# BEATTY SECONDARY SCHOOL
# END-OF-YEAR EXAMINATION 2018

| | | | |
|---|---|---|---|
| **SUBJECT** | **: Mathematics** | **LEVEL** | **: Sec 1 Express** |
| **PAPER** | **: 1** | **DURATION** | **: 1 hour 15 minutes** |
| **SETTER** | **: Mr Bernard Lee** | **DATE** | **: 5 October 2018** |

| | | |
|---|---|---|
| **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.
Calculators should be used where appropriate.
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 $\pi$, use either your calculator value or 3.142, unless the question requires the answer in terms of $\pi$.

At the end of the examination, fasten all your work securely together.
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**.

| For Examiner's Use |
|---|
| 50 |

**Answer all questions**

**1** **(a)** Calculate $\sqrt{10\frac{4}{5}-1.4^2}$.

Write down the first 5 digits displayed on your calculator.

*Answer* ..... [1]

**(b)** Round off your answer in **(a)** to

**(i)** 3 significant figures,

*Answer* ..... [1]

**(ii)** 1 decimal place.

*Answer* ..... [1]

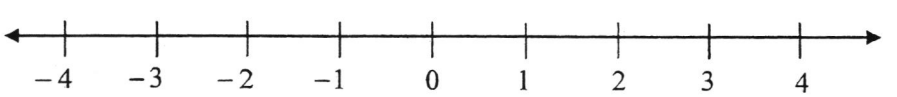
---

**2** **(a)** Solve the inequality $-4x < 4$.

*Answer* ..... [1]

**(b)** Represent your answer in **(a)** on the number line below.

*Answer*




[1]

**(c)** Write down the smallest integer $x$ that satisfies the inequality $-4x < 4$.

*Answer* ..... [1]

**3** **(a)** Express 3168 in index notation.

*Answer* ..... [1]

**(b)** Find the HCF and LCM of 3168 and 27.

*Answer* HCF = .....

LCM = ..... [2]

**(c)** Find the largest integer $k$ such that $\frac{3168}{k}$ is a multiple of 16.

*Answer* $k$ = ..... [1]

---

**4** **(a)** Find the sum of $3a + b$ and $5a - 2b$.

*Answer* ..... [1]

**(b)** Simplify $(3x + 5) - (8x - 1)$.

*Answer* ..... [2]

**5** **(a)** Expand and simplify $3x(x + 2)$.

*Answer* ..... [1]

**(b)** Solve the equation $3y + 5 = y - 6$.



*Answer* $y =$ ..... [2]

---

**6** **(a)** Factorise completely $24ax - 12bx$.



*Answer* ..... [1]

**(b)** Simplify $\frac{x-3}{2}+\frac{2x+1}{4}$, expressing your answer as one single fraction.



*Answer* ..... [2]

7 Dexter's family went out for a meal in a restaurant. The bill is as shown below.

| Item | Cost |
|---|---|
| Tofu | $8.90 |
| Vegetables | $6.40 |
| Fried Chicken | $11.50 |
| Soup | $9.80 |

By rounding off the cost of each item to 1 significant figure, estimate the total cost of the bill.

*Answer* $ ..... [2]

---

8 **(a)** Given that $x = 0.\dot{3}4\dot{5}$, write down the value of $1000x$ as a recurring decimal.

*Answer* ..... [1]

**(b)** By using the fact that $1000x - x = 999x$, calculate the value of $999x$.

*Answer* ..... [1]

**(c)** Hence, use your answer in **(b)** to express $0.\dot{3}4\dot{5}$ as a fraction in the simplest form.

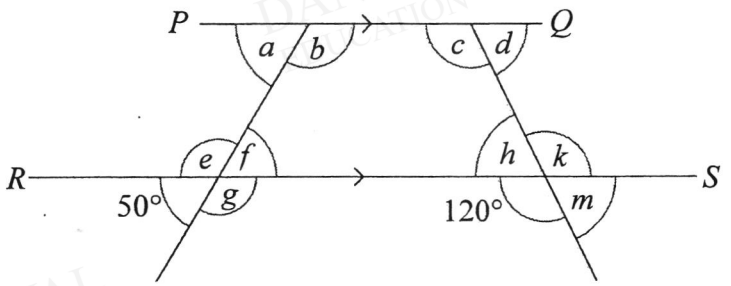
*Answer* ..... [1]

**9** A playpen contains red, blue and yellow balls.
The ratio of red to blue balls is 3 : 5 and the ratio of blue to yellow balls is 7 : 2.
If 20 blue balls are added, the ratio of red to blue balls will become 7 : 15.
Calculate the number of yellow balls in the playpen.

*Answer* ..... [3]

---

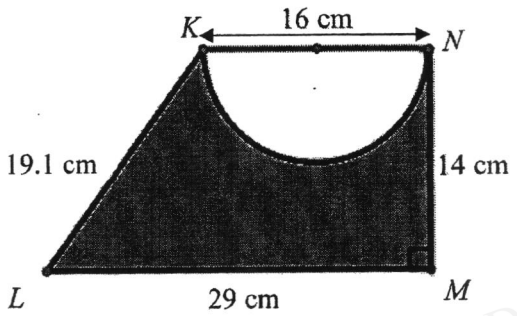
**10** In the diagram, $PQ$ is parallel to $RS$.




Calculate the sum of the angles $b$ and $c$. Write your reasons clearly.

*Answer* ..... ° [4]

**11** In the figure, $KLMN$ is a trapezium and $KN$ is the diameter of a semi-circle.
$LM = 29$ cm, $KN = 16$ cm, $MN = 14$ cm, $KL = 19.1$ cm and $\angle LMN = 90°$.




**(a)** Calculate the perimeter of the shaded region.

*Answer* ..... cm [2]

**(b)** Calculate the area of the shaded region.

*Answer* ..... $cm^2$ [3]

**12** The table below shows some values of $x$ and the corresponding values of $y$ for $y = 5 - 2x$.

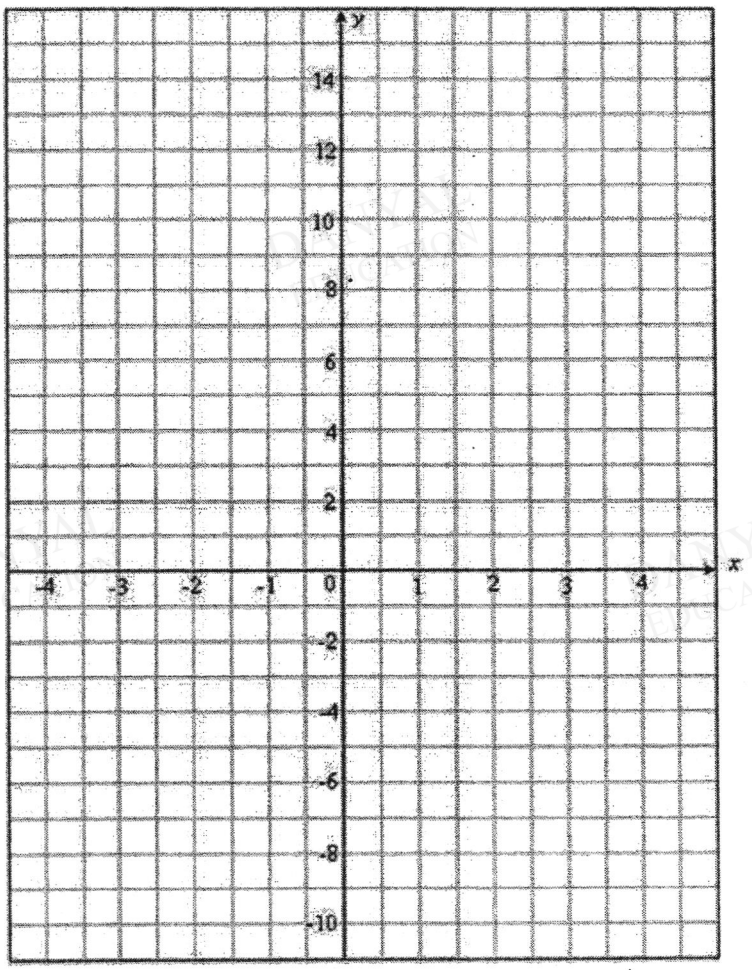
| $x$ | $-4$ | $-2$ | 2 | 4 |
|---|---|---|---|---|
| $y = 5 - 2x$ | $p$ | 9 | 1 | $-3$ |

**(a)** Calculate the value of $p$.

*Answer* $p$ = ..... [1]

**(b)** Plot the points and draw the graph of $y = 5 - 2x$ in the grid below. [2]

*Answers (b), (d)(i)*



**(c)** Using your graph, find

**(i)** its gradient,

*Answer* ... ... ... ... ... ... ... ... ... ... ... [2]

**(ii)** the value of $y$ when $x = 1$,

*Answer* $y =$ ... ... ... ... ... ... ... ... ... ... [1]

**(iii)** the $x$-intercept.

*Answer* ... ... ... ... ... ... ... ... ... ... ... [1]

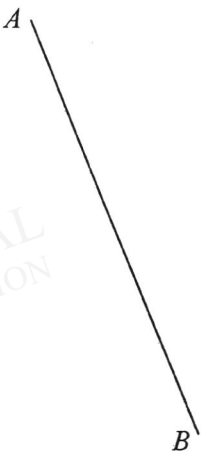
**(d)** **(i)** On the same axes, draw a line which has zero gradient and that passes through the point (3, 10). [1]

**(ii)** Write down the coordinates of the point where the graph of $y = 5 - 2x$ cuts the line in **(d)(i)**.

*Answer* ( ... ... ... ... , ... ... ... ... ) [1]

**13** **(a)** Construct triangle $ABC$ where $BC = 5$ cm and $AC = 6$ cm.
$AB$ has already been drawn. [2]

*Answer (a), (b), (c)* and *(d)*.




**(b)** Construct the perpendicular bisector of $AB$. [1]

**(c)** Construct the bisector of angle $ABC$. [1]

**(d)** Mark clearly a possible point which is inside the triangle, equidistant from $BC$ and $BA$, and is nearer to $A$ than $B$. Label this point $P$. [1]



**End of Paper**

| | |
|---|---|
| **1(a)** | 2.9732 |
| **1(b)(i)** | 2.97 |
| **(b)(ii)** | 3.0 |
| **2(a)** | $x > -1$ |
| **2(c)** | 0 |
| **3(a)** | $2^5 \times 3^2 \times 11$ |
| **3(b)** | HCF = 9, LCM = 9504 |
| **3(c)** | 198 |
| **4(a)** | $8a - b$ |
| **4(b)** | $-5x + 6$ |
| **5(a)** | $3x^2 + 6x$ |
| **5(b)** | $y = -5.5$ |
| **6(a)** | $12x\,(2a - b)$ |
| **6(b)** | $\frac{4x-5}{4}$ |
| **7** | \$35 |
| **8(a)** | $345.\dot{3}\dot{4}\dot{5}$ |
| **8(b)** | 345 |
| **8(c)** | $\frac{115}{333}$ |
| **9** | 20 |
| **10** | 250 |
| **11(a)** | 87.2 |
| **11(b)** | 214 |
| **12(a)** | $p = 13$ |
| **12(c)(i)** | $-2$ |
| **(c)(ii)** | 3 |
| **(c)(iii)** | 2.5 |
| **12(d)(ii)** | $(-2.5, 10)$ |

# BEATTY SECONDARY SCHOOL
# END-OF-YEAR EXAMINATION 2018

| | | | |
|---|---|---|---|
| **SUBJECT** | **: Mathematics** | **LEVEL** | **: Sec 1 Express** |
| **PAPER** | **: 2** | **DURATION** | **: 1 hour 30 minutes** |
| **SETTER** | **: Mrs Rose Ang** | **DATE** | **: 9 October 2018** |

| 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.
Calculators should be used where appropriate.
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 $\pi$, use either your calculator value or 3.142, unless the question requires the answer in terms of $\pi$.

At the end of the examination, fasten all your work securely together.
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**.

---

This paper consists of **8** printed pages (including this cover page)

**[Turn over**

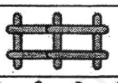
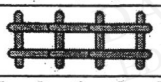
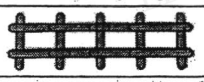
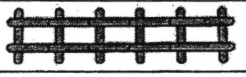
Answer **all** the questions.

1 **(a)** Given that $x = \dfrac{2a^2 - 1}{5 - (2a)^3}$, find the value of $x$ when $a = -\dfrac{1}{3}$. [1]

**(b)** Simplify $\dfrac{3cd}{2c + 2d} \div \dfrac{(3d)^2}{8(c + d)^2}$. [3]

**(c)** Express $\dfrac{2x - 3}{5} - \dfrac{1 - x}{2}$ as a single fraction. [3]

2 The table below shows a sequence of rectangles formed by ice-cream sticks.

| Figure number, $n$ | Diagram | Number of rectangles, $R_n$ | Number of ice-cream sticks, $S_n$ |
|---|---|---|---|
| 1 |  | 2 | 7 |
| 2 |  | 3 | 10 |
| 3 |  | 4 | 13 |
| 4 |  | $a$ | $b$ |
| ⋮ | ⋮ | ⋮ | ⋮ |

**(a)** State the value of $a$ and of $b$. [2]

**(b)** Find an expression, in terms of $n$, for

**(i)** $R_n$, [1]

**(ii)** $S_n$. [1]

**(c)** Find the number of rectangles that can be formed using 97 ice-cream sticks. [1]

3 **(a)** In Fit Bit Secondary School, students with a Body Mass Index (BMI) of more than 23.5 have to attend fitness training every Friday morning before lessons begin. In January 2018, Jing Hua's height was 164 cm and his weight was $M$ kg. If he was not required to attend the fitness training in the first half of the year, find the greatest possible integer value of $M$.

$$\left[\text{BMI} = \frac{\text{weight}}{(\text{height})^2}, \text{ where weight is in kg and height is in metres.}\right]$$ [3]

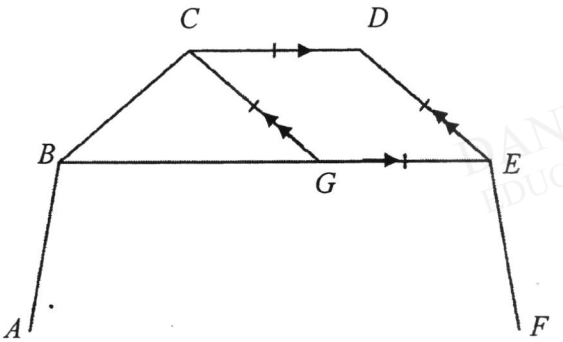
**(b)** In July 2018, Jing Hua's height increased by 1% and his weight increased by 4%. Would Jing Hua have to attend the Friday fitness training for the second half of the year? Show your working clearly using the greatest possible integer value of $M$ obtained in part **(a)** as Jing Hua's original weight. [2]



**[Turn over**

4 **(a)** The difference between an exterior and an interior angle of a $n$-sided regular polygon is 132°. Find the value of $n$. [2]

**(b)** $A, B, C, D, E, F \ldots$ are some adjacent vertices of a regular nonagon (9-sided polygon) and $CDEG$ is a rhombus.




**(i)** Calculate, stating your reasons clearly,

**(a)** $\angle CDE$, [2]

**(b)** $\angle BCG$, [2]

**(c)** $\angle BGC$, [1]

**(d)** $\angle CGE$. [1]

**(ii)** Is $BGE$ a straight line? Use your answers in **(b)(i)** to explain. [1]

5 **(a)** The bill shown below is for a meal at a Western food restaurant.

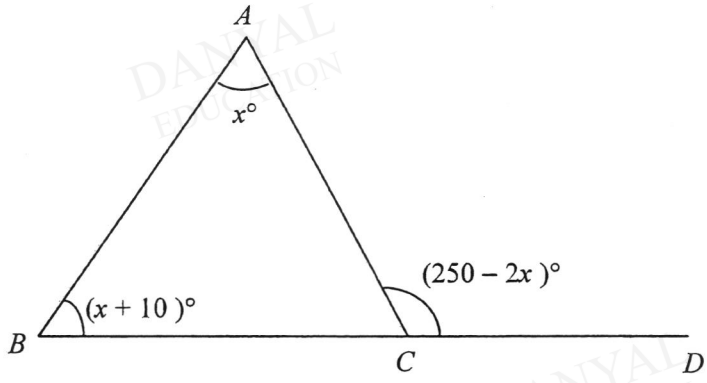
| | |
|---|---|
| Chicken Chop | \$16.90 |
| Caesar Salad | \$12.90 |
| Potato Wedges | \$7.90 |
| 10% Service Charge | \$____ |
| 7% Goods and Services Tax (GST) | \$____ |

Calculate the total cost of the meal with

**(i)** service charge only, [2]

**(ii)** service charge and GST. [2]

**(b)** In the diagram below, angle $BAC = x°$, angle $ABC = (x+10)°$ and angle $ACD = (250-2x)°$.




**(i)** Form an equation in terms of $x$, stating the reason clearly. [2]

**(ii)** Solve the equation in **(b)(i)** and find the value of $x$. [2]

**[Turn over**

6 Mr Mok started his journey from home and travelled for 1 hour 8 minutes to Exco Petrol Station where he stopped for 10 minutes. He then continued his journey for another 40 minutes to reach his destination. His average speed for the whole journey was 100 km/h.

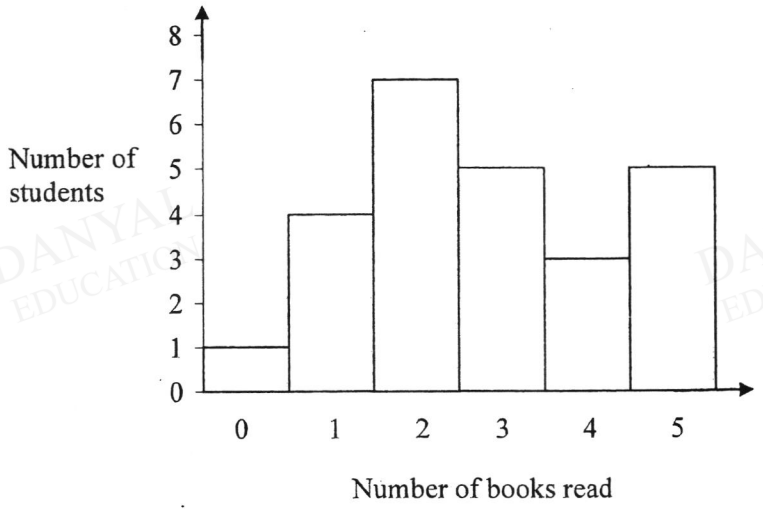
**(a)** Convert 100 km/h to metres per second. [2]

**(b)** Calculate the total distance travelled, giving your answer in kilometres. [2]

Mr Mok's car has a fuel consumption of 7.8 litres per 100 km.
The petrol he purchased at Exco Petrol Station costs $\$x$ per litre.

**(c)** Find an expression, in terms of $x$ and $y$, for the cost, in dollars, of petrol needed to travel $y$ km. [2]

7 A survey was conducted on a group of secondary one students to collect data on the number of books read by each student during the June holidays.
The information is represented in a bar chart shown below.




**(a)** Find the fraction of students who read

**(i)** 2 books, [1]

**(ii)** 3 or 5 books. [1]

**(b)** The same information is to be shown in a pie chart.
Calculate the angle of the sector which represents students who read at least 2 books. [2]

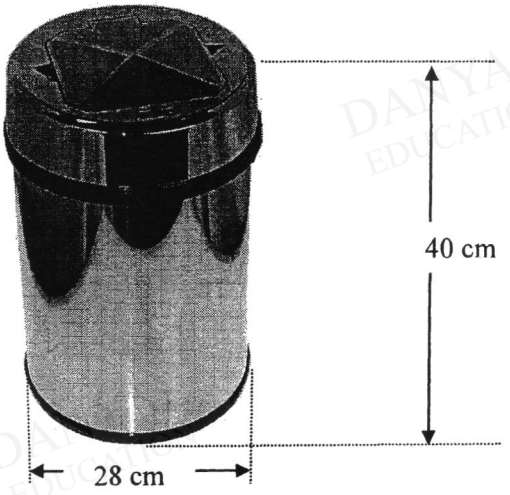
**[Turn over**

**8** The diagram below shows an automatic dustbin sold online.

It consists of an outer cylindrical bin and a cylindrical trash bin inside (not shown in the diagram).

The outer cylindrical bin has a height of 40 cm and a diameter of 28 cm.

The inner cylindrical trash bin has a height of 30 cm and a diameter of 23 cm.




Outer Cylindrical Bin

**(a)** Calculate the capacity of the **inner** trash bin, giving your answer to the nearest litres. (1 litre = 1 000 $cm^3$) [3]

Terence bought the automatic dustbin and wanted to paint the surface of the **outer** cylindrical container green.

**(b)** Calculate the total area of the surface to be painted. Leave your answer in square metres. [3]

*~ End of Paper ~*

***Answer Key***

| | | | | | |
|---|---|---|---|---|---|
| *1a* | $-\frac{21}{143}$ | *1b* | $\frac{4c(c+d)}{3d}$ | *1c* | $\frac{9x-11}{10}$ |
| *2a* | $a = 5,\ b = 16$ | *2bi* | $R_n = n + 1$ | *2bii* | $S_n = 3n + 4$ |
| *2c* | *32* | | | | |
| *3a* | $M = 63$ | *3b* | *BMI = 23.880 > 0, Need to go for fitness training* | | |
| *4a* | *15* | *4bi(a)* | $140°$ | *4bi(b)* | $100°$ |
| *4bi(c)* | $40°$ | *4bi(d)* | $140°$ | | |
| *4bii* | *Since* $\angle BGC + \angle CGE = 40° + 140° = 180°$, *BGE is a straight line.* | | | | |
| *5ai* | *$41.47* | *5aii* | *$44.37* | | |
| *5bi* | $x + x + 10 = 250 - 2x$ (exterior angle of triangle) | | | *5bii* | *60* |
| *6a* | *27.8 m/s* | *6b* | *197 km* | *6c* | *$(0.078xy)* |
| *7ai* | $\frac{7}{25}$ | *7aii* | $\frac{2}{5}$ | *7b* | $288°$ |
| *8a* | *12l* | *8b* | $0.475m^2$ | | |

# BEATTY SECONDARY SCHOOL
# END-OF-YEAR EXAMINATION 2018

| | | | |
|---|---|---|---|
| **SUBJECT** | **: Mathematics** | **LEVEL** | **: Sec 1 Express** |
| **PAPER** | **: 1** | **DURATION** | **: 1 hour 15 minutes** |
| **SETTER** | **: Mr Bernard Lee** | **DATE** | **: 5 October 2018** |

| | | |
|---|---|---|
| **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.
Calculators should be used where appropriate.
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 $\pi$, use either your calculator value or 3.142, unless the question requires the answer in terms of $\pi$.

At the end of the examination, fasten all your work securely together.
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**.

| For Examiner's Use |
|---|
| 50 |

**Answer all questions**

**1** **(a)** Calculate $\sqrt{10\frac{4}{5}-1.4^2}$.

Write down the first 5 digits displayed on your calculator.

*Answer* ..... 2.9732 **[B1]** ..... [1]

**(b)** Round off your answer in **(a)** to

**(i)** 3 significant figures,

*Answer* ..... 2.97 **[B1√]** ..... [1]

**(ii)** 1 decimal place.

*Answer* .....3.0 **[B1√]** ..... [1]

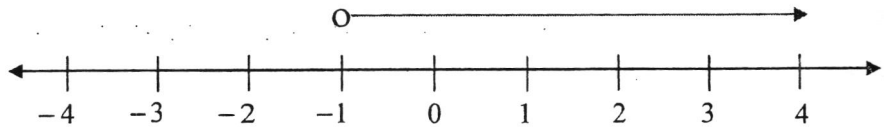
---

**2** **(a)** Solve the inequality $-4x < 4$.

*Answer* ..... $x > -1$ **[B1]** ..... [1]

**(b)** Represent your answer in **(a)** on the number line below.

*Answer*




**[B1√ *their (a)*]**

[1]

**(c)** Write down the smallest integer $x$ that satisfies the inequality $-4x < 4$.

*Answer* ..... 0 **[B1√ *their (a)*]** ..... [1]

**3** **(a)** Express 3168 in index notation.

*Answer* ..... $2^5 \times 3^2 \times 11$ **[B1]**..... [1]

**(b)** Find the HCF and LCM of 3168 and 27.

$27 = 3^3$

HCF $= 3^2 = 9$
LCM $= 2^5 \times 3^3 \times 11 = 9504$

*Answer* HCF = ..... 9 **[B1]**.....

LCM = .....9504 **[B1]**..... [2]

**(c)** Find the largest integer $k$ such that $\frac{3168}{k}$ is a multiple of 16.

$k = \frac{3168}{16} = 198$

*Answer* $k$ = ..... 198 **[B1]**..... [1]

---

**4** **(a)** Find the sum of $3a + b$ and $5a - 2b$.

*Answer* ..... $8a - b$ **[B1]** ..... [1]

**(b)** Simplify $(3x + 5) - (8x - 1)$.

Solution

$(3x + 5) - (8x - 1)$

$= 3x + 5 - 8x + 1$ **M1**

$= -5x + 6$ **A1**

*Answer* .....$-5x + 6$..... [2]

**5** **(a)** Expand and simplify $3x(x + 2)$.

*Answer* ..... $3x^2 + 6x$ **[B1]**..... [1]

**(b)** Solve the equation $3y + 5 = y - 6$.

Solution

$3y + 5 = y - 6$
$2y = -11$ **M1**
$y = -5.5$ **A1**

*Answer* $y =$ ..... $-5.5$ ..... [2]
*Accept also* $-\frac{11}{2}$ *or* $-5\frac{1}{2}$

---

**6** **(a)** Factorise completely $24ax - 12bx$.

*Answer* ..... $12x\,(2a - b)$ **[B1]**..... [1]

**(b)** Simplify $\frac{x-3}{2} + \frac{2x+1}{4}$, expressing your answer as one single fraction.

Solution

$\frac{x-3}{2} + \frac{2x+1}{4}$
$= \frac{2x-6}{4} + \frac{2x+1}{4}$ **M1**
$= \frac{4x-5}{4}$ **A1**

*Answer* ..... $\frac{4x-5}{4}$ ..... [2]

7 Dexter's family went out for a meal in a restaurant. The bill is as shown below.

| Item | Cost |
|---|---|
| Tofu | \$8.90 |
| Vegetables | \$6.40 |
| Fried Chicken | \$11.50 |
| Soup | \$9.80 |

By rounding off the cost of each item to 1 significant figure, estimate the total cost of the bill.

Solution

Total cost $= 8.9 + 6.4 + 11.5 + 9.8$
$\approx 9 + 6 + 10 + 10$ **M1**
$= \$35$ **A1**

*Answer* \$..... 35 ..... [2]

---

8 **(a)** Given that $x = 0.\dot{3}4\dot{5}$, write down the value of $1000x$ as a recurring decimal.

*Answer* ..... $345.\dot{3}4\dot{5}$ ..... [1]

**(b)** By using the fact that $1000x - x = 999x$, calculate the value of $999x$.

Solution

$999x = 345.\dot{3}4\dot{5} - 0.\dot{3}4\dot{5} = 345$

*Answer* ..... 345 ..... [1]

**(c)** Hence, use your answer in **(b)** to express $0.\dot{3}4\dot{5}$ as a fraction in the simplest form.

Solution
$999x = 345$
$0.\dot{3}4\dot{5} = x = \frac{345}{999} = \frac{115}{333}$

*Answer* ..... $\frac{115}{333}$ ..... [1]

**9** A playpen contains red, blue and yellow balls.
The ratio of red to blue balls is 3 : 5 and the ratio of blue to yellow balls is 7 : 2.
If 20 blue balls are added, the ratio of red to blue balls will become 7 : 15.
Calculate the number of yellow balls in the playpen.

Solution

Original red : blue : yellow = 21 : 35 : 10 **M1**

New red : blue 21 : 45 **M1**

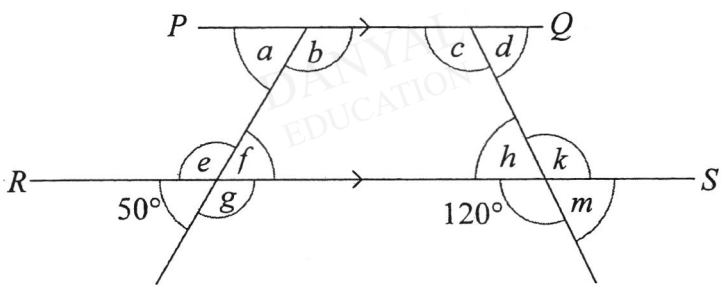
45 – 35 = 10 units = 20 balls

Number of yellow balls = 10 units = 20 **A1**

*Answer* ..... 20 ..... [3]

---

**10** In the diagram, $PQ$ is parallel to $RS$.




Calculate the sum of the angles $b$ and $c$. Write your reasons clearly.

Solution

$f = 50°$ (vertically opposite angles) **M1**

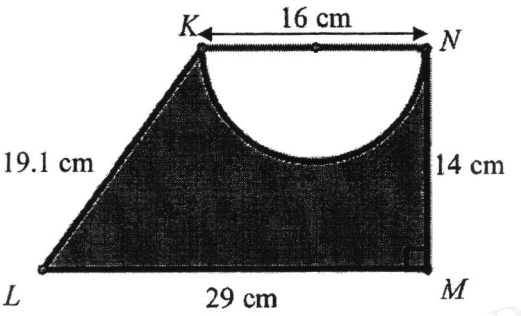
$b = 180° - 50° = 130°$ (interior angles) **M1**

$c = 120°$ (corresponding angles) **M1**

$b + c = 130° + 120° = 250°$ **A1**

*Answer* ..... 250 ..... ° [4]

**11** In the figure, $KLMN$ is a trapezium and $KN$ is the diameter of a semi-circle.
$LM = 29$ cm, $KN = 16$ cm, $MN = 14$ cm, $KL = 19.1$ cm and $\angle LMN = 90°$.




**(a)** Calculate the perimeter of the shaded region.

Solution

Half-circumference of semi-circle $= \pi \times 8 = 8\pi$ (or 25.1327) **M1**

Perimeter of logo $= 19.1 + 29 + 14 + 8\pi = 87.2$ cm (to 3sf) **A1**

*Answer* ..... 87.2 ..... cm [2]

**(b)** Calculate the area of the shaded region.

Solution

Area of semi-circle $= \dfrac{\pi(8)^2}{2} = 32\pi$ (or 100.53) **M1**

Area of trapezium $= \dfrac{1}{2}(29+16)(14) = 315$ cm$^2$ **M1**

Total area $= 315 - 32\pi = 214$ cm$^2$ (to 3sf) **A1**

*Answer* ..... 214 ..... cm$^2$ [3]

**12** The table below shows some values of $x$ and the corresponding values of $y$ for $y = 5 - 2x$.

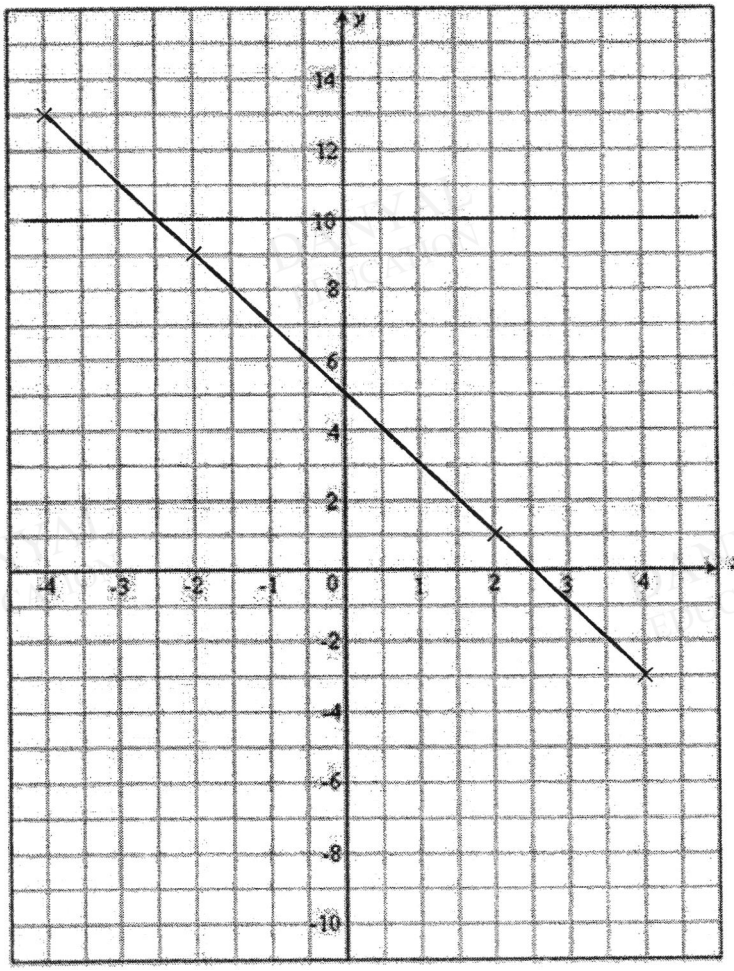
| $x$ | $-4$ | $-2$ | 2 | 4 |
|---|---|---|---|---|
| $y = 5 - 2x$ | $p$ | 9 | 1 | $-3$ |

**(a)** Calculate the value of $p$.

*Answer* $p$ = ..... 13 **[B1]**..... [1]

**(b)** Plot the points and draw the graph of $y = 5 - 2x$ in the grid below. [2]

*Answers (b), (d)(i)*




**(b)** $y = 5 - 2x$
G1 – correct points
G1 – straight line

**(d)(i)**
G1 – correct horizontal line that cuts $y$-axis at 10.

**(c)** Using your graph, find

**(i)** its gradient,

Solution

Gradient $= -\frac{16}{8}$ **M1**

$= -2$ **A1**

*Answer* ... ... ... ...−2 ... ... ... ... [2]

**(ii)** the value of $y$ when $x = 1$,

*Answer* $y$ = ... ...3 **[B1]**... ... ... ... [1]

***Dashes required***

**(iii)** the $x$-intercept.

*Answer* ... ... ... ... 2.5 **[B1]**... ... ... ... [1]

**(d)** **(i)** On the same axes, draw a line which has zero gradient and which passes through the point (3, 10). [1]

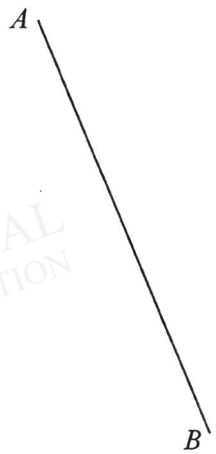
**(ii)** Write down the coordinates of the point where the graph of $y = 5 - 2x$ cuts the line in **(d)(i)**.

*Answer* ( ... ...−2.5... ... , ... ...10... ...) [1]

**[B1]**

**13** **(a)** Construct triangle $ABC$ where $BC = 5$ cm and $AC = 6$ cm.
$AB$ has already been drawn. [2]

*Answer (a), (b), (c)* and *(d)*.



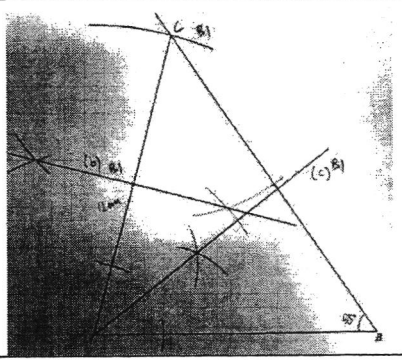

**(b)** Construct the perpendicular bisector of $AB$. [1]

**(c)** Construct the bisector of angle $ABC$. [1]

**(d)** Mark clearly a possible point which is inside the triangle, equidistant from $BC$ and $BA$, and is nearer to $A$ than $B$. Label this point $P$. [1]



**End of Paper**

| | |
|---|---|
| **1(a)** | 1.0050 |
| **1(b)** | 1.01 |
| **2(a)** | $0.16\pi$ , $0.504$ , $0.5\dot{0}$ , $\frac{23}{45}$ |
| **2(b)** | $0.16\pi$ |
| **3(a)** | $x=3$<br>$y=2$ |
| **3(b)** | 132 |
| **3(c)** | $k=30$ |
| **4(a)** | London |
| **4(b)** | 44°C |
| **5(a)** | $\frac{x}{30}$ |
| **5(b)** | $\frac{y}{4}-x$ |
| **6(a)** | 125 ml |
| **6(b)** | 25:55:28 |
| **7** | area $=288-72\pi$ cm$^2$<br>perimeter $=48+24\pi$ cm |
| **8(a)** | $6a+7ab+5b$ |
| **8(b)** | $\frac{11x-3}{12}$ |
| **8(c)** | $p=6$ |
| **9(a)** | 108° |
| **9(b)** | 9 |
| **9(c)** | Yes, since ext $\angle = 18°$ and $n=\frac{360}{18}=20$, so $CDG$ is part of a regular polygon. |
| **10(a)** | $x=2.6$ |
| **10(b)** | $x=14.5$ |
| **11(a)** | 25 |
| **11(b)** | $4n-7$ |
| **11(c)** | No, because when $4n-7=295$, $n=75.5$. Since $n$ must be an integer, 295 is not a term in $S$. |
| **11(d)** | $n^2+4n-6$ |
| **12** | 6.5% decrease |
| **13** |  |

**BEATTY SECONDARY SCHOOL**
**END-OF-YEAR EXAMINATION 2018**

# Marking Scheme

| | | | |
|---|---|---|---|
| **SUBJECT** | **: Mathematics** | **LEVEL** | **: Sec 1 Express** |
| **PAPER** | **: 2** | **DURATION** | **: 1 hour 30 minutes** |
| **SETTER** | **: Mrs Rose Ang** | **DATE** | **: 9 October 2018** |

| 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.
Calculators should be used where appropriate.
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 $\pi$, use either your calculator value or 3.142, unless the question requires the answer in terms of $\pi$.

At the end of the examination, fasten all your work securely together.
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**.



This paper consists of **8** printed pages (including this cover page)

**[Turn over**

Answer **all** the questions.

| Question No. | | Solution | Remarks |
|---|---|---|---|
| **1** | **(a)** | $x = -\frac{21}{143}$ [B1] | *Accept* $x = -0.147$ *(3 s.f.)* |
| | **(b)** | $\frac{3cd}{2c+2d} \div \frac{(3d)^2}{8(c+d)^2}$.<br>$= \frac{3cd}{2c+2d} \times \frac{8(c+d)^2}{(3d)^2}$ [*M*]<br>$= \frac{8(3d)c(c+d)^2}{2(c+d)(3d)^2}$ [*M1 – factorise*]<br>$= \frac{4c(c+d)}{3d}$. [*A1*] | |
| | **(c)** | $\frac{2x-3}{5} - \frac{1-x}{2}$<br>$= \frac{2(2x-3)}{10} - \frac{5(1-x)}{10}$ [*M1 – LCM denominator*]<br>$= \frac{4x-6-5+5x}{10}$ [*M1 – expand and change of sign*]<br>$= \frac{9x-11}{10}$ [*A1*] | |
| | | | |
| **2** | **(a)** | $a = 5$ $b = 16$ [B1,B1] | |
| | **(bi)** | $R_n = n + 1$ [B1] | |
| | **(bii)** | $S_n = 3n + 4$ [B1] | |
| | **(c)** | 32 [B1] | |
| | | | |

| Question No. | | Solution | Remarks |
|---|---|---|---|
| 3 | (a) | $\frac{M}{1.64^2} \le 23.5$ [*M1 – forming inequality*]<br>$M \le 63.2056$ (2 d.p.) [*M1 – solving inequality*]<br>$M = 63$ [*A1*] | |
| | | | |
| | (b) | New height $= 1.64 \times 1.01 = 1.6564$ m<br>New weight $= 63 \times 1.04 = 65.52$ kg<br>$BMI = \frac{63 \times 1.04}{(1.64 \times 1.01)^2}$ [M1]<br>$BMI = 23.880 > 23.5$<br>Jing Hua need to go for the fitness training. [A1] | |
| | | | |
| 4 | (a) | Let the exterior angle $= x°$<br>interior angle $= (180 - x)°$<br>$180 - x - x = 132$ [M1]<br>$x = 24$ [M1]<br>$n = \frac{360}{24} = 15$ [A1] | |
| | | | |
| | (b) | (i)(a) Sum of interior angles $= (9-2)180°$ [M1]<br>$\angle CDE = 140°$ [A1] | |
| | | (i)(b) $\angle DCG = 180° - 140° = 40°$ (interior angles, *CG//DE*) [M1]<br>$\angle BCG = 140° - 40° = 100°$ [A1] | |
| | | (i)(c) $\angle BGC = \frac{180° - 100°}{2}$ (base angle of isosceles triangle) [B1]<br>$= 40°$ | |
| | | (i)(d) $\angle CGE = \angle CDE = 140°$ (property of rhombus) [A1] | *Accept interior angles, CD//GE* |
| | | (ii) Since $\angle BGC + \angle CGE = 40° + 140° = 180°$, *BGE* is a straight line. [A1] | |
| | | | |

| Question No. | | | Solution | Remarks |
|---|---|---|---|---|
| 5 | (a) | (i) | Cost of meal = \$16.90 + \$12.90 + \$7.90 = \$37.70 [M1]<br>Cost with service charge = 1.10 × \$37.70 = \$41.47 [A1] | |
| | | (ii) | Cost with service charge and GST = \$41.47 × 1.07 [M1]<br>= \$44.37 (nearest cent) [A1] | |
| | | | | |
| 5 | (b) | (i) | $x + x + 10 = 250 - 2x$ [B1]<br>(exterior ∠ of a triangle) [B1] | |
| | | (ii) | $2x + 10 = 250 - 2x$<br>$4x = 240$<br>$x = 60$ [A1] } [M1] | |
| | | | | |
| 6 | | (a) | 100 km/h = 100 × 1000 ÷ 3600 [M1]<br>= 27.8 m/s (to 3 s.f.) [A1] | |
| | | (b) | total distance travelled = $100 \times 1\frac{58}{60}$ [M1]<br>= 197 km (to 3 s.f.) [A1] | |
| | | (c) | cost of petrol = $\frac{y}{100} \times 7.8 \times x$ [M1]<br>= \$(0.078xy) [A1] | |
| | | | | |

| Question No. | | Solution | Remarks |
|---|---|---|---|
| 7 | (a)(i) | Total number of students $= 1+4+7+5+3+5 = 25$<br>Fraction required $= \frac{7}{25}$ [B1] | |
| | (a)(ii) | Fraction required $= \frac{10}{25} = \frac{2}{5}$ [B1] | |
| | (b) | number of students read at least 2 books $= 25-5 = 20$ [M1]<br>Required angle $= \frac{4}{5} \times 360° = 288°$ [A1] | |
| | | | |
| 8 | (a) | capacity $= \pi\left(\frac{23}{2}\right)^2 (30)$ [M1]<br>$= 12460 \text{ cm}^3$ [M1]<br>$= 12$ litres (nearest litres) [A1] | |
| | (b) | Area of the curved surface $= 2\pi(14) \times 40$ [M1]<br>Base Area $= = \pi(14)^2$<br>Total Area of the Surface to be painted<br>$= 1120\pi + 2(196\pi)$ [M1]<br>$= 4750 \text{ cm}^2$ (nearest $\text{cm}^2$)<br>$= 0.475 \text{ m}^2$ [A1] | |