T 3 2011

Name:----------

Teacher:----------

SYDNEY TECHNICAL HIGH SCHOOL

YEAR 9 YEARLY EXAMINATION 2011

MATHEMATICS

Paper A

SECTION 1: Non-calculator (25 marks)

Instructions:

Write the answers to Questions 1 – 25 in the answer column.

Calculators are not to be used.

Do not start section 2 until instructed by your teacher.

TIME ALLOWED 30 min

Section 1: Non-calculator

ANSWERS

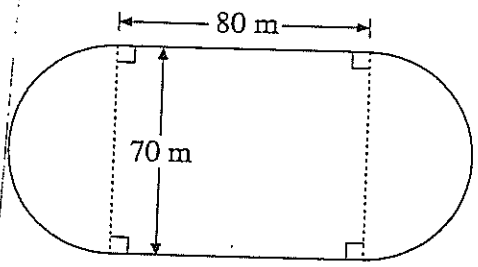
1. Evaluate $27^{\frac{1}{3}}$.

2. $a+b\div c\times 2$ is equal to

(A) $a+\frac{b}{c}\times 2$ (B) $\frac{a+b}{c}\times 2$ (C) $a+\frac{b}{c\times 2}$ (D) $\frac{a+b}{c\times 2}$

3. When $x=-1$, $2x^3-(3x)^3=$

4.



NOT TO SCALE

The diagram shows a track with semicircular ends.

The distance around the track in metres is

(A) $70\pi+160$

(B) $70\pi+300$

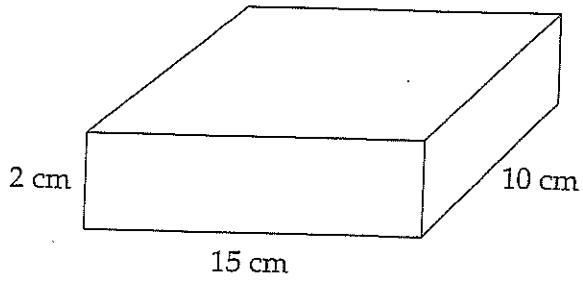
(C) $140\pi+160$

(D) $140\pi+300$

5. $75\text{ mm}^2=$

(A) $0{\cdot}75\text{ cm}^2$ (B) $7{\cdot}5\text{ cm}^2$ (C) 750 cm^2 (D) 7500 cm^2

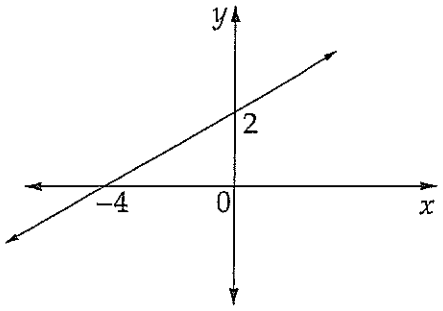
6. The diagram shows a closed rectangular prism.



NOT TO SCALE

What is its surface area?

7. What is the equation of the line below?



8. $\frac{4x}{5} + \frac{x}{3} =$

(A) $\frac{4x^2}{8}$ (B) $\frac{5x}{8}$ (C) $\frac{17x}{15}$ (D) $\frac{23x}{15}$

9. Consider the table of values.

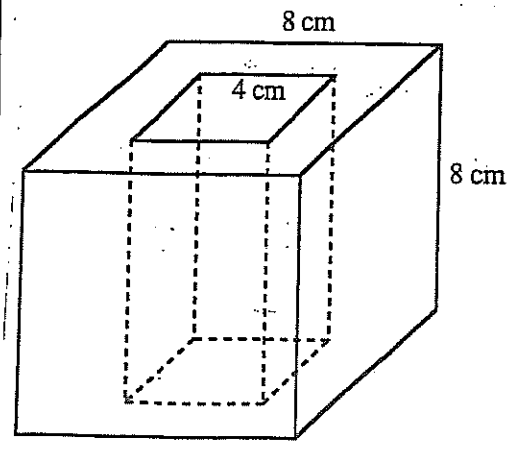
x	1	2	3	4
y	3	7	11	15

What rule describes the pattern?

10. The faces on a 10-sided die are numbered 1 to 10.

What is the probability of NOT rolling a 5?

11.



An 8 cm cube has a 4 cm square hole cut through it.

Calculate the *remaining* volume.

(A) 64 cm^3

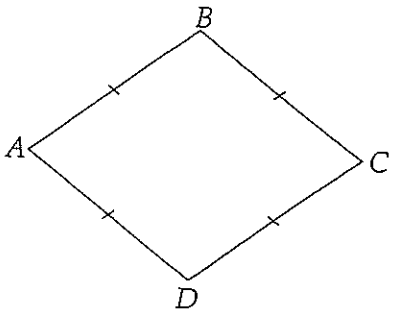
(B) 128 cm^3

(C) 384 cm^3

(D) 448 cm^3

ANSWER

12. *ABCD* is a rhombus. Its area is 48 cm^2, and $AC = 8$ cm.



NOT TO SCALE

What is the length of *BD*?

13. 20% of an amount is 40.

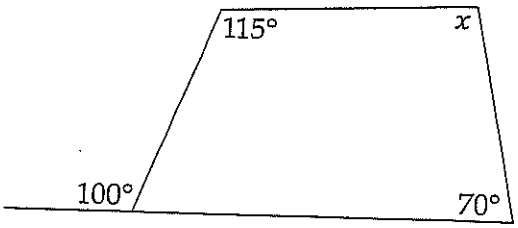
What is the amount?

14. A shipping container of mass T tonnes is filled with x car engines, each of mass y kilograms.

The total mass, in tonnes, of the container full of engines is

(A) $T + \frac{xy}{1000}$ (B) $\frac{T}{1000} + xy$ (C) $\frac{T + xy}{1000}$ (D) $1000T + xy$

15.



NOT TO SCALE

What is the value of x?

16. Eva is x years old. Tara is 3 years older than Eva.

Which of these is an expression for Tara's age in 5 years' time?

(A) $x + 8$ (B) $5(x + 3)$ (C) $x + 2$ (D) $3x + 5$

17. Tai and Mel received text messages in the ratio of 4:5.

They received 108 text messages altogether.

How many did Tai receive?

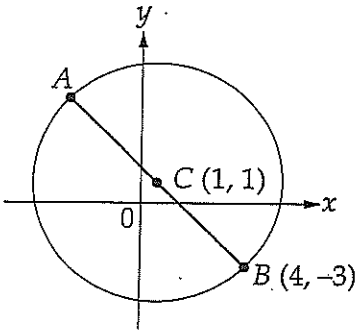
18. $5x^{-2} =$

(A) $\frac{1}{25x^2}$ (B) $\frac{1}{5x^2}$ (C) $\frac{5}{x^2}$ (D) $\frac{25}{x^2}$

19. An item decreased in value from \$20 to \$5.

What is the percentage decrease?

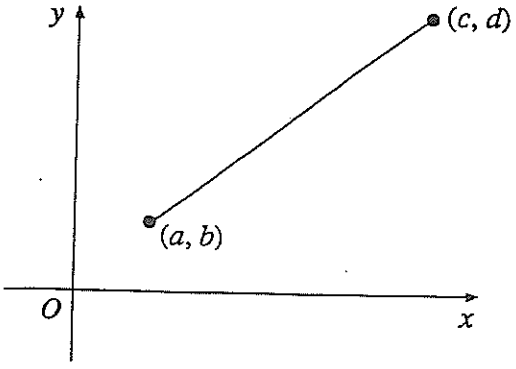
20. The circle has AB as a diameter and centre C.



NOT TO SCALE

What are the coordinates of A?

21.



The distance between these two points is

(A) $\sqrt{(a-c)^2+(b-d)^2}$

(B) $\sqrt{(a+b)^2-(c+d)^2}$

(C) $\sqrt{(a+c)^2-(b+d)^2}$

(D) $\sqrt{(a-b)^2+(c-d)^2}$

22.	Peter's rate of pay is \$18 per hour. When he works overtime, his rate of pay is at time-and-a-half. What is he paid for two hours of overtime work?	
23.	Which expression is equivalent to a^6? (A) $\sqrt{a^{36}}$ (B) $(a^3)^2$ (C) $a^3 \times a^2$ (D) $a^{18} \div a^3$	
24.	If $b < 0 < a$ then (A) a is negative and b is negative (B) a is negative and b is positive (C) a is positive and b is negative (D) a is positive and b is positive	
25.	Factorise $6a - 15$	

Name:----------

Teacher:----------

SYDNEY TECHNICAL HIGH SCHOOL

YEAR 9 YEARLY EXAMINATION 2011

MATHEMATICS

Paper A

SECTION 2: Multiple Choice (30 marks)

1. 0·030 142 written correct to 3 significant figures is

(A) 0·03 (B) 0·030 (C) 0·030 1 (D) 0·030 14

2. There are 15 boys in a group of 35 students.

What is the ratio of boys to girls in this group?

(A) 3 : 4 (B) 4 : 3 (C) 4 : 7 (D) 3 : 7

3. A motor car travels 6·25 km on 1 litre of fuel. How many litres is this per 100 km?

(A) 0·0625 (B) 0·16 (C) 16 (D) 625

4. A group of students was surveyed regarding their favourite type of TV show. The results are shown in the table below.

Comedy	*Drama*	*Reality*
15	13	12

A student from this group is chosen at random.

What is the probability that this student's favourite type of TV show is comedy?

(A) $\frac{1}{3}$ (B) $\frac{3}{8}$ (C) $\frac{1}{15}$ (D) $\frac{15}{25}$

5. Paul will sit for 10 tests this year. Each test is marked out of 50.

After 8 tests, his mean mark is 77·5%.

What is the highest mean mark (as a percentage) that Paul could achieve for this year?

(A) 72% (B) 82% (C) 88·75% (D) 92·5%

6. A full bucket holds approximately 5×10^8 grains of sand.

Jock estimates that the sand on a beach would fill 60 000 buckets.

Approximately how many grains of sand are on the beach?

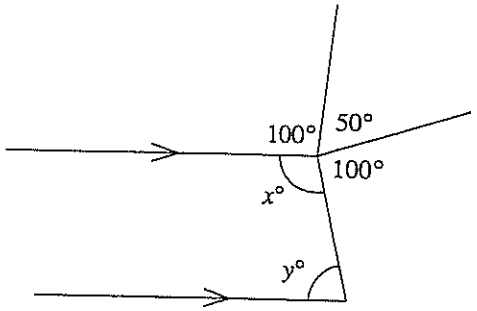
(A) 3×10^{13}

(B) 3×10^9

(C) 8.3×10^3

(D) 1.2×10^4

7. NOT TO SCALE



Without drawing any further lines on the diagram, four students found the values of x and y, giving reasons. Only one student gave the correct reasons.

Which reasons are correct? (NOTE. The values of x and y are not shown.)

(A) $x =$ . . . (vertically opposite angles)
$y =$ . . . (cointerior angles and parallel lines)

(B) $x =$ . . . (angle-sum at a point is 360°)
$y =$ . . . (cointerior angles and parallel lines)

(C) $x =$ . . . (vertically opposite angles)
$y =$ . . . (corresponding angles and parallel lines)

(D) $x =$ . . . (angle-sum at a point is 360°)
$y =$ . . . (corresponding angles and parallel lines)

8. An item is sold for $22.00 including 10% GST.

What is the cost before the GST is added?

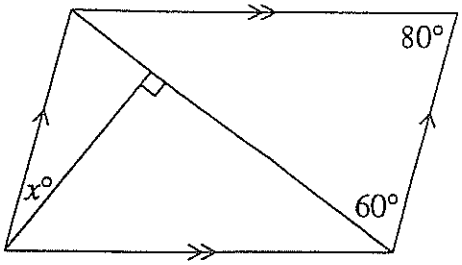
(A) $18 (B) $19.80 (C) $20 (D) $24.20

9.

Make n the subject of $nc = n + 50$.

(A) $n = 50 - c$ (B) $n = 50 - c + 1$ (C) $n = \frac{c + 50}{c}$ (D) $n = \frac{50}{c - 1}$

10.



NOT TO SCALE

$x =$

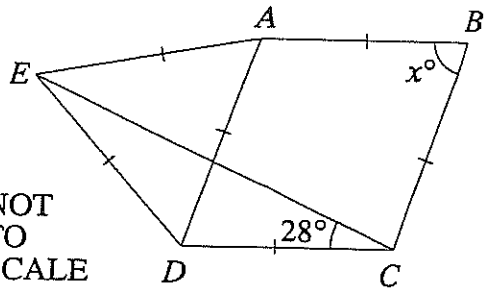
(A) 20

(B) 30

(C) 40

(D) 50

11.



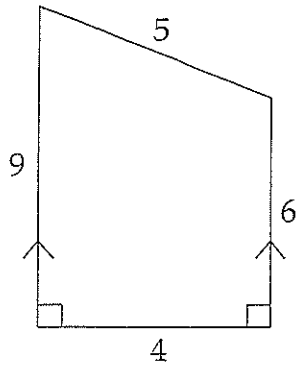
NOT TO SCALE

ABCD is a rhombus.
DEA is an equilateral triangle.
Find the value of x.

(A) 56 (B) 60

(C) 62 (D) 64

12.

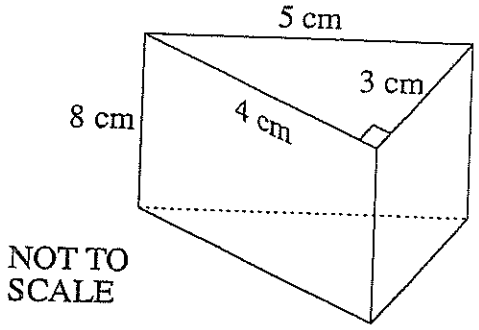


NOT TO SCALE

Which of the following expressions could be used to find the area of this trapezium?

(A) $\frac{1}{2} \times 9(5 + 4)$ (B) $\frac{1}{2} \times 4(9 + 6)$ (C) $\frac{1}{2} \times 6(9 + 5)$ (D) $\frac{1}{2} \times 5(9 + 4)$

13.



NOT TO SCALE

The volume of this triangular prism is

(A) 48 cm^3

(B) 60 cm^3

(C) 80 cm^3

(D) 96 cm^3

14. $\sqrt{24} =$

(A) $2\sqrt{6}$ (B) $4\sqrt{3}$ (C) $4\sqrt{6}$ (D) $6\sqrt{2}$

15. Rationalize the denominator of $\frac{1}{\sqrt{7}-2}$.

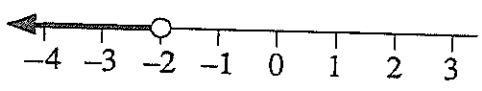
(A) $\frac{\sqrt{7}-2}{3}$ (B) $\frac{\sqrt{7}+2}{3}$ (C) $\frac{\sqrt{7}-2}{5}$ (D) $\frac{\sqrt{7}+2}{5}$

16. $(6+\sqrt{5})(6-\sqrt{5}) =$

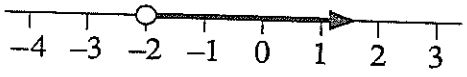
(A) $11-12\sqrt{5}$ (B) $31-12\sqrt{5}$ (C) 11 (D) 31

17. The graph that illustrates the solution of $-3x > 6$ is

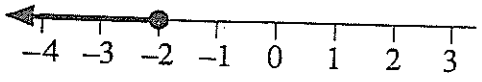
(A)



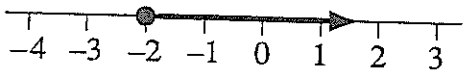
(B)



(C)



(D)



18. $\frac{(a^3)^2}{a^4 \times a^2} =$

(A) 1 (B) $\frac{1}{a}$ (C) $\frac{1}{a^2}$ (D) $\frac{1}{a^3}$

19. $\frac{1}{3x} + \frac{3}{x} =$

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

20. $\left(\frac{x^{-1}}{3}\right)^{-2} =$

(A) $\frac{1}{9x^2}$ (B) $\frac{9}{x^2}$ (C) $\frac{x^2}{9}$ (D) $9x^2$

21. The point $(a, 2)$ lies on the line whose equation is $2x + y + 4 = 0$.

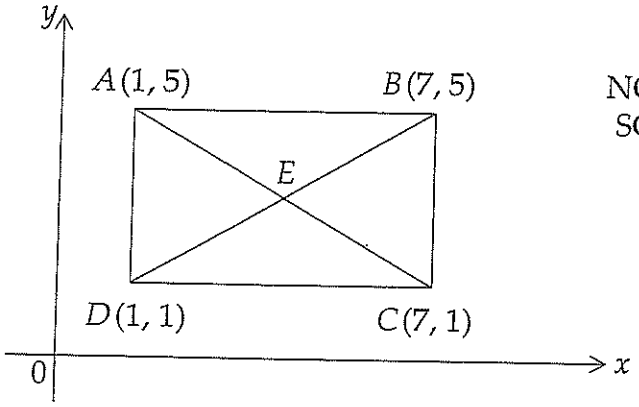
The value of a is

(A) -8 (B) -3 (C) 3 (D) 8

22. The gradient of the line $2x - 3y + 7 = 0$ is

(A) $-\frac{3}{2}$ (B) $-\frac{2}{3}$ (C) $\frac{2}{3}$ (D) $\frac{3}{2}$

23.



NOT TO SCALE

What are the coordinates of E in the above figure?

(A) (4, 3) (B) (3, 4) (C) (3, 2) (D) (2, 3)

24. René lost 80% on his share investments. After a period of time, his shares increased in value to their previous value.

What is this increase expressed as a percentage?

(A) 20% (B) 80% (C) 400% (D) 500%

25. Oliver earns a yearly salary of $68 720. After tax, he receives 65% of this as net pay.

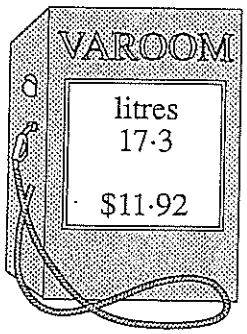
What is his monthly net pay to the nearest dollar?

(A) $2004 (B) $3436 (C) $3722 (D) $5662

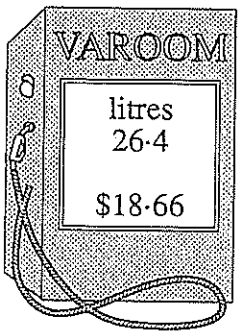
26. The petrol pumps show the number of litres bought and the total price paid on four different days.

Which pump shows the best value?

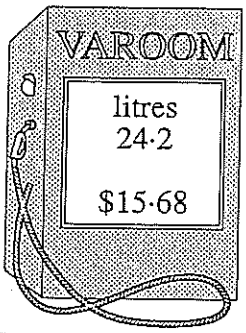
(A)



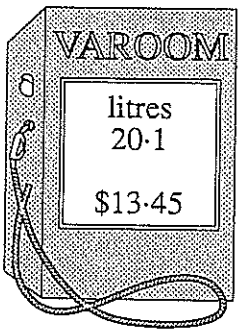
(B)



(C)



(D)



27. The tax payable on taxable incomes in the range $20 701 to $38 000 is given by:

$3060 plus 34c for each $1 over $20 700.

How much tax does Theresa pay if her taxable income is $29 408?

(A) $2960·72 (B) $6020·72 (C) $9998·72 (D) $13 058·72

28. In one particular week, Isabella works 40 hours at $8.75 per hour, 3 hours at time-and-a-half and 4 hours at double-time.

What is her total wage for this week?

(A) $411.25 (B) $441.88 (C) $459.38 (D) $1050

29. A TV set is advertised as follows:

Cash price	:	$760
OR		
Terms	:	15% deposit and $37·50 per month for two years

How much extra is paid for the TV set if it is purchased on terms?

(A) $26 (B) $140 (C) $254 (D) $786

30. If $(3x+P)^2 = 9x^2 - Mx + 16$ (where M is positive),

then

(A) $P = -4$ and $M = 12$ (B) $P = -4$ and $M = 24$

(C) $P = 4$ and $M = 12$ (D) $P = 4$ and $M = 24$

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SYDNEY TECHNICAL HIGH SCHOOL

YEAR 9 YEARLY EXAMINATION 2011

MATHEMATICS

Paper A

SECTION 2: Multiple Choice (30 marks)

Instructions: Do not start section 2 until instructed by your teacher.

Calculators may be used.

Circle the correct answer on the answer sheet below

TIME ALLOWED 35 min

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

Name:---Solutions---

Teacher:----------

SYDNEY TECHNICAL HIGH SCHOOL

YEAR 9 YEARLY EXAMINATION 2011

MATHEMATICS

Paper A

SECTION 2: Multiple Choice (30 marks)

Instructions: Do not start section 2 until instructed by your teacher.

Calculators may be used.

Circle the correct answer on the answer sheet below

TIME ALLOWED 35 min

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

Name:----------

Teacher:----------

SYDNEY TECHNICAL HIGH SCHOOL

YEAR 9 YEARLY EXAMINATION 2011

MATHEMATICS

Paper A

SECTION 2: Multiple Choice (30 marks)

1. 0·030 142 written correct to 3 significant figures is

   (A) 0·03 (B) 0·030 (C) 0·030 1 (D) 0·030 14

2. There are 15 boys in a group of 35 students.

   What is the ratio of boys to girls in this group?

   (A) 3:4 (B) 4:3 (C) 4:7 (D) 3:7

3. A motor car travels 6·25 km on 1 litre of fuel. How many litres is this per 100 km?

   (A) 0·0625 (B) 0·16 (C) 16 (D) 625

4. A group of students was surveyed regarding their favourite type of TV show. The results are shown in the table below.

Comedy	*Drama*	*Reality*
15	13	12

   A student from this group is chosen at random.

   What is the probability that this student's favourite type of TV show is comedy?

   (A) $\frac{1}{3}$ (B) $\frac{3}{8}$ (C) $\frac{1}{15}$ (D) $\frac{15}{25}$

5. Paul will sit for 10 tests this year. Each test is marked out of 50.

After 8 tests, his mean mark is 77·5%.

What is the highest mean mark (as a percentage) that Paul could achieve for this year?

(A) 72% (B) 82% (C) 88·75% (D) 92·5%

6. A full bucket holds approximately 5×10^8 grains of sand.

Jock estimates that the sand on a beach would fill 60 000 buckets.

Approximately how many grains of sand are on the beach?

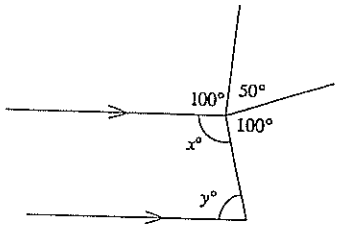
(A) 3×10^{13}

(B) 3×10^9

(C) 8.3×10^3

(D) 1.2×10^4

7. NOT TO SCALE



Without drawing any further lines on the diagram, four students found the values of x and y, giving reasons. Only one student gave the correct reasons.

Which reasons are correct? (NOTE. The values of x and y are not shown.)

(A) x = ... (vertically opposite angles)
y = ... (cointerior angles and parallel lines)

(B) x = ... (angle-sum at a point is 360°)
y = ... (cointerior angles and parallel lines)

(C) x = ... (vertically opposite angles)
y = ... (corresponding angles and parallel lines)

(D) x = ... (angle-sum at a point is 360°)
y = ... (corresponding angles and parallel lines)

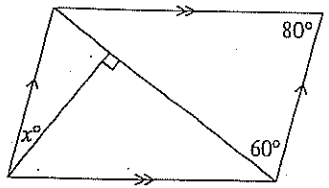
8. An item is sold for $22.00 including 10% GST.

What is the cost before the GST is added?

(A) $18 (B) $19.80 (C) $20 (D) $24.20

9. Make n the subject of $nc = n + 50$.

(A) $n = 50 - c$ (B) $n = 50 - c + 1$ (C) $n = \frac{c+50}{c}$ (D) $n = \frac{50}{c-1}$

10. 

NOT TO SCALE

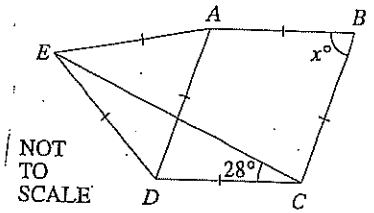
$x =$

(A) 20

(B) 30

(C) 40

(D) 50

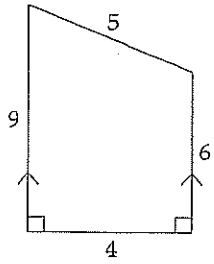
11. 

NOT TO SCALE

$ABCD$ is a rhombus.
DEA is an equilateral triangle.
Find the value of x.

(A) 56 (B) 60

(C) 62 (D) 64

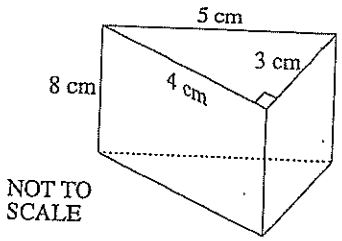
12. 

NOT TO SCALE

Which of the following expressions could be used to find the area of this trapezium?

(A) $\frac{1}{2} \times 9(5+4)$ (B) $\frac{1}{2} \times 4(9+6)$ (C) $\frac{1}{2} \times 6(9+5)$ (D) $\frac{1}{2} \times 5(9+4)$

13.



NOT TO SCALE

The volume of this triangular prism is

(A) 48 cm^3

(B) 60 cm^3

(C) 80 cm^3

(D) 96 cm^3

14. $\sqrt{24} =$

(A) $2\sqrt{6}$ (B) $4\sqrt{3}$ (C) $4\sqrt{6}$ (D) $6\sqrt{2}$

15. Rationalize the denominator of $\frac{1}{\sqrt{7}-2}$.

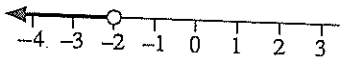
(A) $\frac{\sqrt{7}-2}{3}$ (B) $\frac{\sqrt{7}+2}{3}$ (C) $\frac{\sqrt{7}-2}{5}$ (D) $\frac{\sqrt{7}+2}{5}$

16. $(6+\sqrt{5})(6-\sqrt{5}) =$

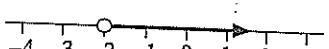
(A) $11-12\sqrt{5}$ (B) $31-12\sqrt{5}$ (C) 11 (D) 31

17. The graph that illustrates the solution of $-3x > 6$ is

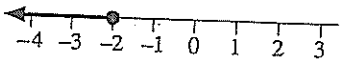
(A)



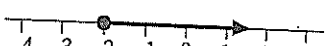
(B)



(C)



(D)



18. $\frac{(a^3)^2}{a^4 \times a^2} =$

(A) 1 (B) $\frac{1}{a}$ (C) $\frac{1}{a^2}$ (D) $\frac{1}{a^3}$

19. $\frac{1}{3x} + \frac{3}{x} =$

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

20. $\left(\frac{x^{-1}}{3}\right)^{-2} =$

(A) $\frac{1}{9x^2}$ (B) $\frac{9}{x^2}$ (C) $\frac{x^2}{9}$ (D) $9x^2$

21. The point $(a, 2)$ lies on the line whose equation is $2x + y + 4 = 0$.

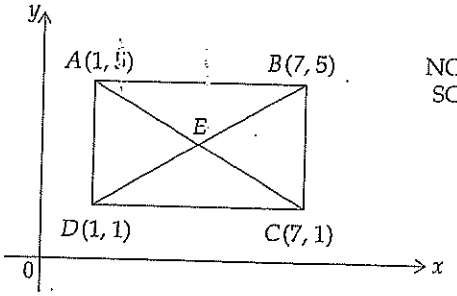
The value of a is

(A) −8 (B) −3 (C) 3 (D) 8

22. The gradient of the line $2x - 3y + 7 = 0$ is

(A) $-\frac{3}{2}$ (B) $-\frac{2}{3}$ (C) $\frac{2}{3}$ (D) $\frac{3}{2}$

23.



NOT TO SCALE

What are the coordinates of E in the above figure?

(A) (4, 3) (B) (3, 4) (C) (3, 2) (D) (2, 3)

24. René lost 80% on his share investments. After a period of time, his shares increased in value to their previous value.

What is this increase expressed as a percentage?

(A) 20% (B) 80% (C) 400% (D) 500%

25. Oliver earns a yearly salary of $68 720. After tax, he receives 65% of this as net pay.

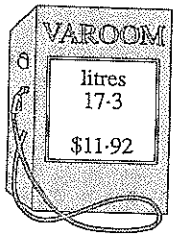
What is his monthly net pay to the nearest dollar?

(A) $2004 (B) $3436 (C) $3722 (D) $5662

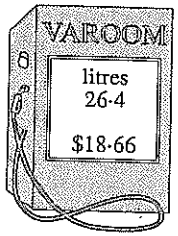
26. The petrol pumps show the number of litres bought and the total price paid on four different days.

Which pump shows the best value?

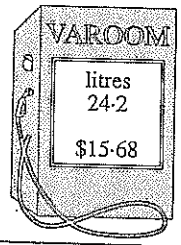
(A)



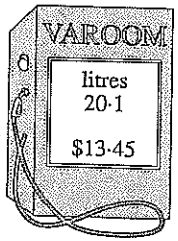
(B)



(C)



(D)



27. The tax payable on taxable incomes in the range $20 701 to $38 000 is given by:

$3060 plus 34c for each $1 over $20 700.

How much tax does Theresa pay if her taxable income is $29 408?

(A) $2960·72 (B) $6020·72 (C) $9998·72 (D) $13 058·72

28. In one particular week, Isabella works 40 hours at $8.75 per hour, 3 hours at time-and-a-half and 4 hours at double-time.

What is her total wage for this week?

(A) $411.25 (B) $441.88 (C) $459.38 (D) $1050

29. A TV set is advertised as follows:

Cash price	:	$760
OR		
Terms	:	15% deposit and $37·50 per month for two years

How much extra is paid for the TV set if it is purchased on terms?

(A) $26 (B) $140 (C) $254 (D) $786

30. If $(3x+P)^2 = 9x^2 - Mx + 16$ (where M is positive),

then

(A) $P=-4$ and $M=12$ (B) $P=-4$ and $M=24$

(C) $P=4$ and $M=12$ (D) $P=4$ and $M=24$