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BEATTY SECONDARY SCHOOL
END OF YEAR EXAMINATION 2016

SUBJECT : Mathematics **LEVEL : Sec 2 Express**

PAPER : 1 **DURATION : 1 hour 15 minutes**

DATE : 12 Oct 2016

CLASS :	NAME :	REG NO :

.....

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number in the spaces on the top of this page.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.

If working is needed for any question, it must be shown with the answer.
Omission of essential working will result in loss of marks.
You are expected to use a scientific calculator to evaluate explicit numerical expressions.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to
three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

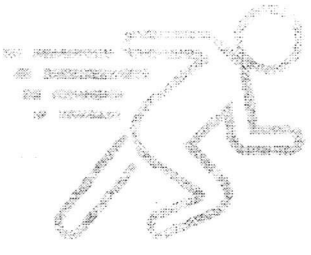
The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is **50**.

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50

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Answer ALL questions.

1 Expand and simplify the following expressions.

(a) $3a(4-2b)-b(a-3c)$

(b) $3(1-2d)^2-d(d-3)$

Answer (a) ..... [2]

(b) ..... [2]

2 Factorise the following expressions completely.

(a) $2x^2-9x+9$

(b) $8y^2-18z^2$

Answer (a) ..... [2]

(b) ..... [2]

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3 The kinetic energy of a moving car, E, is directly proportional to the square of its speed v. Given that $E = 324$ when $v = 2$, find

(a) the equation connecting E and v,

(b) the value of v when $E = 1024$.

Answer (a) ..... [2]

(b) $v =$ ..... [2]

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4 **(a)** Solve the following pair of simultaneous equations.

$$\frac{1}{2}x - y + 5 = 0$$
$$2x - y - 1 = 0$$

(b) State the coordinates of the point of intersection between the lines $\frac{1}{2}x - y + 5 = 0$ and $7x - 3y = 3 + x$.

Answer (a) $x =$.....

$y =$..... [3]

(b) (..... , ...) [1]

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5 **(a)** Solve the quadratic equation $3x^2 + 11x - 20 = 0$.

(b) Hence, solve the quadratic equation $3(y-1)^2 + 11(y-1) - 20 = 0$.

Answer (a) $x =$ ..... [3]

(b) $y =$ ..... [2]

6 Simplify each of the following.

(a) $\dfrac{4a^2 + 12a}{a^2 - 9}$

(b) $\dfrac{4a^2b}{cd^3} \times \dfrac{c}{6ab}$

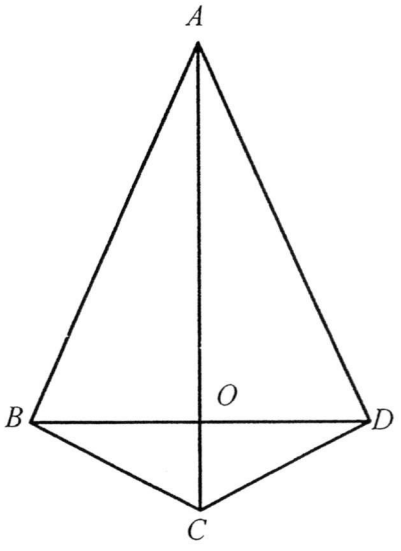
Answer (a) ..... [2]

(b) ..... [2]

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The diagram above shows a kite $ABCD$. The straight lines AC and BD intersect at the point O.

Write down **all the pairs** of congruent triangles in the figure.

Answer .....

.....

..... [2]

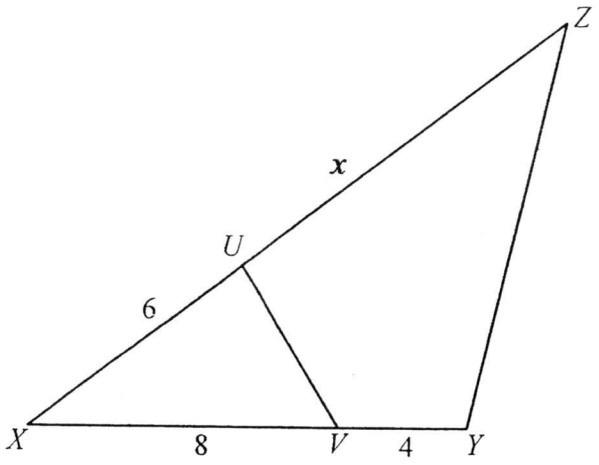
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In the diagram above, triangle XYZ is similar to triangle XUV. Given that $XV = 8$ cm, $VY = 4$ cm, $XU = 6$ cm and $UZ = x$ cm, find the value of x.

Answer $x =$..... [3]

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1	4	4	6	6	6	8	11	12

Nine cards, numbered 1, 4, 4, 6, 6, 6, 8, 11, and 12 are well-shuffled and placed face down on a table.

One of the nine cards is drawn at random. Find

(a) the probability of drawing an even number,

(b) the probability of drawing a 3,

(c) the number whose probability of being drawn is $\frac{1}{3}$,

(d) the probability of drawing a number which is at least 6.

Answer (a) ..... [1]

(b) ..... [1]

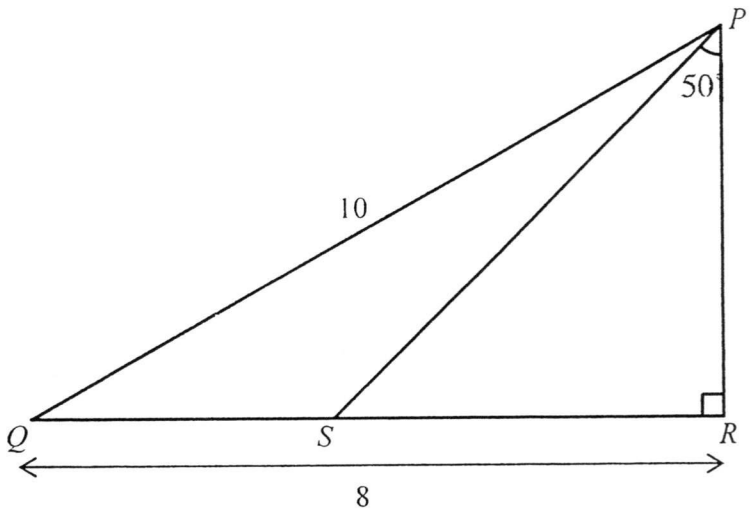
(c) ..... [1]

(d) ..... [1]

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In the diagram above, PQR is a right-angled triangle with angle $PRQ = 90°$, $QR = 8$ cm and $PQ = 10$ cm. S is a point on the line QR such that angle $SPR = 50°$. Find

(a) the length of PR,

(b) the length of SR,

(c) angle SPQ.

Answer (a) ..... cm [2]

(b) ..... cm [1]

(c) ..... ° [2]

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11 **(a)** Simplify the expression $\frac{gh-2k}{4-2h} \div \frac{1+h}{2h^2-2h-4}$.

(b) Given that $s=\frac{2t-1}{t+4}$, express t in terms of s.

Answer (a) ..... [3]

(b) $t =$ ..... [2]

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12 The stem-and-leaf diagram below shows the scores obtained in a science test by a group of Secondary Two students from class 2*A*.

Stem	Leaf
1	5
6	5 7
7	6 6 8
8	3 3 5 5 5 7
9	4 4 8

Key: 6 | 5 means 65 marks.

(a) Find the median score of this group of students.

(b) Find the mean score of this group of students, giving your answer correct to 1 decimal place.

(c) Mr Sng claims that the mean score is a better guage of the performance of this group of students as compared to the median score. Do you agree with him? Explain your answer.

(d) It was later discovered that the score of 1 student was accidentally omitted from the data above, and the actual median score was x. Write down the largest possible value of x.

Answer (a) ..... [1]

(b) ..... [2]

(c) Agree/Disagree, because.....

.....

..... [2]

(d) ..... [1]

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Answer Key:

1(a) $12a-7ab+3bc$ (b) $3-9d+11d^2$

2(a) $(2x-3)(x-3)$ (b) $2(2y+3z)(2y-3z)$

3(a) $E=81v^2$ (b) $v=3\frac{5}{9}$ or 3.56 (to 3 s.f.)

4(a) $x=4, y=7$ (b) (4, 7)

5(a) $x=5$ or $1\frac{1}{3}$ (b) $y=-4$ or $2\frac{1}{3}$

6(a) $\frac{4a}{a-3}$ (b) $\frac{2a}{3d^3}$

8. $x=10$

9(a) $\frac{7}{9}$ (b) 0 (c) 6 (d) $\frac{2}{3}$

10(a) 6 cm (b) 7.15 (c) 3.1°

11(a) $2k-gh$ (b) $t=\frac{4s+1}{2-s}$

12(a) 83 (b) 78.1 (d) 84

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