

Name : File

Teacher : _____

SYDNEY TECHNICAL HIGH SCHOOL



YEAR 9 YEARLY EXAMINATION 2010

MATHEMATICS

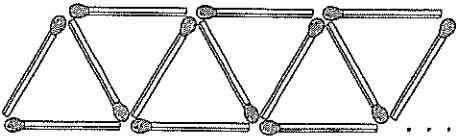
Paper A

SECTION 1 : NON CALCULATOR (25 marks)

Instructions:

- Write the answer to Questions 1 – 25 in the answer column.
- Calculators are not to be used.
- Do not start section 2 until instructed.

Time Allowed 30 min

1.	<p>$x \div 3 \times y + z$ is equal to</p> <p>(A) $\frac{x}{3y} + z$ (B) $\frac{xy}{3} + z$ (C) $\frac{x}{3}(y + z)$ (D) $\frac{x}{3y + z}$</p>	
2.	<p>$\sqrt{\square^2 + 12^2} = 13$</p> <p>Write a number in the square to make this a true statement.</p>	$\square =$
3.	<p>What number is half-way between $\frac{2}{5}$ and 0.7?</p>	
4.	<p>Work out the value of</p> $\frac{1 + \frac{2}{3}}{1 - \frac{2}{3}}$	
5.	<p>Between which two consecutive whole numbers is the square root of 42.5?</p>	
6.	 <p>This pattern of triangles, made with matchsticks, was continued until there were 30 triangles.</p> <p>How many matchsticks were used?</p>	
7.	<p>At the end of one year, Mr Willis received \$40 interest from an investment. The interest rate was 5% per annum.</p> <p>How much had Mr Willis invested?</p>	
8.	<p>Dieter's grandmother was 42 years old when Dieter was born. His grandmother was three times his age when she retired.</p> <p>How old was Dieter when his grandmother retired?</p>	

9.

Ivan sends 3 text messages on his mobile telephone for every 4 text messages he receives. Ivan received 240 text messages last year.

In total, how many messages did he send and receive last year?

- (A) 180 (B) 320 (C) 420 (D) 560

10.

The expression $\frac{84}{\square + 3}$ has a value between 8 and 10.

What is a possible value of \square ?

$\square =$

11.

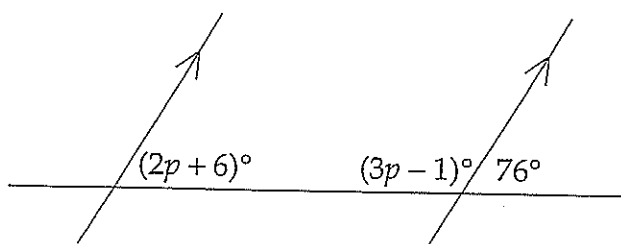
The normal price of a radio is \$65.

Which expression gives its price with a 15% discount?

- (A) $\$65 \times 0.85$ (B) $\$65 + \65×0.15
(C) $\$65 - 0.15$ (D) $\$65 \times 0.15$

12.

Using the diagram below, write an equation that could be used to find the value of p .



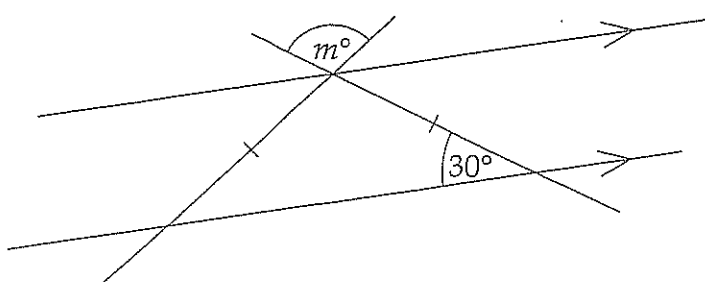
13.

Which of the following is equivalent to $\frac{4}{9}$?

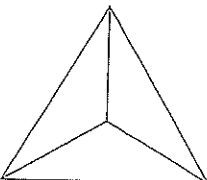
- (A) $\frac{4+3}{9+3}$ (B) $\frac{4^2}{9^2}$ (C) $\frac{4 \times 3}{9 \times 3}$ (D) $\frac{\sqrt{4}}{\sqrt{9}}$

14.

What is the value of m in the diagram?

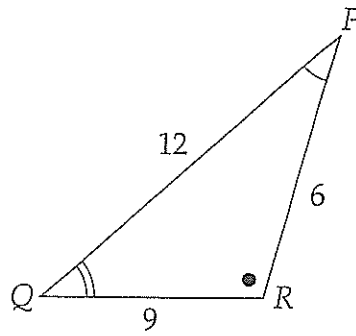


NOT
TO
SCALE

15.	<p>Write positive integers in the \square and \triangle to make this subtraction true:</p> $\begin{array}{r} 9 \quad 3 \quad 4 \quad - \\ 2 \quad \square \quad 3 \\ \hline 6 \quad 5 \quad \triangle \end{array}$	$\square =$ $\triangle =$
16.	<p>A bag contains 7 blue marbles, 2 yellow marbles and 1 green marble.</p> <p>One marble is selected at random. What is the probability of NOT selecting a blue marble?</p>	
17.	<p>The diagonal of a square is 12 cm long.</p> <p>What is the area of the square?</p>	
18.	<p>The price of a coat was \$160. This price increased by 25%. A month later Josie bought the coat at a 25% discount sale.</p> <p>How much did Josie pay for the coat?</p>	
19.	<p>A boat sailed 24 kilometres in 90 minutes.</p> <p>What was the average speed of the boat?</p> <p>(A) 12 km/h (B) 16 km/h (C) 18 km/h (D) 36 km/h</p>	
20.	<p>The 3 digit number 2 \square 6 is divisible by 3.</p> <p>What could the missing digit be?</p>	$\square =$
21.	<p>A tetrahedron is used as a die in a game. The four sides are numbered 1, 2, 4 and 8. When the die is rolled, the three visible sides are added together.</p>  <p>Which of the following totals is possible?</p> <p>(A) 7 (B) 8 (C) 9 (D) 10</p>	

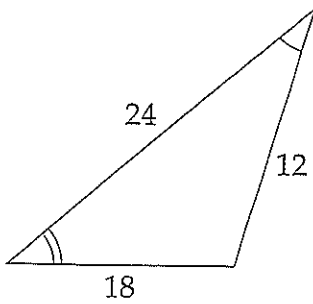
22.

The diagrams in this question are NOT TO SCALE.

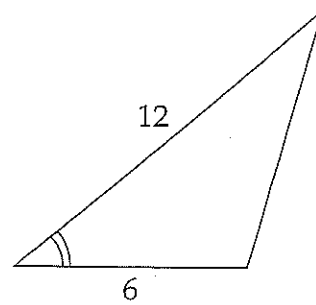


Which of these triangles is congruent to $\triangle PQR$?

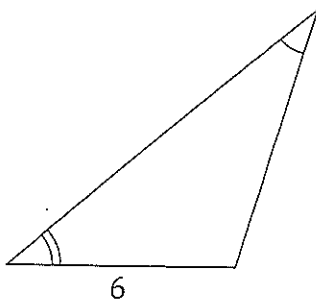
(A)



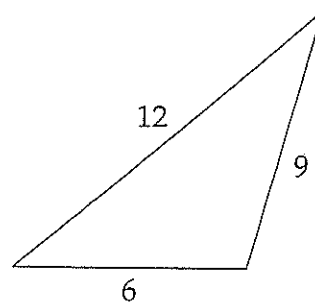
(B)



(C)

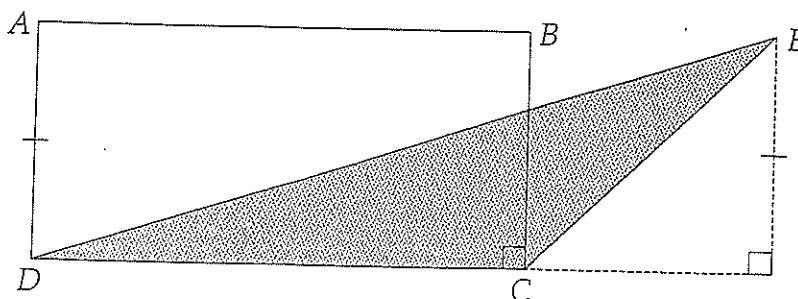


(D)



23

What is the ratio of the area of triangle DEC to the area of rectangle $ABCD$?



24

A green light flashes every 8 seconds and a red light flashes every 6 seconds. Zehra sees the green and red lights flash at the same time.

How many seconds later will she see the lights flash together again?

25

Consider the pattern.

$$10^2 - 10 + 1 = 91$$

$$10^4 - 10^2 + 1 = 9901$$

$$10^6 - 10^3 + 1 = 999\,001$$

Use this pattern to complete:

$$10^{10} - 10^{\boxed{}} + 1 = \boxed{}$$

Name : _____

SYDNEY TECHNICAL HIGH SCHOOL

YEAR 9 YEARLY EXAMINATION 2010

MATHEMATICS

Paper A

SECTION 2 : Multiple Choice Answer Sheet

Time Allowed 35 min



Instructions:

Do not start section 2 until instructed.

Circle the letter that best answers the question.

- | | |
|------------------------|------------------------|
| 1. A B C D | 16. A B C D |
| 2. A B C D | 17. A B C D |
| 3. A B C D | 18. A B C D |
| 4. A B C D | 19. A B C D |
| 5. A B C D | 20. A B C D |
| 6. A B C D | 21. A B C D |
| 7. A B C D | 22. A B C D |
| 8. A B C D | 23. A B C D |
| 9. A B C D | 24. A B C D |
| 10. A B C D | 25. A B C D |
| 11. A B C D | 26. A B C D |
| 12. A B C D | 27. A B C D |
| 13. A B C D | 28. A B C D |
| 14. A B C D | 29. A B C D |
| 15. A B C D | 30. A B C D |

Name: _____

1

Simplify $3(k-1) - 2(k-5)$.

(A) $k+7$

(B) $k+4$

(C) $k-6$

(D) $k-13$

2

$$\frac{a^6 \times (a^8)^2}{a^2} =$$

(A) a^8

(B) a^{11}

(C) a^{14}

(D) a^{20}

3

$$\frac{6a+18}{9} =$$

(A) $2a+6$

(B) $6a+2$

(C) $\frac{2}{3}a+18$

(D) $\frac{2}{3}a+2$

4

$$\frac{5}{2x} + \frac{6}{x} =$$

(A) $\frac{8}{x}$

(B) $\frac{11}{2x}$

(C) $\frac{17}{2x}$

(D) $\frac{11}{3x}$

5

A family hires tables and chairs for a party. Hire charges are:

Tables	\$10 each
Chairs	\$4 each
Delivery	\$15

What is the total cost in dollars for hire and delivery of k tables and $6k$ chairs?

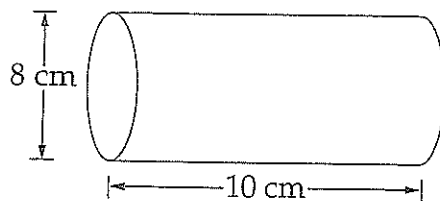
(A) $49k$

(B) $15 + 7k$

(C) $15 + 34k$

(D) $15 + 64k$

6



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) $\pi \times 8^2 \times 10$

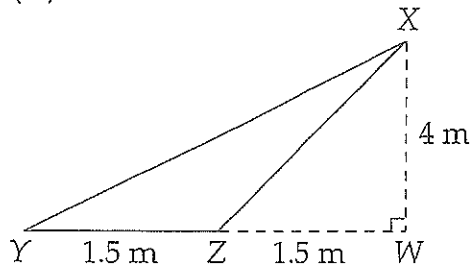
(D) $\pi \times 10^2 \times 8$

7

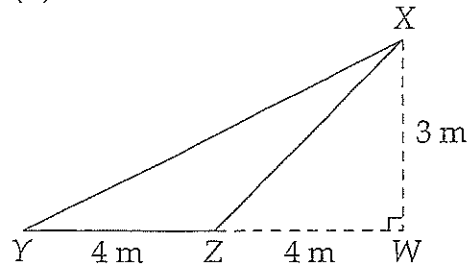
In which diagram does triangle XYZ have an area of 12 m^2 ?

The diagrams are NOT TO SCALE.

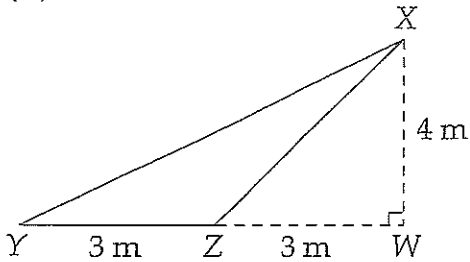
(A)



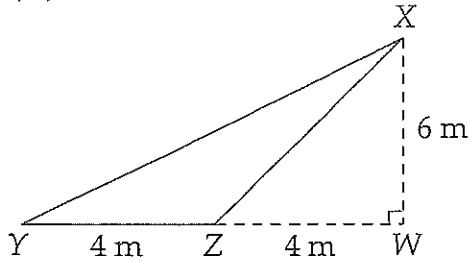
(B)



(C)

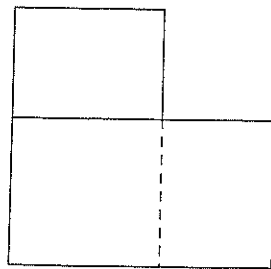


(D)



8

Two rectangles measuring 10 cm by 6 cm are overlapped to form an L-shape, as shown in the diagram.



NOT TO
SCALE

What is the area of the figure?

- (A) 64 cm^2 (B) 84 cm^2 (C) 96 cm^2 (D) 104 cm^2

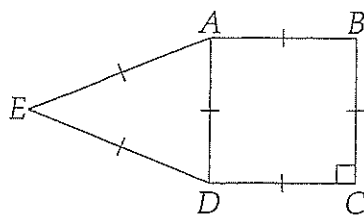
9

Jarrold is investigating a quadrilateral. He measures an angle between the diagonals to be 85° .

Which one of these shapes could the quadrilateral be?

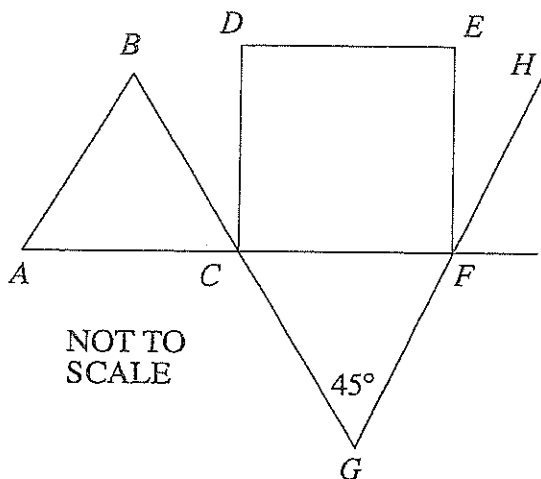
- (A) Kite (B) Rectangle (C) Rhombus (D) Square

10

NOT
TO
SCALEWhat is the size of $\angle EDC$?

- (A) 60° (B) 90° (C) 150° (D) 180°

11

NOT
TO
SCALE ABC is an equilateral triangle. $CDEF$ is a square. BCG , ACF , and GFH are straight lines. $\angle CGF = 45^\circ$.The size of $\angle EFH$ is

- (A) 15°
 (B) $22\frac{1}{2}^\circ$
 (C) 30°
 (D) 45°

12

Which statement is correct?

- (A) $0.19 < 0.2$ (B) $0.6 < 0.6^2$ (C) $-0.2 < -0.6$ (D) $0.1^2 < 0.01$

13

Kim made errors when solving the equation $3x - 15 = -2 + 10$.

Here is Kim's working:

$$3x - 15 = -2 + 10$$

Line I $3x - 15 = -8$

Line II $3x = 7$

Line III $x = \frac{3}{7}$

In which lines were the errors made?

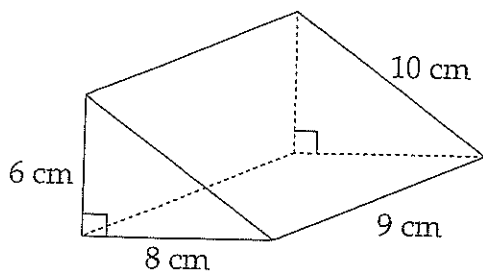
- (A) Lines I and II (B) Lines I and III
 (C) Lines II and III (D) Lines I, II and III

- 18 Sue was standing in a queue at the video store. She noticed that there were three more people ahead of her than behind her. There were 16 people in the queue in total.

What was Sue's position in the queue?

- (A) 6th (B) 7th (C) 9th (D) 10th

- 19 What is the volume of this prism?



NOT
TO
SCALE

- (A) 216 cm^3 (B) 240 cm^3 (C) 432 cm^3 (D) 480 cm^3

- 20 Emma is comparing simple interest rates.
Which of the following is the lowest simple interest rate?

- (A) 0.05% per day (B) 0.35% per week
(C) 1.6% per month (D) 18.1% per year

- 21 George bought a new digital television. After receiving a 20% discount, he paid \$2000.

What was the original price?

- (A) \$1600 (B) \$2020 (C) \$2400 (D) \$2500

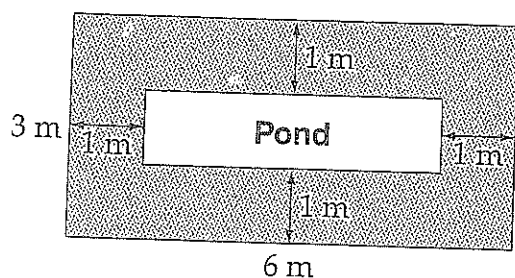
- 22
-
- NOT
TO
SCALE

What are the values of x and y ?

- (A) $x = 40, y = 50$ (B) $x = 40, y = 70$
(C) $x = 80, y = 50$ (D) $x = 80, y = 70$

23

A rectangular pond is surrounded by a path one metre wide, as shown.

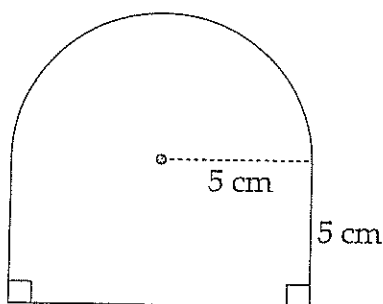


What is the area of the path, in square metres?

- (A) 4 (B) 8 (C) 10 (D) 14

24

Which of the following is the perimeter, in centimetres, of this shape?

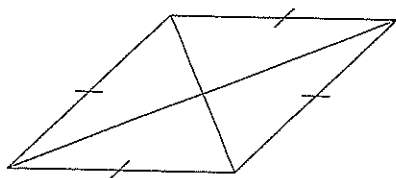


NOT
TO
SCALE

- (A) $5\pi + 20$ (B) $5\pi + 30$ (C) $10\pi + 20$ (D) $10\pi + 30$

25

A rhombus has an area of 24 cm^2 .



NOT
TO
SCALE

What are possible lengths of the diagonals of the rhombus?

- (A) 3 cm and 4 cm (B) 4 cm and 6 cm
(C) 4 cm and 12 cm (D) 8 cm and 12 cm

26

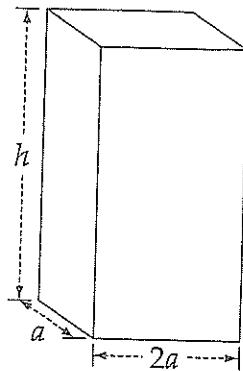
a , b and c are three different positive integers, and $(ab)^2 = abc$.

Which of the following is a possible value for c ?

- (A) 1 (B) 5 (C) 9 (D) 12

27

What is the total surface area, in square units, of this rectangular prism?



(A) $2a^2h$

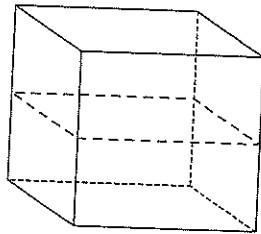
(B) $4a^2 + 4ah$

(C) $4a^2 + 6ah$

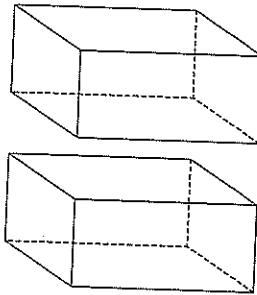
(D) $4a^2 + 8ah$

28

A cube is cut into two rectangular prisms, as shown. The surface area has now increased.



Cube

Rectangular
prisms

By what fraction has the surface area increased?

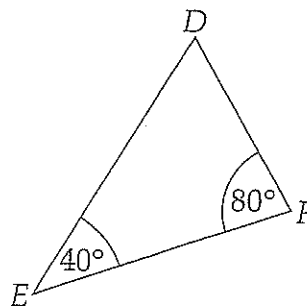
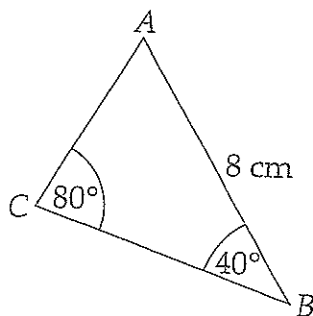
(A) $\frac{1}{12}$

(B) $\frac{1}{6}$

(C) $\frac{1}{3}$

(D) $\frac{1}{2}$

29



NOT
TO
SCALE

What additional information is necessary to prove that $\triangle ABC$ is congruent to $\triangle DEF$?

(A) $\angle EDF = 60^\circ$

(B) $DE = 8\text{ cm}$

(C) $DF = 8\text{ cm}$

(D) $EF = 8\text{ cm}$

The following four diagrams represent fractal trees.

1st tree



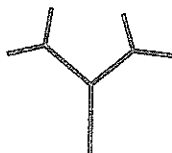
1 branch

2nd tree



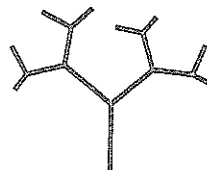
3 branches

3rd tree



7 branches

4th tree



15 branches

How many branches would be in the seventh fractal tree?

(A) 63

(B) 64

(C) 127

(D) 128

Name : _____

Teacher : Solutions

SYDNEY TECHNICAL HIGH SCHOOL



YEAR 9 YEARLY EXAMINATION 2010

MATHEMATICS

Paper A

SECTION 1 : NON CALCULATOR (25 marks)

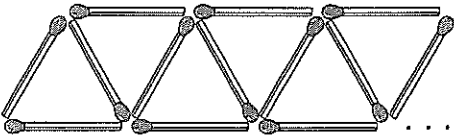
Instructions:

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

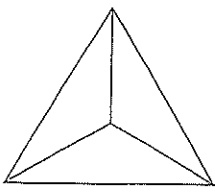
Calculators are not to be used.

Do not start section 2 until instructed.

Time Allowed 30 min

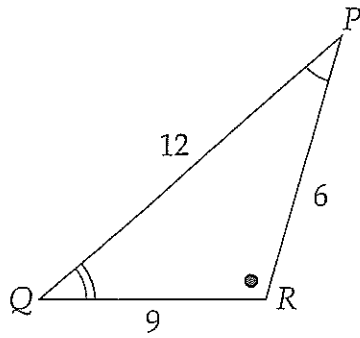
1.	<p>$x \div 3 \times y + z$ is equal to</p> <p>(A) $\frac{x}{3y} + z$ (B) $\frac{xy}{3} + z$ (C) $\frac{x}{3}(y + z)$ (D) $\frac{x}{3y + z}$</p>	B
2.	<p>$\sqrt{\square^2 + 12^2} = 13$</p> <p>Write a number in the square to make this a true statement.</p>	<p>$\square =$ 5</p>
3.	<p>What number is half-way between $\frac{2}{5}$ and 0.7?</p>	0.55
4.	<p>Work out the value of</p> $\frac{1 + \frac{2}{3}}{1 - \frac{2}{3}}$	5
5.	<p>Between which two consecutive whole numbers is the square root of 42.5?</p>	6, 7
6.	 <p>This pattern of triangles, made with matchsticks, was continued until there were 30 triangles.</p> <p>How many matchsticks were used?</p>	61
7.	<p>At the end of one year, Mr Willis received \$40 interest from an investment. The interest rate was 5% per annum.</p> <p>How much had Mr Willis invested?</p>	\$800
8.	<p>Dieter's grandmother was 42 years old when Dieter was born. His grandmother was three times his age when she retired.</p> <p>How old was Dieter when his grandmother retired?</p>	21

9.	<p>Ivan sends 3 text messages on his mobile telephone for every 4 text messages he receives. Ivan received 240 text messages last year.</p> <p>In total, how many messages did he send and receive last year?</p> <p>(A) 180 (B) 320 (C) 420 (D) 560</p>	<p>A C</p>
10.	<p>The expression $\frac{84}{\square + 3}$ has a value between 8 and 10.</p> <p>What is a possible value of \square?</p>	<p>$\square =$ any number s.t $5.4 < x < 7.5$</p>
11.	<p>The normal price of a radio is \$65.</p> <p>Which expression gives its price with a 15% discount?</p> <p>(A) $\\$65 \times 0.85$ (B) $\\$65 + \\65×0.15 (C) $\\$65 - 0.15$ (D) $\\$65 \times 0.15$</p>	<p>A</p>
12.	<p>Using the diagram below, <u>write an equation</u> that could be used to find the value of p.</p> <div data-bbox="399 1164 1037 1411"> </div>	<p>may not be simplified this far ok. $3p + 75 = 180$ or $5p + 5 = 180$</p>
13.	<p>Which of the following is equivalent to $\frac{4}{9}$?</p> <p>(A) $\frac{4+3}{9+3}$ (B) $\frac{4^2}{9^2}$ (C) $\frac{4 \times 3}{9 \times 3}$ (D) $\frac{\sqrt{4}}{\sqrt{9}}$</p>	<p>C</p>
14.	<p>What is the value of m in the diagram?</p> <div data-bbox="319 1836 1037 2128"> </div>	<p>NOT TO SCALE 120</p>

15.	<p>Write positive integers in the \square and \triangle to make this subtraction true:</p> $\begin{array}{r} 9 \quad 3 \quad 4 \quad - \\ 2 \quad \square \quad 3 \\ \hline 6 \quad 5 \quad \triangle \end{array}$	$\square = 8$ $\triangle = 1$
16.	<p>A bag contains 7 blue marbles, 2 yellow marbles and 1 green marble.</p> <p>One marble is selected at random. What is the probability of NOT selecting a blue marble?</p>	$\frac{3}{10}$
17.	<p>The diagonal of a square is 12 cm long.</p> <p>What is the area of the square?</p> <p>(do not worry about units)</p>	72 cm^2
18.	<p>The price of a coat was \$160. This price increased by 25%. A month later Josie bought the coat at a 25% discount sale.</p> <p>How much did Josie pay for the coat?</p>	\$150
19.	<p>A boat sailed 24 kilometres in 90 minutes.</p> <p>What was the average speed of the boat?</p> <p>(A) 12 km/h (B) 16 km/h (C) 18 km/h (D) 36 km/h</p>	B
20.	<p>The 3 digit number 2 \square 6 is divisible by 3.</p> <p>What could the missing digit be?</p>	$\square =$ 1, 4 or 7
21.	<p>A tetrahedron is used as a die in a game. The four sides are numbered 1, 2, 4 and 8. When the die is rolled, the three visible sides are added together.</p>  <p>Which of the following totals is possible?</p> <p>(A) 7 (B) 8 (C) 9 (D) 10</p>	A

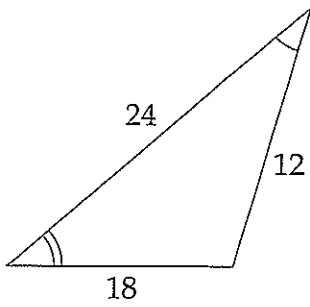
22.

The diagrams in this question are NOT TO SCALE.

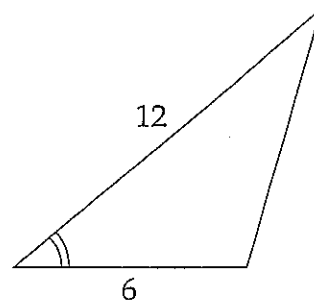


Which of these triangles is congruent to $\triangle PQR$?

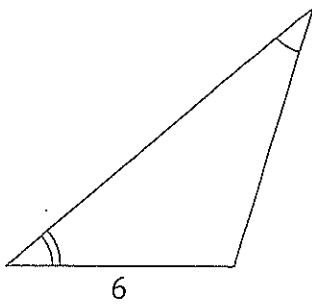
(A)



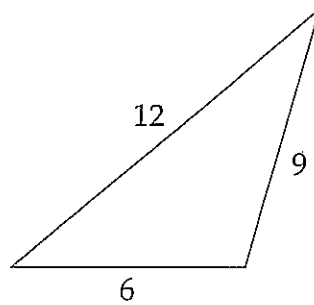
(B)



(C)



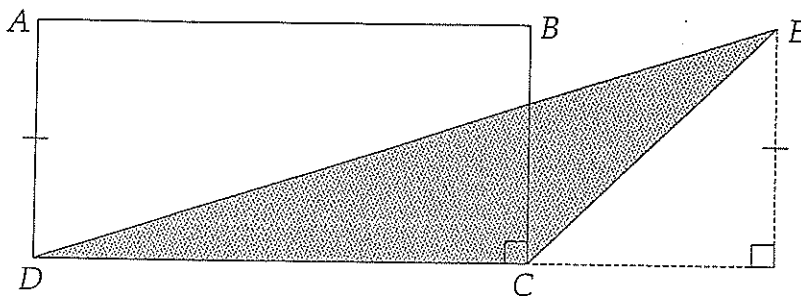
(D)



D

23

What is the ratio of the area of triangle DEC to the area of rectangle ABCD?



1:2

not
2:1

24

A green light flashes every 8 seconds and a red light flashes every 6 seconds. Zehra sees the green and red lights flash at the same time.

How many seconds later will she see the lights flash together again?

24

25

Consider the pattern.

$$10^2 - 10 + 1 = 91$$

$$10^4 - 10^2 + 1 = 9901$$

$$10^6 - 10^3 + 1 = 999\,001$$

Use this pattern to complete:

$$10^{10} - 10^{\boxed{5}} + 1 = \boxed{99999\,0000\,1}$$

$\underbrace{\hspace{1.5cm}}$
 5
 of
 them

 $\underbrace{\hspace{1.5cm}}$
 4
 of
 them

Name : Solutions

SYDNEY TECHNICAL HIGH SCHOOL

YEAR 9 YEARLY EXAMINATION 2010

MATHEMATICS

Paper A

SECTION 2 : Multiple Choice Answer Sheet

Time Allowed 35 min

Instructions:

Do not start section 2 until instructed.

Circle the letter that best answers the question.

- | | |
|------------------------|------------------------|
| 1. X B C D | 16. A X C D |
| 2. A B C X | 17. A B X D |
| 3. A B C X | 18. A B C X |
| 4. A B X D | 19. X B C D |
| 5. A B X D | 20. A B C X |
| 6. X B C D | 21. A B C X |
| 7. A B C X | 22. A X C D |
| 8. A X C D | 23. A B C X |
| 9. A X C D | 24. X B C D |
| 10. A B X D | 25. A B X D |
| 11. X B C D | 26. A B C X |
| 12. X B C D | 27. A B X D |
| 13. A X C D | 28. A B X D |
| 14. X B C D | 29. A X C D |
| 15. A B C X | 30. A B X D |