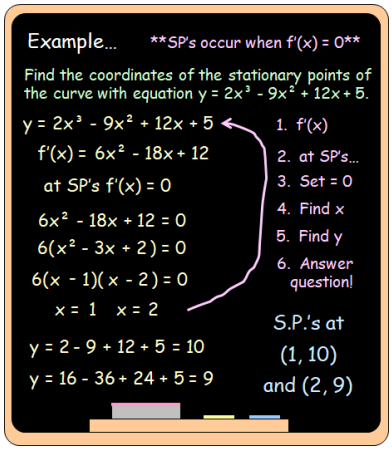
Outcome 1 – Finding the coordinates of stationary points

Bronze example



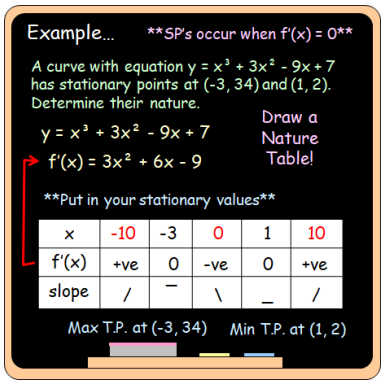
Bronze questions

Find the coordinates of the stationary point(s) of the following curves...

1. $y = x^2 - 2x + 5$
2. $y = x^3 + 3x^2 - 9x + 5$
3. $y = x^3 - 12x + 10$
4. $y = 2x^3 - 12x^2 + 11$
5. $y = 36x^2 - 3x^3$
6. $y = 3x^4 - 20x^3 + 30$

Outcome 2 – Determining the nature of stationary points

Silver example



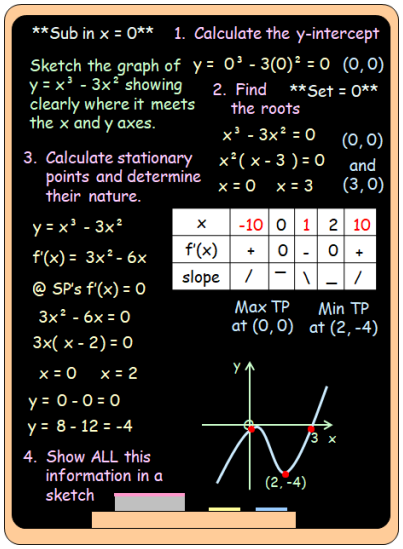
Silver questions

Determine the nature of the stationary points of the following curves...

1. $y = x^2 - 2x + 5$ → SP at (1, 4)
2. $y = x^3 + 3x^2 - 9x + 5$ → SP's at (-3, 32) and (1, 0)
3. $y = x^3 - 12x + 10$ → SP's at (-2, 27) and (2, -5)
4. $y = 2x^3 - 12x^2 + 11$ → SP's at (0, 11) and (4, -53)
5. $y = 36x^2 - 3x^3$ → SP's at (0, 0) and (8, 768)
6. $y = 3x^4 - 20x^3 + 30$ → SP's at (0, 30) and (5, -595)

Outcome 3 – Curve sketching

Gold example



Gold questions

Sketch the following curves showing intersection with both axes and any stationary points...

1. $y = 2x^3 - 18x^2$
2. $y = 6x^2 - 20x^3$
3. $y = (x + 5)(x - 1)^2$
4. $y = (x - 6)(x - 1)(x + 2)$

Bronze Answers

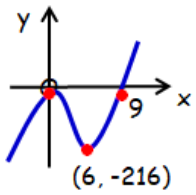
1. (1, 4)
2. (-3, 32) and (1, 0)
3. (-2, 27) and (2, -5)
4. (0, 11) and (4, -53)
5. (0, 0) and (8, 768)
6. (0, 30) and (5, -595)

Silver Answers

1. Min TP at (1, 4)
2. Max TP at (-3, 32), Min TP at (1, 0)
3. Max TP at (-2, 27), Min TP at (2, -5)
4. Max TP at (0, 11), Min TP at (4, -53)
5. Min TP at (0, 0), Max TP at (8, 768)
6. Falling pt of inflection at (0, 30), Min TP at (5, -595)

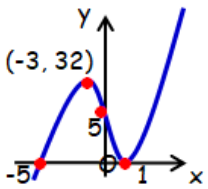
Gold Answers

1. Y-intercept = (0, 0)
   Roots = (0, 0) & (9, 0)
   TP's = Max (0, 0)
   & min (6, -216)



2. Y-intercept = (0, 0)
   Roots = (0, 0) & $(\frac{3}{10}, 0)$
   TP's = Max (0, 0)
   & min $(\frac{1}{5}, \frac{2}{25})$

3. Y-intercept = (0, 5)
   Roots = (-5, 0) & (1, 0)
   TP's = Max (-3, 32)
   & min (1, 0)



4. Y-intercept = (0, 5)
   Roots = (-5, 0) & (1, 0)
   TP's = Max (-3, 0)
   & min (1, -216)