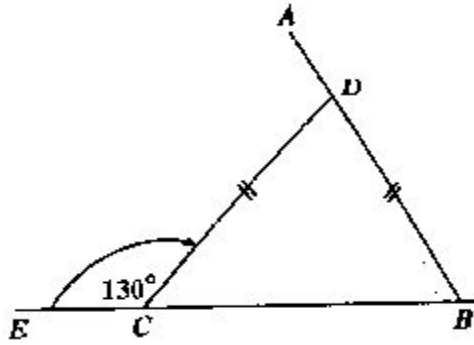
Rate on Fixed Deposits	
1975	7.8%
1976	7.5%

How much more would a fixed deposit of \$1 000 earn in 1975 than in

- (A) \$ 3.00 (B) \$ 30.00 (C) \$ 30.00 (D) \$33.00

17. Which of the following sets has an infinite number of members?

- (A) {odd number between 10 and 20}
 (B) {prime numbers between 10 and 201}
 (C) {factors of 20}
 (D) {multiples of 20}
18. If $p * q$ means $(p^2 - q^2)$, then the value of $10 * 6 =$
 (A) 4 (B) 8 (C) 16 (D) 64
19. If $50 - 3x = x - 26$, then $x =$
 (A) -12 (B) -6 (C) 6 (D) 19



20. In the figure above, angle $DCE = 130^\circ$ and $CD = BD$. The angle ADC is
 A. 50° B. 80° C. 100° D. 130°
21. If $f(x) = x^2 - 5x + 3$, then $f(-2) =$
 A. -17 B. -3 C. 9 D. 17
22. $t - \frac{3-t}{2} + \frac{3+t}{2}$ is equal to:
 A. t B. $2t$ C. $3 + 2t$ D. $4t$

Questions 23, 24 and 25 refer to the information below.

$$P = \{1, 2, 3, 4, 5, 6, 7\}$$

$$Q = \{1, 3, 5, 10, 15\}$$

$$R = \{2, 4, 6, 8, 10\}$$

23. $P \cap Q \cap R =$
 A. $\{0\}$ B. $\{\emptyset\}$ C. 0 D. \emptyset
24. $n(P \cup Q) =$
 A. 5 B. 7 C. 9 D. 10
25. $Q \cup (P \cap R) =$
 A. $\{1, 2, 3, 4, 5, 6, 10, 15\}$ C. $\{2, 4, 6, 8, 10\}$
 B. $\{2, 3, 4, 5, 6, 7\}$ D. $\{1, 3, 5, 10\}$
26. $5 - 2(x+4) =$
 A. $3x + 12$ B. $13 - 2x$ C. $3x + 4$ D. $-2x - 3$
27. $\frac{1}{2} + \frac{2}{3} =$
 A. $\frac{3}{6}$ B. $\frac{3}{5}$ C. $\frac{7}{6}$ D. $\frac{7}{5}$