Name : _____

Sydney Technical High School

2009 August Common Test

General Instructions

- Write using black or blue pen
- You may use pencil to draw or complete diagrams
- Attempt all questions
- Calculators may be used in Section 2 only

Section 2

75 marks

Time allowed for this section is 1 hour and 30 minutes

This section has TWO parts

Part A - Questions 1 – 55	55 marks
Part B - Questions 56 – 60	20 marks

Part A

Questions 1 – 55 55 marks

Use the Section 2 – Part A Answer Sheet for Questions . 1 - 55

Instructions for answering multiple-choice questions

- For Questions 1 – 50, select the alternative A, B, C or D that best answers the question. Fill in the response oval completely.

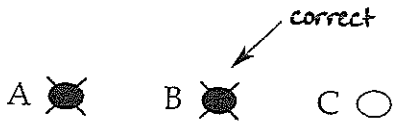
  Sample: 2 + 4 = (A) 2 (B) 6 (C) 8 (D) 9

  A ○ B ● C ○ D ○

- If you think you have made a mistake, put a cross through the incorrect answer and fill in the new answer.

  A ● B ⊗ C ○ D ○

- If you change your mind and have crossed out what you consider to be the correct answer, then indicate the correct answer by writing the word *correct* and drawing an arrow as follows.

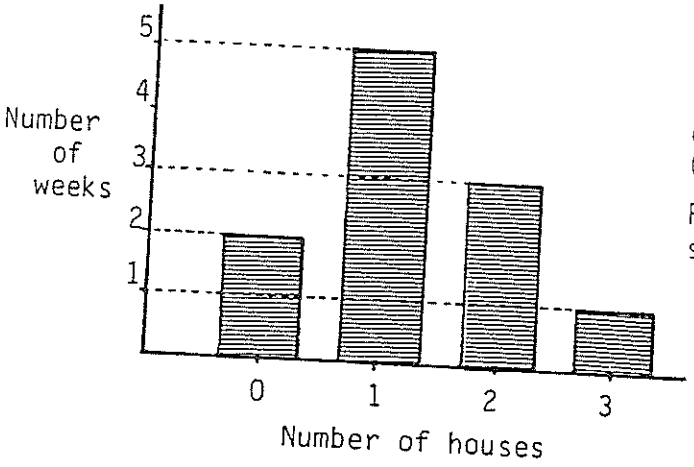
  A ⊗ B ⊗ C ○ D ○

SECTION 2 Part A

1. $\frac{7}{2000} - \frac{1}{500} =$

A. $\frac{33}{1000}$ B. $\frac{1}{250}$ C. $\frac{3}{1000}$ D. $\frac{3}{2000}$

2.



The graph shows the number of weeks a salesperson sold 0, 1, 2 or 3 houses.

For how many weeks are sales shown ?

A. 4 B. 11 C. 14 D. 15

3. A calculator displays an answer as shown below:

0.0206054

What is this answer to 3 significant figures ?

A. 0.02 B. 0.021 C. 0.0206 D. 0.020605

4. The statement "4 more than half a number n is 3 less than twice the number n" may be represented by

A. $\frac{n}{2} + 4 = 2n - 3$

B. $\frac{n}{2} + 4 = 3 - 2n$

C. $4 - \frac{n}{2} = 2n - 3$

D. $4 - \frac{n}{2} = 3 - 2n$

5. If $(a + b)^2 = a^2 + b^2 + 2$, then which of the following is true ?

A. $a = 1$, $b = 1$ or $a = -1$, $b = -1$ only

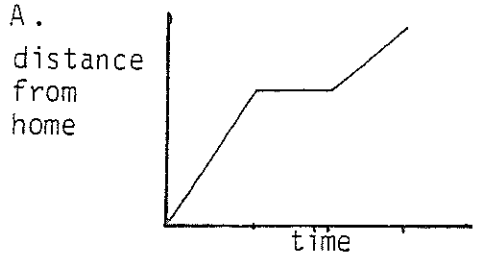
B. $a = -b$

C. $a = \frac{1}{b}$

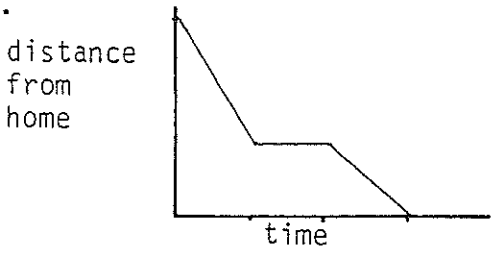
D. $a = b$

6. A cyclist travels towards home with one stop on the way.
The cyclist travels faster after the stop than before the stop.
Which graph best represents this information ?

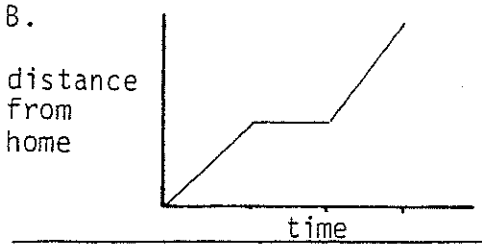
A.



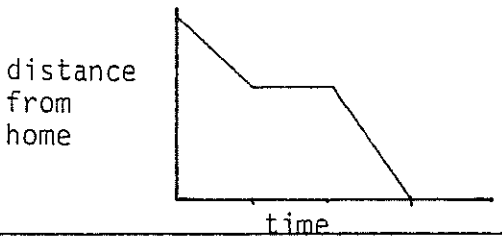
C.



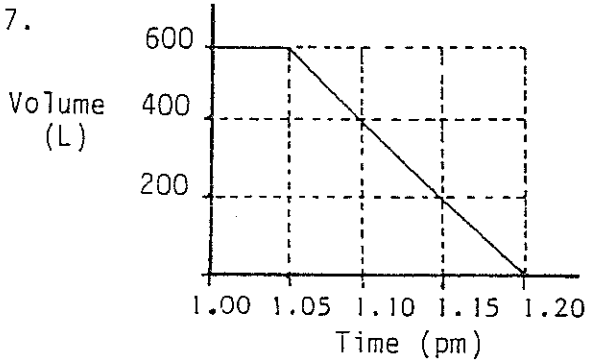
B.



D.



7.



The graph shows the volume of liquid in a 600 litre tank at different times. The tank was emptied by opening a tap.
At what rate, in litres per minute, did the tank empty ?

A. 30 B. 40 C. 1800 D. 2400

---

8. SPARKS coffee is sold in 4 different sized jars.
Which represents the best buy ?

A. 75g of coffee for $2.85
B. 100g of coffee for $3.69
C. 150g of coffee for $5.48
D. 250g of coffee for $9.25

---

9. A computer is advertised

CASH PRICE:.. $660 TERMS:.....15% deposit, then $36.50 monthly over 2 years.

How much extra is paid for the computer by buying on terms ?

A. $117.00 B. $216.00 C. $260.00 D. $315.00

10. Luke reached the station at 9.25 a.m. The next train arrived at 11 minutes to 10. The number of minutes Luke waited for this train was

A. 14 B. 24 C. 36 D. 46

---

11. $\frac{1}{2x^3}$ = ?

A. $2x^{1/3}$ B. $2x^{-3}$ C. $\frac{1}{2}x^{1/3}$ D. $\frac{1}{2}x^{-3}$

---

12. If $a\sqrt{b} = \sqrt{x}$, then x = ?

A. ab B. ab^2 C. a^2b D. a^2b^2

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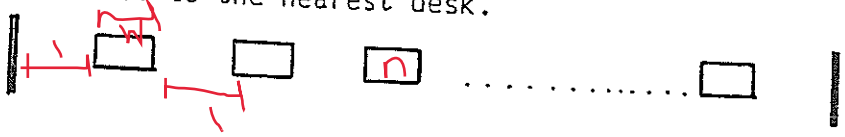
13. A row of n desks is placed between two parallel walls for an examination. Each desk is w metres wide. Desks are placed so that there is 1 metre between desks and there is 1 metre from the wall to the nearest desk.



What is the width of the room in metres ?

A. nw + n B. nw + 1 C. nw + 2 D. nw + n + 1

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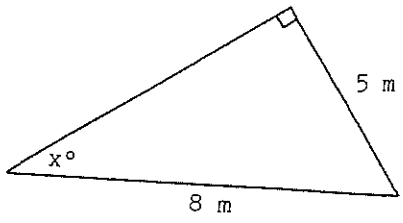
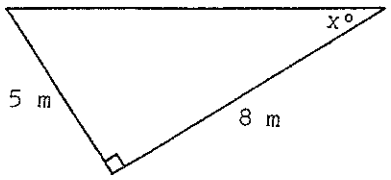
14. In which diagram does cos x° = $\frac{5}{8}$?

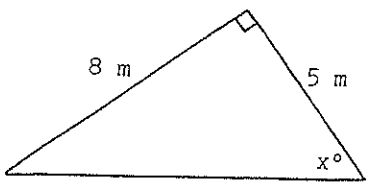
A.



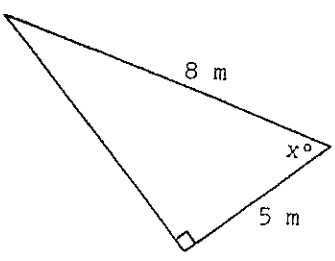
B.



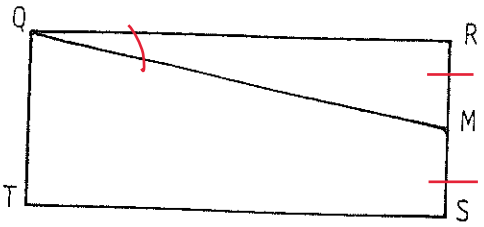
C.



D.



15.



The rectangle QRST has
QR = 3RS
M is the midpoint of RS

To the nearest degree, angle RQM = ?

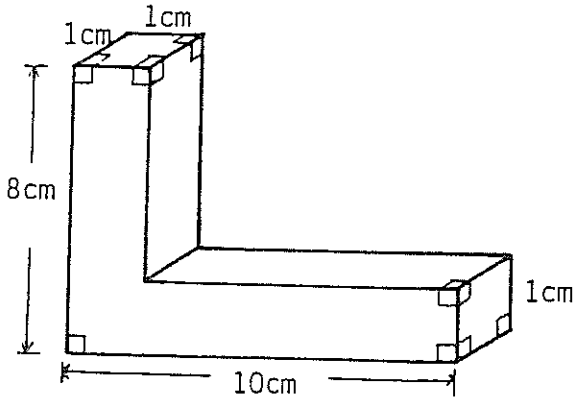
A. 9^{o} B. 18^{o} C. 72^{o} D. 81^{o}

16.

In one year, the population of a city increased by 20%. The next year, it decreased by 10%. What was the percentage increase in the population over the two years?

(A) 8% (B) 10% (C) 15% (D) 30%

17.



What is the volume, in cm^3, of the prism shown ?

A. 16 B. 17 C. 18 D. 80

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18. A room contains 4 adults, 3 boys and 2 girls.
If one person is chosen at random, what is the probability that the person is an adult ?

A. $\frac{1}{3}$ B. $\frac{1}{4}$ C. $\frac{4}{9}$ D. $\frac{4}{5}$

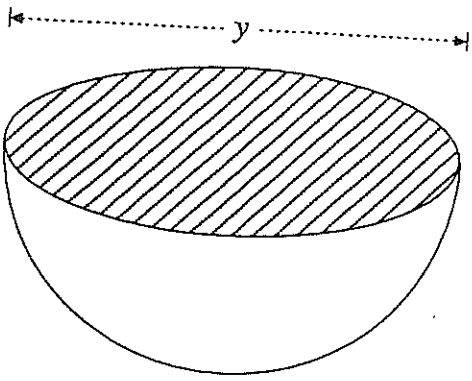
19.

Sydney is 2 hours behind Fiji. A plane leaves Sydney at 8.00 am and flies to Fiji. The flight takes 4 hours and 30 minutes.

What time is it in Fiji when the plane arrives?

(A) 2.30 pm (B) 10.30 am (C) 12.30 am (D) 12.30 pm

20.



The surface area of this *solid* hemisphere in square units is

(A) $\frac{1}{2}\pi y^2$

(B) $\frac{3}{4}\pi y^2$

(C) $2\pi y^2$

(D) $3\pi y^2$

---

21. 200 tickets are sold in a raffle in which 3 prizes are to be drawn by selecting 3 different tickets at random. Chris buys 3 tickets, and wins one of the first two prizes drawn. What is the probability that Chris will now win the third prize ?

A. $\frac{1}{99}$ B. $\frac{1}{100}$ C. $\frac{1}{198}$ D. $\frac{3}{200}$

---

22. Karen invests $900 in a building society account. Interest is paid and compounded every 6 months at a rate of 10% per annum. How much interest is earned in 2 years ?

A. $180 B. $189 C. $193.96 D. $417.69

23. What is the solution of $3 - x < 5$?

A. $x < -2$ B. $x < 2$ C. $x > -2$ D. $x > 2$

24.

$$\frac{b + \sqrt{2b}}{\sqrt{b}} = ?$$

A. $b + \sqrt{2}$ B. $\sqrt{3b}$ C. $3\sqrt{b}$ D. $\sqrt{b} + \sqrt{2}$

---

25. Which equation below is equivalent to $y = \frac{x}{3} + 4$?

A. $x = 3y - 12$

B. $x = 3y - 4$

C. $x = \frac{y}{3} - 4$

D. $x = 3y + 12$

---

26. A school has an equal number of boys and girls. $\frac{1}{5}$ of the girls and $\frac{1}{4}$ of the boys chose swimming for sport.

What fraction of the school chose swimming ?

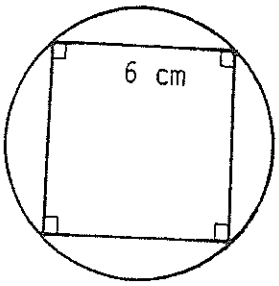
A. $\frac{1}{9}$ B. $\frac{2}{9}$ C. $\frac{9}{20}$ D. $\frac{9}{40}$

---

27. A bookseller sells a book for \$15.30 at a sale.
This represents a loss of 10%.
How much did the bookseller lose on this book ?

A. \$1.39 B. \$1.53 C. \$1.70 D. \$13.77

28.



The diagram shows a square of side 6 cm in a circle. What is the area of the circle in cm^2 ?

A. 9π B. 18π C. 36π D. 72π

---

29. How many times must the number m be subtracted from m^2 to give a result of zero ?

A. 2 B. m C. m^2 D. m^2-m

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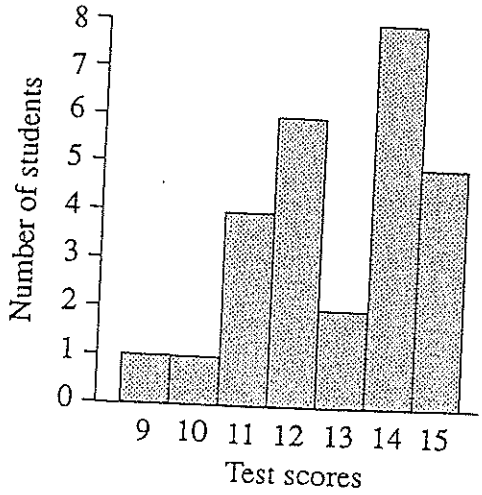
30. The results of a Year 10 class test are shown in the frequency histogram below.



The median test score is

(A) 11 (B) 12 (C) 13 (D) 14

---

31. What is the least (minimum) value of $(x + 3)^2 + 4$?

A. 3 B. 4 C. 9 D. 13

32. x is the smallest of three consecutive odd numbers.

What is their sum ?

A. $9x$ B. $3x + 3$ C. $3x + 4$ D. $3x + 6$

---

33. Which expressions are the solutions of $x^2 - 5x - 3 = 0$?

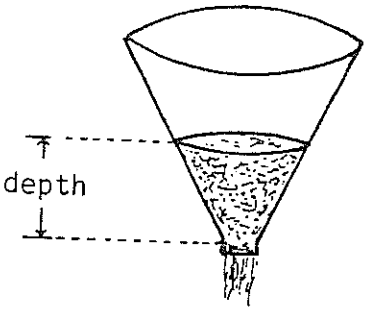
A. $\frac{-5 + \sqrt{37}}{2}$ or $\frac{-5 - \sqrt{37}}{2}$

B. $\frac{5 + \sqrt{13}}{2}$ or $\frac{5 - \sqrt{13}}{2}$

C. $\frac{-5 + \sqrt{13}}{2}$ or $\frac{-5 - \sqrt{13}}{2}$

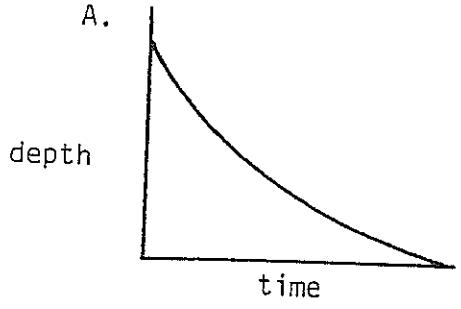
D. $\frac{5 + \sqrt{37}}{2}$ or $\frac{5 - \sqrt{37}}{2}$

34.

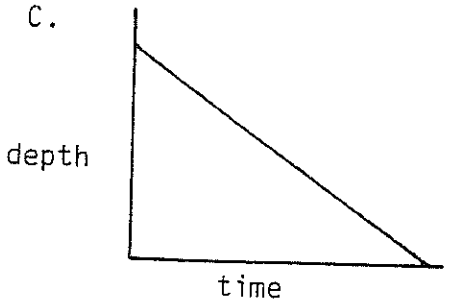


Water flows out of a conical funnel at a constant rate.
Which graph best illustrates the change in depth of water with time ?

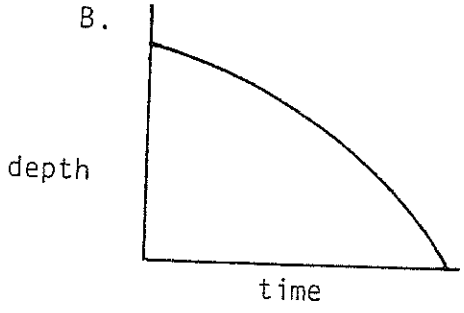
A.



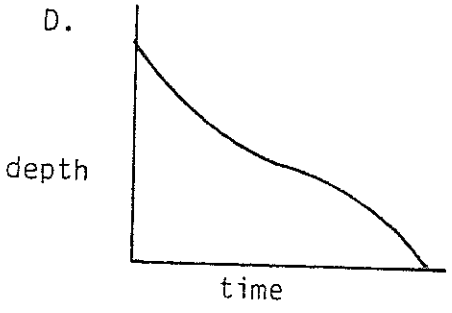
C.



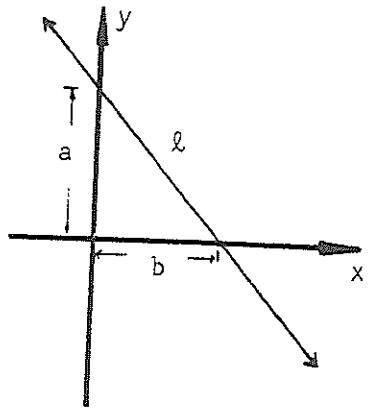
B.



D.



35.



What is the equation of the line ℓ ?

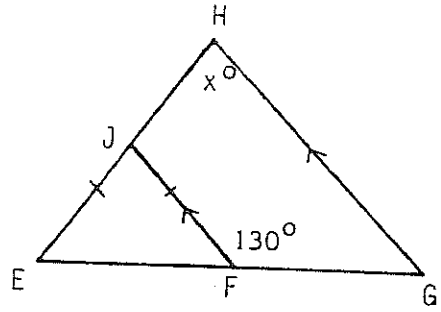
A. $y = \frac{a}{b}x + a$

B. $y = \frac{a}{b}x + b$

C. $y = -\frac{a}{b}x + a$

D. $y = -\frac{a}{b}x + b$

36.



In the diagram,

EJ = JF

JF ∥ HG

$\angle JFG = 130^{\circ}$

x = ?

A. 50 B. 80 C. 100 D. 130

37.

$ax - ay - cy + cx$ expressed as a product of factors is

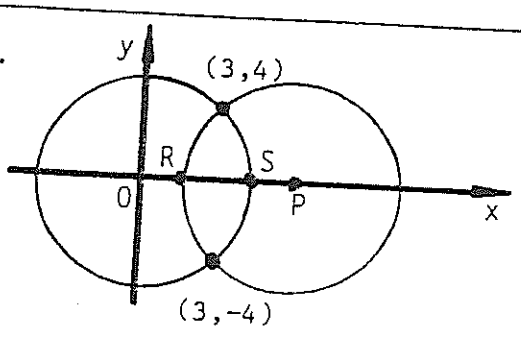
A. $(a + c)(x - y)$

B. $(a - c)(x + y)$

C. $(a + c)(y - x)$

D. $(a - c)(x - y)$

38.

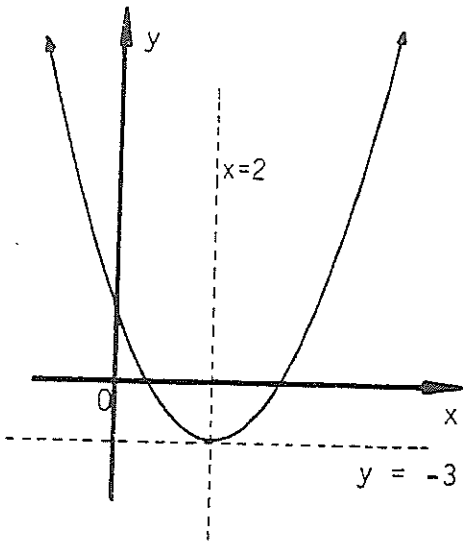


O and P are centres of equal circles which intersect at (3,4) and (3,-4). The circles cut the x axis as shown at R and S.

RS = ?

A. 1 B. 2 C. 4 D. 5

39.



Which equation best represents the parabola shown ?

A. $y = (x-2)^2 - 3$

B. $y = (x-2)^2 + 3$

C. $y = (x+2)^2 - 3$

D. $y = (x+2)^2 + 3$

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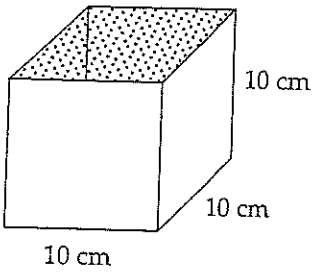
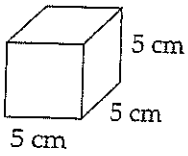
40. How many 5 cm cubes can be packed in a box which measures 10 cm by 10 cm by 10 cm?





NOT TO SCALE

(A) 4 (B) 8 (C) 10 (D) 16

41.

The table shows personal income tax rates.

Taxable income	*Tax on this income*
\$0 – \$6 000	Nil
\$6 001 – \$20 000	17 cents for each \$1 over \$6 000
\$20 001 – \$50 000	\$2 380 plus 30 cents for each \$1 over \$20 000
\$50 001 – \$60 000	\$11 380 plus 42 cents for each \$1 over \$50 000
\$60 001 and over	\$15 580 plus 47 cents for each \$1 over \$60 000

Sandra has a gross income of \$60 780 and deductions that total \$2420.
What is the tax payable on Sandra's taxable income?

(A) \$13 526·60 (B) \$14 891·20 (C) \$15 946·60 (D) \$17 084·00

42.

The mean and standard deviation of a set of test scores are m and s respectively.

If 4 marks are added to each score, what are the mean and standard deviation of the new set of scores?

(A) Mean = m, Standard Deviation = s

(B) Mean = $m+4$, Standard Deviation = s

(C) Mean = m, Standard Deviation = $s+4$

(D) Mean = $m+4$, Standard Deviation = $s+4$

43.

Which of the following is not sufficient to ensure that a quadrilateral is a parallelogram ?

A. One pair of opposite sides are equal and parallel.

B. The diagonals bisect each other.

C. The diagonals are of different lengths.

D. All four sides are equal.

44.

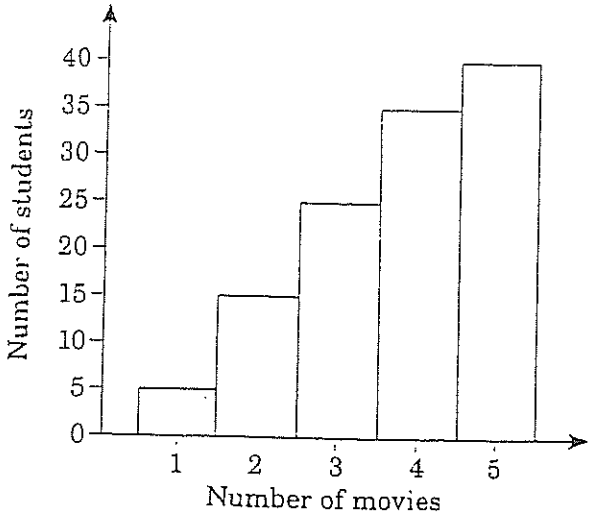
Sophia tossed a fair coin ten times, with 3 heads and 7 tails appearing.

What is the probability that the next toss will be a head?

(A) $\frac{1}{2}$ (B) $\frac{3}{7}$ (C) $\frac{3}{10}$ (D) $\frac{4}{11}$

45.

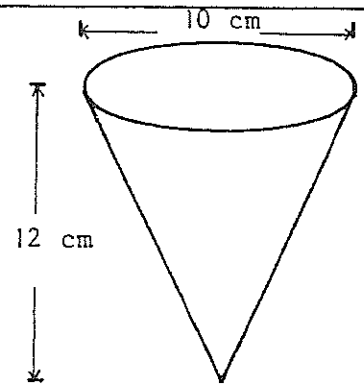
Students were surveyed about the number of movies they had watched in the last week. The results are shown in this *cumulative* frequency histogram.



How many students said they watched four movies last week?

(A) 5 (B) 10 (C) 25 (D) 35

46.



Which expression gives the volume (in cm^3) of this cone ?

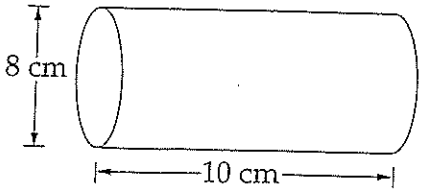
A. 100π

B. 300π

C. 400π

D. 1200π

47.



NOT TO SCALE

Which expression gives the volume of the cylinder?

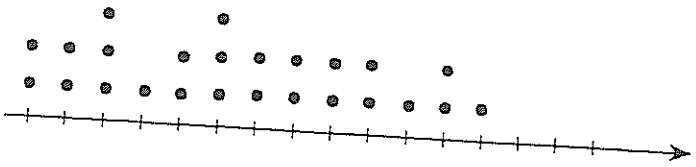
(A) $\pi \times 4^2 \times 10$ (B) $\pi \times 5^2 \times 8$

(C) $\pi \times 8^2 \times 10$ (D) $\pi \times 10^2 \times 8$

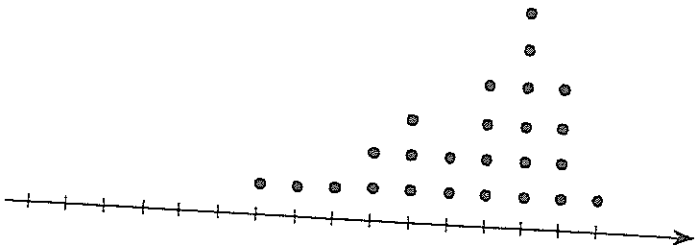
48.

The dot plots below are drawn on the same scale. They show the class scores in tests taken before and after a unit of work was completed.

Before



After

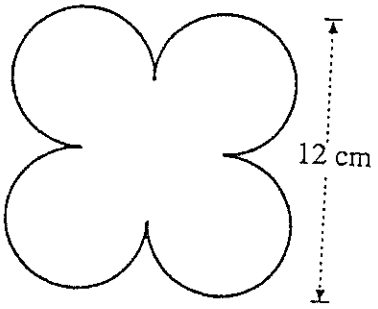


Which statement about the change in scores is correct?

(A) The mean increased and the standard deviation decreased.
(B) The mean increased and the standard deviation increased.
(C) The mean decreased and the standard deviation decreased.
(D) The mean decreased and the standard deviation increased.

---

49. Four circles of the same size are used to create the shape below.



The perimeter of this shape is

(A) 18π (B) 24π (C) 27π (D) 36π

50.

In a certain area of Australia the rabbit population doubles each year.
At the beginning of one year there were x rabbits in the area.
How many rabbits will there be in the area after n years ?

A. $2x^{n-1}$ B. $2x^{n}$ C. $2^{n-1}x$ D. $2^{n}x$

Instructions for answering Questions 51 – 55

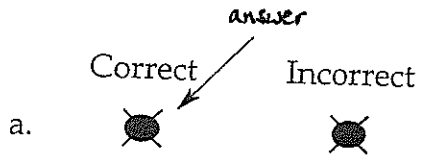
- Questions '51-55 contain options a, b, c and d. Each option may be Correct or Incorrect. In each question, one, two, three or four options may be Correct.
- For Questions 51-55, fill in the response ovals on the Section 2 – Part A Answer Sheet to indicate whether options a, b, c and d are Correct or Incorrect. You must fill in either the Correct or the Incorrect response oval for each option.

Sample:

		Correct	Incorrect
a.	$2+4 = 4+2$	a. ●	○
b.	$2-4 = 4-2$	b. ○	●
c.	$2\times4 = 4\times2$	c. ●	○
d.	$2\div4 = 4\div2$	d. ○	●

- If you think you have made a mistake, put a cross through your answer and fill in your new answer.

- If you change your mind and have crossed out what you consider to be the right answer, then indicate your intended answer by writing the word 'answer' and drawing an arrow as follows.



Question 51

Indicate whether each of the following is Correct or Incorrect

(A) $14 = \frac{42 \times 2}{4 - 7}$ (B) $14 = \frac{60 + 24}{4 + 2}$ (C) $14 = \frac{90 - 6}{3 \times 2}$ (D) $14 = \frac{21 \times 4}{12 \div 2}$

Question 52

Brad put \$110 into an envelope. He used SIX notes and NO coins.

Indicate whether each of the following is Correct or Incorrect

(A) The envelope could contain exactly 1 twenty-dollar note.

(B) The envelope could contain exactly 2 twenty-dollar notes.

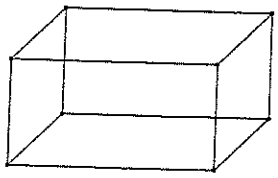
(C) The envelope could contain exactly 3 twenty-dollar notes.

(D) The envelope could contain exactly 4 twenty-dollar notes.

Question 53

A frame in the shape of a rectangular prism is made from 24 cm of wire.

Each side length is a whole number of centimeters.



Indicate whether each of the following is Correct or Incorrect

(A) The volume could be 4 cubic centimeters.

(B) The volume could be 6 cubic centimeters.

(C) The volume could be 8 cubic centimeters.

(D) The volume could be 12 cubic centimeters.

Question 54

A set of scores has a mean of 65 and a standard deviation of 12.

A score of 45 is added to the set.

Indicate whether each of the following is Correct or Incorrect.

(A) The mean will decrease.

(B) The standard deviation will decrease.

(C) The median could stay the same.

(D) The median could decrease.

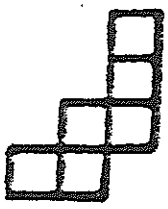
Question 55

Four students were asked to draw the net of a cube.

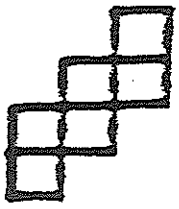
Indicate whether each of the following is Correct or Incorrect.

(A)

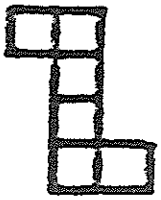
(B)



(C)



(D)



Name : _____ Teacher : SOLUTIONS

MATHEMATICS YEAR 10 AUGUST COMMON TEST 2009

Section 2 Part A Answer Sheet. Fill in the response oval completely.

1.	A ○	B ○	C ○	D ●
2.	A ○	B ●	C ○	D ○
3.	A ○	B ○	C ●	D ○
4.	A ●	B ○	C ○	D ○
5.	A ○	B ○	C ●	D ○
6.	A ○	B ○	C ○	D ●
7.	A ○	B ●	C ○	D ○
8.	A ○	B ○	C ●	D ○
9.	A ○	B ○	C ○	D ●
10.	A ○	B ●	C ○	D ○
11.	A ○	B ○	C ○	D ●
12.	A ○	B ○	C ●	D ○
13.	A ○	B ○	C ○	D ●
14.	A ○	B ○	C ○	D ●
15.	A ●	B ○	C ○	D ○
16.	A ●	B ○	C ○	D ○
17.	A ○	B ●	C ○	D ○
18.	A ○	B ○	C ●	D ○
19.	A ●	B ○	C ○	D ○
20.	A ○	B ●	C ○	D ○
21.	A ●	B ○	C ○	D ○
22.	A ○	B ○	C ●	D ○
23.	A ○	B ○	C ●	D ○
24.	A ○	B ○	C ○	D ●
25.	A ●	B ○	C ○	D ○
26.	A ○	B ○	C ○	D ●
27.	A ○	B ○	C ●	D ○
28.	A ○	B ●	C ○	D ○
29.	A ○	B ●	C ○	D ○
30.	A ○	B ○	C ●	D ○
31.	A ○	B ●	C ○	D ○
32.	A ○	B ○	C ○	D ●
33.	A ○	B ○	C ○	D ●
34.	A ○	B ●	C ○	D ○
35.	A ○	B ○	C ●	D ○
36.	A ○	B ●	C ○	D ○
37.	A ●	B ○	C ○	D ○
38.	A ○	B ○	C ●	D ○
39.	A ●	B ○	C ○	D ○
40.	A ○	B ●	C ○	D ○
41.	A ○	B ●	C ○	D ○
42.	A ○	B ●	C ○	D ○
43.	A ○	B ○	C ●	D ○
44.	A ●	B ○	C ○	D ○
45.	A ○	B ●	C ○	D ○
46.	A ●	B ○	C ○	D ○
47.	A ●	B ○	C ○	D ○
48.	A ●	B ○	C ○	D ○
49.	A ●	B ○	C ○	D ○
50.	A ○	B ○	C ○	D ●

Turn over to answer questions 51-55

51.

	Correct	Incorrect
(A)	O	●
(B)	●	O
(C)	●	O
(D)	●	O

52.

	Correct	Incorrect
(A)	●	O
(B)	●	O
(C)	O	●
(D)	O	●

53.

	Correct	Incorrect
(A)	●	O
(B)	●	O
(C)	●	O
(D)	O	●

54.

	Correct	Incorrect
(A)	●	O
(B)	O	●
(C)	●	O
(D)	●	O

55.

	Correct	Incorrect
(A)	O	●
(B)	O	●
(C)	●	O
(D)	●	O