

No Calculator!! Box your final answer.

1. Given $y = 2x^2 + 6x - 20$

a) Rewrite in $y = a(x - h)^2 + k$ form

$$y = 2(x^2 + 3x + (\frac{3}{2})^2) - 20 - 2(\frac{9}{4})$$

$$y = 2(x + \frac{3}{2})^2 - \frac{49}{2}$$

b) Identify the vertex and the axis of symmetry.

Vertex $(-\frac{3}{2}, -\frac{49}{2})$ line of sym. $x = -\frac{3}{2}$

c) Rewrite in $y = a(x - r_1)(x - r_2)$ and identify the x-intercepts.

$$y = 2(x^2 + 3x - 10)$$

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

X-intercepts: $(-5, 0)$ $(2, 0)$

2. Show that the lines with equations $y = -5x + k$ are tangents to the parabola $y = x^2 - 3x + c$ if and only if $c - k = 1$.

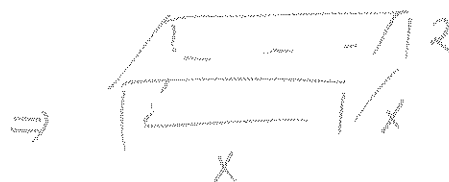
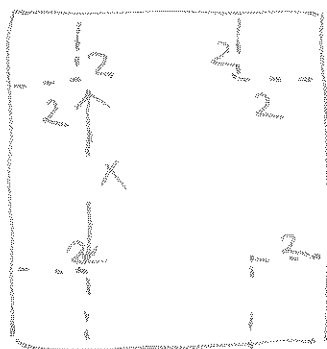
$$x^2 - 3x + c = -5x + k$$

$$\Rightarrow x^2 + 2x + c - k = 0$$

Show $\Delta = 0 \Rightarrow (2)^2 - (4)(1)(c - k) = 0$

$$4 - 4(c - k) = 0 \Rightarrow \boxed{c - k = 1}$$

5. An open square based container is made by cutting 4 cm square pieces out of a piece of tinfoil. If the volume of the container is 120 cm^3 , find the size of the original piece of tinfoil.



$$2x^2 = 120$$

$$x^2 = 60$$

$$x = \sqrt{60} = \sqrt{4 \cdot 15} = 2\sqrt{15}$$

The original: $2\sqrt{15} + 4$ by $2\sqrt{15} + 4$

Notes: You must study. Do not expect you will do fine without study. Go over the IB exam style questions, quiz, the exit slips, the review sets for a good preparation of exam.

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