DIRECTIONS

Answering Multiple-Choice Questions
Answer all multiple-choice questions. If you fill in more than one answer to a question, or leave a question blank, the question will be scored zero. Incorrect answers will also be scored zero.

Answering Open-Response Questions
Do all of your work for each question in the space provided for the question only.
Write your solutions, including all calculations, clearly and completely.

ATTENTION:
There are more open-response questions in this booklet than a regular booklet.

You are now ready to start.
To indicate your answer, use a pencil to fill in the appropriate circle below completely.

Like this: ⬜️

Not like this: ✕  ✔️

Cleanly erase your answer if you wish to change it and fill in the circle for your new answer.

Fill in only one circle for each question.

1  ⬜️  ⬜️  ⬜️  ⬜️
2  ⬜️  ⬜️  ⬜️  ⬜️
3  ⬜️  ⬜️  ⬜️  ⬜️
4  ⬜️  ⬜️  ⬜️  ⬜️
5  ⬜️  ⬜️  ⬜️  ⬜️
6  ⬜️  ⬜️  ⬜️  ⬜️
7  ⬜️  ⬜️  ⬜️  ⬜️
8  ⬜️  ⬜️  ⬜️  ⬜️
Determine an unsimplified expression for the total area of the floor, $A$, in m$^2$.

$$A = 26x^2 - 21x$$

Simplify your expression fully. Show your work.

$$A_{\text{total}} = \text{Area}_K + \text{Area}_L$$

$$= 2x(3x-3) + 5x(4x-3)$$

$$= 6x^2 - 6x + 20x^2 - 15x$$

$$= 26x^2 - 21x$$
Folding Time

A piece of paper is folded in half, which results in two layers of paper. Then the paper is folded in half again to make four layers, and so on.

The number of layers and the number of folds are recorded in the chart.

<table>
<thead>
<tr>
<th>Number of folds</th>
<th>Number of layers</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>

Determine whether this relationship is linear or non-linear.
Circle one: Linear Non-linear

Justify your answer.
You have the option of using the grid if you wish.

1. Since first differences are not the same, it is non-linear
2. Line of best fit is a curve
Theatre Programs

A company charges schools to print programs for school plays. Information about the linear relationship between the total cost and number of programs printed is shown below.

<table>
<thead>
<tr>
<th>Number of programs, ( n )</th>
<th>Total cost, ( C ) ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>350</td>
<td>220</td>
</tr>
<tr>
<td>500</td>
<td>250</td>
</tr>
<tr>
<td>750</td>
<td>300</td>
</tr>
</tbody>
</table>

Determine an equation to represent this relationship.

Show your work.

You have the option of using the grid if you wish.

\[
\text{Step 1: } A(350, 220), B(500, 250)
\]

\[
m = \frac{250 - 220}{500 - 350} = \frac{30}{150} = \frac{1}{5} = 0.2
\]

\[
y = mx + b \quad m = 0.2 \quad A(350, 220)
\]

\[
220 = 0.2(350) + b
\]

\[
220 = 70 + b
\]

\[
150 = b
\]

\[
\therefore y = \frac{1}{5}x + 150
\]
Standard Lines

Two lines are represented by the equations below.

Line 1: \( x - 2y + 6 = 0 \)  
Line 2: \( 3x + 6y - 18 = 0 \)

Determine which line could be represented by \( y = -\frac{1}{2}x + 3 \).

Circle one: Line 1  Line 2  Both

Justify your answer. Include information for both Line 1 and Line 2.

\[
\begin{align*}
\text{Line 1: } & \quad x - 2y + 6 = 0 \\
& \quad -2y = -x - 6 \\
& \quad y = \frac{1}{2}x + 3 \\
\end{align*}
\]

\[
\begin{align*}
\text{Line 2: } & \quad 3x + 6y - 18 = 0 \\
& \quad 6y = -3x + 18 \\
& \quad y = -\frac{1}{2}x + 3
\end{align*}
\]

If the slope were negative, it'd have \( b = 6 \).
### Terrific Ts

A school orders T-shirts from Terrific Ts. The total cost is made up of a set-up fee of $115 and a cost of $3 per T-shirt.

Terrific Ts requires a minimum order of 25 T-shirts. The school can spend a maximum of $800.

Determine all the possible values of the total cost, $C$, and the number of T-shirts, $n$, for this situation.

Show your work.

Let $C$ represent the cost, $n$ represent the number of T-shirts.

\[ C = 3n + 115 \]

Find the maximum number of T-shirts you can purchase:

\[ 800 = 3n + 115 \]

\[ 685 = 3n \]

\[ n = \frac{685}{3} \]

The possible values of $n$ in this situation are $\{25, 26, \ldots, 228\}$.

\[ C_{\text{min}} = 3(25) + 115 \]

\[ = 75 + 115 \]

\[ = 190 \]

The possible values of $C$ in this situation are $\{190, \ldots, 799\}$.

\[ \text{min} \$190 \text{ and max } \$799 \]
Six and Five Sides

A regular hexagon and a regular pentagon are joined as shown below.

Complete the table below with the values of $x$ and $y$. Justify your answer using geometric properties.

<table>
<thead>
<tr>
<th>Value</th>
<th>Justification using geometric properties</th>
</tr>
</thead>
</table>
| $x = 120^\circ$ | $(n-2)180 = \text{sum of interior angles}$  
$6-2)180 = 6x$  
$(4)180 = 6x$  
$720 = 6x$  
$\frac{720}{6} = x$  
$120 = x$ |
| $y = 132^\circ$ | $(n-2)180 = 5a$  
$(5-2)180 = 5a$  
$3 \cdot 180 = 5a$  
$540 = 5a$  
$\frac{540}{5} = a$  
$108 = a$  
$q + x + y = 360^\circ$ (circle)  
$y = 360 - 120 - 108$  
$y = 132^\circ$ |
To indicate your answer, use a pencil to fill in the appropriate circle below completely.

Like this: ●

Not like this: ✗ ✗ ✗

Cleanly erase your answer if you wish to change it and fill in the circle for your new answer.

Fill in only one circle for each question.

15 [ ] [ ] [ ] [ ]
16 [ ] [ ] [ ] [ ]
17 [ ] [ ] [ ] [ ]
18 [ ] [ ] [ ] [ ]
19 [ ] [ ] [ ] [ ]
20 [ ] [ ] [ ] [ ]
21 [ ] [ ] [ ] [ ]
22 [ ] [ ] [ ] [ ]