Note: Higher level questions are marked with an asterisk*

3. Warty Ltd

a) Selling price of each unit:

\[ \frac{5,000,000}{20,000} = £250 \]

b) Variable cost of each unit:

\[ \frac{(1,400,000 + 400,000)}{20,000} = £90 \text{ per unit} \]

c) Warty's contribution per unit:

£250 - £90 = £160

d) Warty's breakeven point in units:

\[ \frac{(1,600,000 + 1,200,000)}{160} = 17,500 \text{ units} \]

e) Warty's margin of safety as a percentage:

\[ \frac{(20,000 - 17,500)}{20,000} \times 100 = 12.5\% \]

f) Warty Ltd need to sell:

\[ \frac{(1,600,000 + 1,200,000 + 1,000,000)}{160} = 23,750 \text{ units} \]

To achieve a target profit of £1,000,000.

4. Harvey

a)

Variable cost per unit = 70 + 80 + 30 = £180
Contribution per unit = 270 - 180 = £90

Break-even point = \( \frac{150,000}{90} \) = 1,667 desks
Margin of safety = 2,000 - 1,667 = 333 desks

b) Margin of safety (as a percentage) = \( \frac{333 \times 100\%}{2,000} \) = 16.7%

Expected production / demand has to fall by only 16.7% before the breakeven point is reached and production would be running at a loss. This makes the project slightly risky as 16.7% is not a very secure margin.

c) Profit at budgeted production = (£90 x 2000) - £150,000 = £30,000

d) Although £230 is well below his usual selling price, Harvey should still accept this order as each computer manufactured and sold will make a positive contribution of:

\[ £230 - £180 = £50. \]

If these 500 computers are made and sold, extra profits of £50 x 500 = £25,000 will result.

e) The relevant range is the range over which it is valid to look at the relationship between cost, volume and profit. The range will be limited because, after a certain volume is reached, fixed costs will rise, perhaps because additional space will have to be rented, and unit costs will vary, possibly caused by with economies of scale.
5. Henry

a) Original projection

<table>
<thead>
<tr>
<th></th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling price per unit</td>
<td>10.60</td>
</tr>
<tr>
<td>Less variable costs per unit</td>
<td>4.20</td>
</tr>
<tr>
<td><strong>CONTRIBUTION PER UNIT</strong></td>
<td><strong>6.40</strong></td>
</tr>
</tbody>
</table>

Break-even point = 220,000/6.40 = 34,375 units

b) Total contribution = 75,000 x £6.40 = £480,000

Less fixed costs = £220,000

Projected profit = £260,000

c) Option 1 - reduce selling price by 5%

Selling price = £10.60 x 95% = £10.07

Contribution per unit = £10.07 - £4.20 = £5.87

To maintain the original profit of £260,000, Henry needs to sell enough units to cover fixed costs and generate this profit:

Required level of sales \(\frac{(220,000 + 260,000)}{5.87}\) = 81,772 units

Option 2 - increase selling price by 10%

Selling price = £10.60 x 110% = £11.66
Contribution per unit  =  £11.66 - £4.20  =  £7.46

To maintain the original profit of £260,000, Henry needs to sell enough units to cover fixed costs and generate this profit:

Required level of sales  \[
\frac{(220,000 + 260,000)}{7.46} = 64,343 \text{ units}
\]

**d) Sales manager’s proposals**

Variable costs = £4.20 + 0.20 = £4.40

Fixed costs = £220,000 - £15,000 = £205,000

Contribution per unit = £10.60 - £4.40 = £6.20

Break-even point  =  \[
\frac{205,000}{6.20} = 33,065 \text{ units}
\]

The break-even point if the sales manager’s proposal is adopted is very similar to the break-even point under the original proposal.

*6. Activate Ltd*

**a)** Anticipated profit = (contribution per child x expected number) less fixed costs:

Contribution per child per week  =  £117 - (18 + 15 + 7) = £77

Fixed costs = £20,000

Anticipated profit  =  (£77 x 150 x 5 weeks) - £20,000  =  £37,750

**b)** To break even, Activate Ltd needs to sell:

\[
\frac{20,000}{77} = 260 \text{ holiday weeks}
\]

**c)** Margin of safety  =  (150 x 5) - 260 = 490 holidays.

Margin of safety  =  \[
\frac{490}{(150 \times 5)} \times 100\% = 65.3\%
\]
(d) Reduced return rate = £65

Contribution per unit = £65 - £40 = £25

Hence, as an extra 40 children can be accommodated on each week’s camp, and
the directors should offer this scheme for ‘returning children’.
These extra children will generate extra profits of

£25 x 40 children x 4 weeks = £4,000.

7. Wanda

<table>
<thead>
<tr>
<th></th>
<th>Fixed costs</th>
<th>Variable costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawings</td>
<td>— Wanda’s salary</td>
<td>Petrol</td>
</tr>
<tr>
<td>Van depreciation</td>
<td>Electricity</td>
<td></td>
</tr>
<tr>
<td>Van expenses</td>
<td>Detergent</td>
<td>Casual labour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Washing machine depreciation</td>
</tr>
</tbody>
</table>

(b) Variable cost | Per bag £
Petrol (£2/2 bags) | 1.00
Electricity      | 1.00
Detergent
Casual labour
Machine depreciation

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Detergent</td>
<td>0.50</td>
</tr>
<tr>
<td>Casual labour</td>
<td>8.00</td>
</tr>
<tr>
<td>Machine depreciation</td>
<td>0.20</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>10.70</strong></td>
</tr>
</tbody>
</table>

c) **Fixed costs**

<table>
<thead>
<tr>
<th></th>
<th>Per annum £</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawings—Wanda’s salary</td>
<td>22,000</td>
</tr>
<tr>
<td>Delivery van depreciation</td>
<td>4,000</td>
</tr>
<tr>
<td>Van expenses</td>
<td>2,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>28,000</strong></td>
</tr>
</tbody>
</table>

d) Wanda has far lower fixed costs, and more of her costs are variable. This makes it easier to control costs, and the venture is less risky than Pippa’s. Even if no customers want portraits taken one day, Pippa will still have to pay her photographers and cover her other fixed costs. In Wanda’s business, the casual labour is paid only when there is work that needs doing.