DAPTO HIGH SCHOOL

MATHEMATICS

YEAR 11

HALF-YEARLY EXAMINATION

2009

General Instructions

- Reading time – 5 minutes
- Working time – 2 hours
- Total marks – 80 marks
- Write using blue or black pen
- Approved calculators may be used
- Write on only one side of the paper
- Each question must be written on a new sheet of paper
- Write your name at the top of each piece of paper

Start on a new bundle of answer sheets

Basic Arithmetic and Algebra (40 Marks) **Marks**

1. Find the value of $\dfrac{0.5288 \times \sqrt{22.14}}{9.7 - 6.9}$ correct to 2 significant figures. **2**

2. Evaluate $\dfrac{4.2 \times 10^{12}}{(3.7 \times 10^{-3} \div 1.8 \times 10^{2})}$ correct to 2 decimal places in scientific notation. **2**

3. Write $64^{-\frac{2}{3}}$ as a rational number (i.e. as a fraction). **1**

4. Write $5\sqrt{2}$ as an entire surd. **1**

5. Simplify the following:

   (a) $\dfrac{12\sqrt{30}}{3\sqrt{10}}$ **1**

   (b) $4\sqrt{2} \times 2\sqrt{5}$ **1**

   (c) $\sqrt{72} - 2\sqrt{2} + \sqrt{18}$ **2**

6. Expand and simplify:

   (a) $3\sqrt{3}(\sqrt{3} - 2)$ **1**

   (b) $(2\sqrt{5} + 3)(2\sqrt{5} - 3)$ **1**

   (c) $(\sqrt{5} + \sqrt{7})^2$ **1**

7. Completely factorise the following:

   (a) $9x - 12y + 6b$ **1**

   (b) $x^2 - 3x - 4$ **1**

   (c) $x^3 - 27$ **1**

Marks

8. Rationalise the denominator of:

(a) $\frac{7}{\sqrt{11}}$ **1**

(b) $\frac{5}{2+\sqrt{3}}$ **2**

9. Find all possible solutions of the following equations and inequations:

(a) $x(x+7)=0$ **2**

(b) $x^2-11x+24=0$ **2**

(c) $|5x-1|=4$ **2**

(d) $-9x \geq 54$ **1**

(e) $|2x+6| \leq 4$ **2**

(f) $x^2-16 \geq 0$ **2**

10. Solve simultaneously:

(a) $\begin{aligned} a+b&=19 \\ a-b&=3 \end{aligned}$ **2**

(b) $\begin{aligned} y&=x^2 \\ y&=-7x-12 \end{aligned}$ **3**

11. Express $0.3\dot{7}$ as a rational numeral in its simplest form. **2**

12. Given that $N=\frac{A}{(1+r)^n}$, find, correct to 2 decimal places the value of **3**

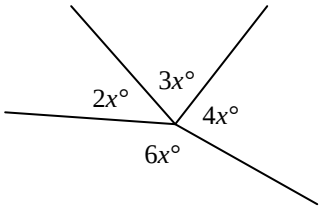
r if $N=5000$, $A=9000$ and $n=10$.

Start on a new bundle of answer sheets

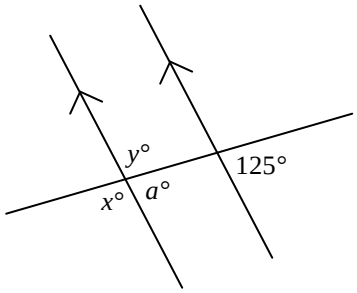
Plane Geometry (30 Marks) **Marks**

1. Find the value of the pronumerals:

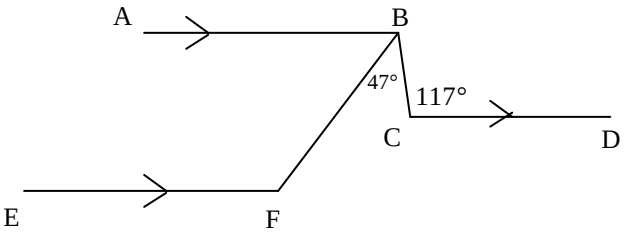
(a) **1**



(b) **3**

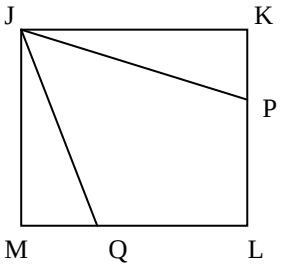


2. Find $\angle BFE$. Give reasons. **2**



3. Find the number of sides of a polygon whose angle sum is 3060°. **1**

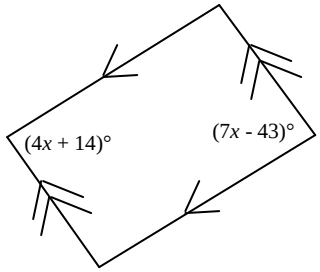
4. $JKLM$ is a square and $JP = GQ$.



Prove, showing results, that $\Delta JKP \equiv \Delta JMQ$. **3**

Marks

5.

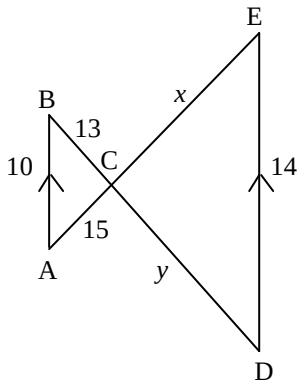


(a) Find the value of x. **1**

(b) Find the size of $\angle BAD$. **1**

(c) What type of quadrilateral is $ABCD$? Justify your answer. **2**

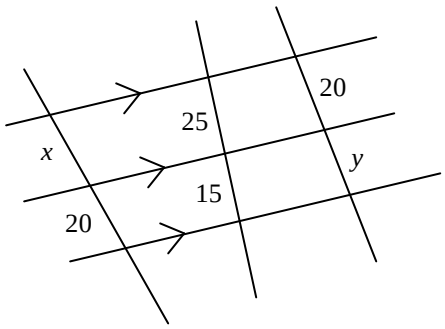
6.



(a) Prove, showing reasons, that $\Delta ABC \,|||\, \Delta EDC$. **2**

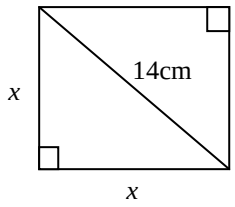
(b) Find the value of x and y. **2**

7. Find the value of x and y. **2**



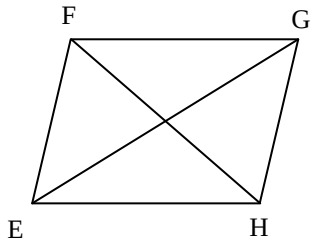
Marks

8. Find the exact length (as a surd) of x. **2**



9. $EFGH$ is a rhombus.

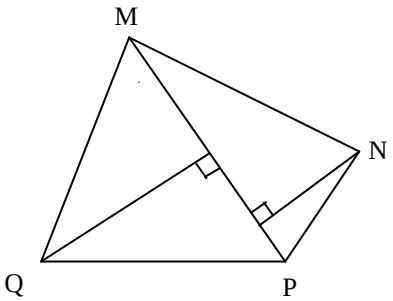
$EG = 72\text{cm}$ and $FH = 75.6\text{cm}$



(a) Find the area of the rhombus. **1**

(b) Find the perimeter of the rhombus. **3**

10. Find the area of the quadrilateral below. **2**



MP = 19cm

11. The sizes of three angles of a triangle are in the ratio 1:2:3.

Find the size of the largest angle. **2**

Start on a new bundle of answer sheets

Trigonometry (10 Marks) **Marks**

1. Evaluate:

   (a) $\cos 43°18'$ correct to 2 decimal places. **1**

   (b) Find A (correct to the nearest degree) of $\tan A = 2.721$ **1**

2. Without using a calculator, find the values of $\dfrac{\tan 28°}{\cot 62°}$ **2**

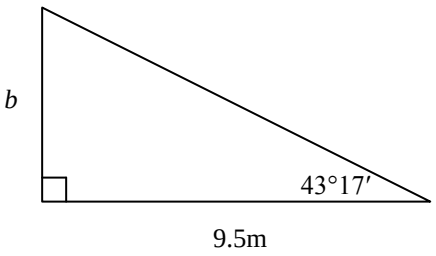
3. In a right-angled triangle ABC, $\sin A = \frac{2}{7}$ and A is acute.

   (a) Draw a diagram to show this information. **2**

   (b) Find, in exact form, the length of the missing side. **2**

   (c) Write the exact value of $\tan A$. **1**

4. Find the value of the pronumeral correct to 2 decimal places. **2**



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