Straight Line Graphs- Mark Scheme

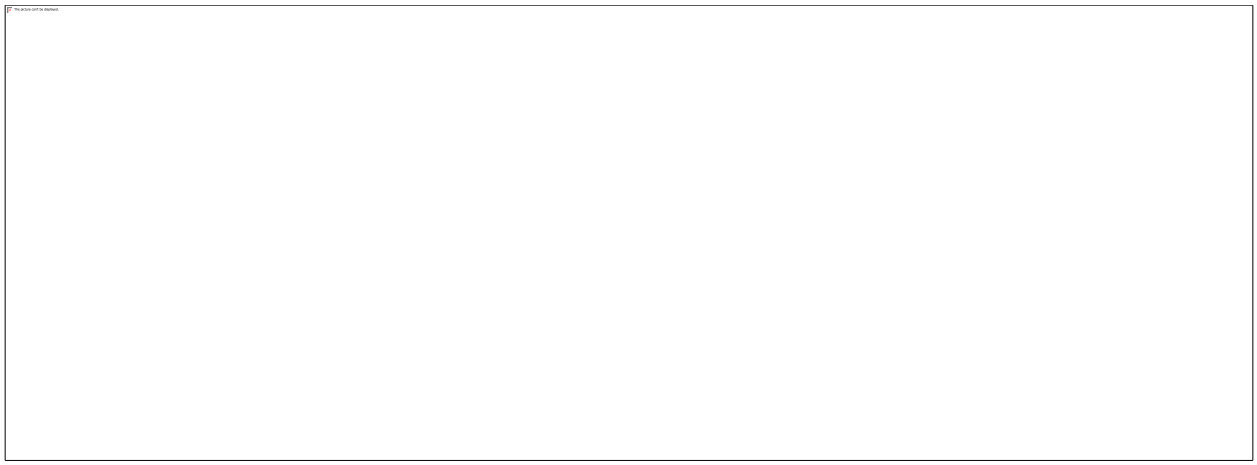
May 2019 Mathematics Advanced Paper 1: Pure Mathematics 1

1.

Question	Scheme	Marks	AOs
1(a)	$2x+4y-3=0 \Rightarrow y=\mp\frac{2}{4}x+...$ Gradient of perpendicular $=\pm\frac{4}{2}$	M1	1.1b
	Either $m=2$ or $y=2x+7$	A1	1.1b
		(2)	
(b)	Combines 'their' $y=2x+7$ with $2x+4y-3=0 \Rightarrow 2x+4(2x+7)-3=0 \Rightarrow x=...$	M1	1.1b
	$x=-2.5$ oe	A1	1.1b
		(2)	
			(4 marks)

(a)

M1: Attempts to set given equation in the form $y=ax+b$ with $a=\mp\frac{2}{4}$ oe such as $\mp\frac{1}{2}$ **AND** deduces that $m=-\frac{1}{\ }$ Condone errors on the "+b"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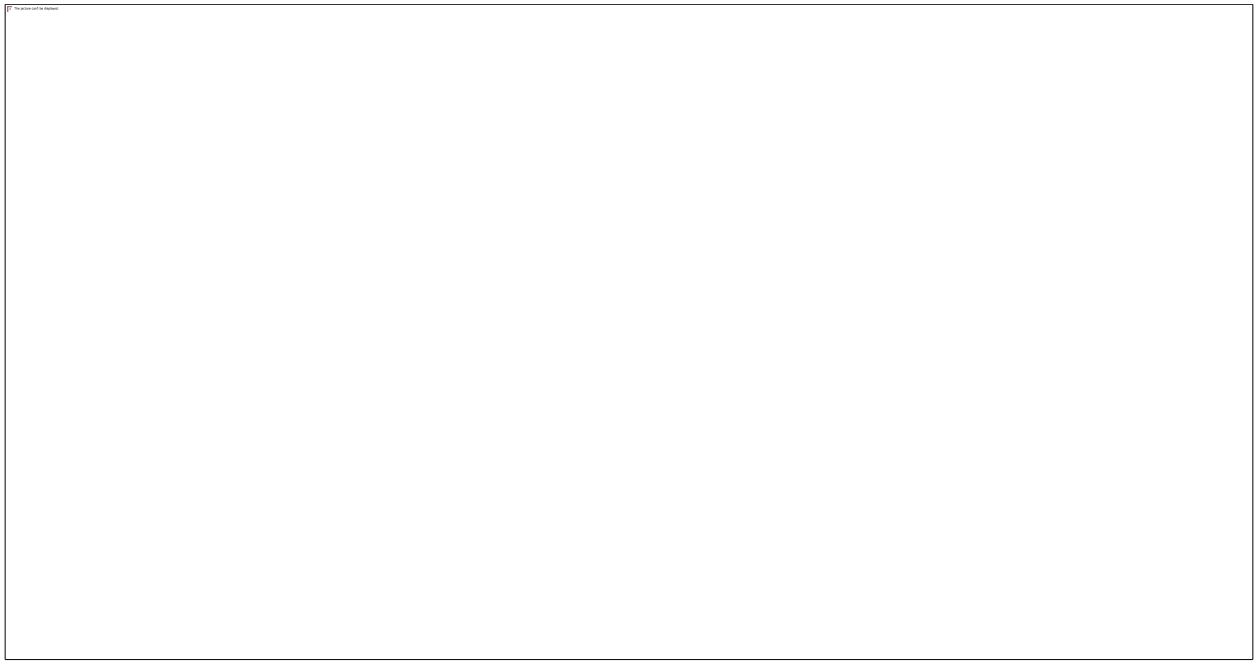
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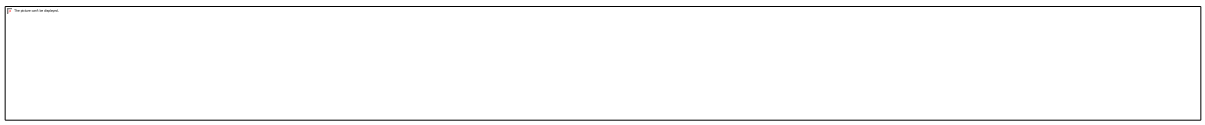

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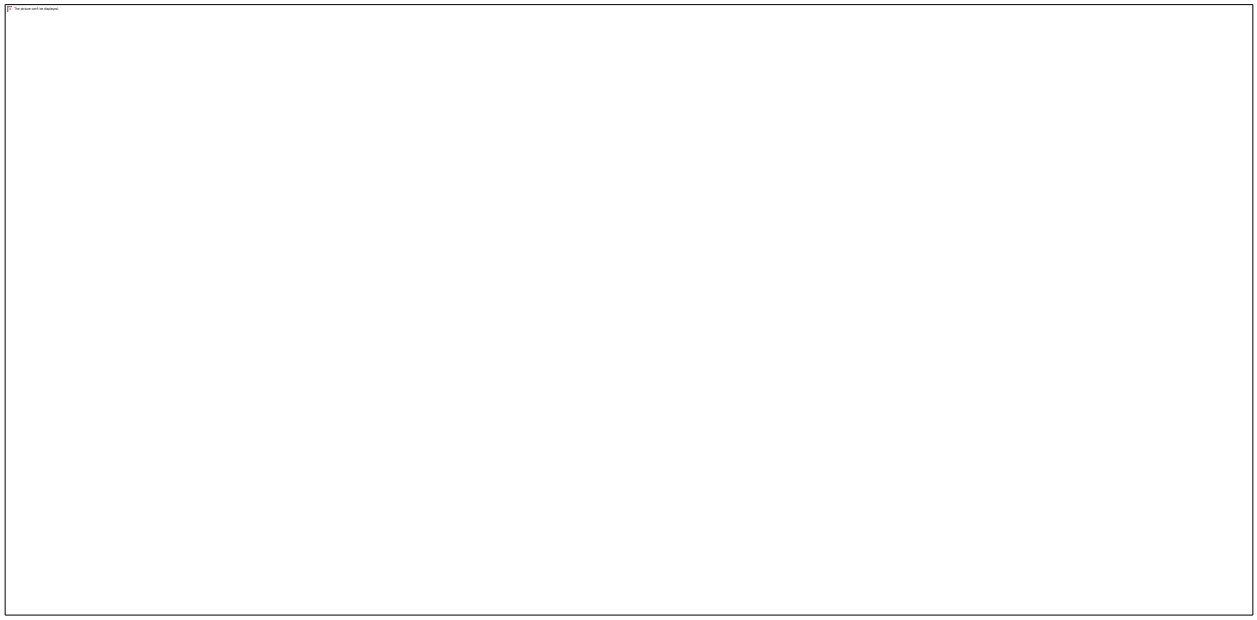

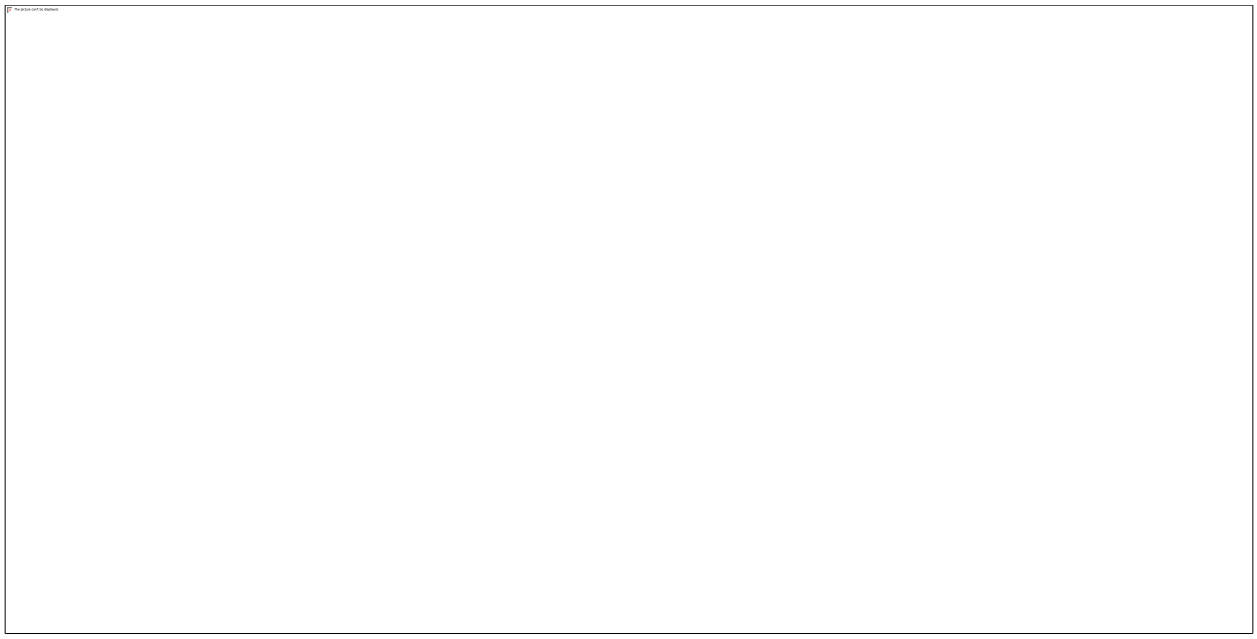

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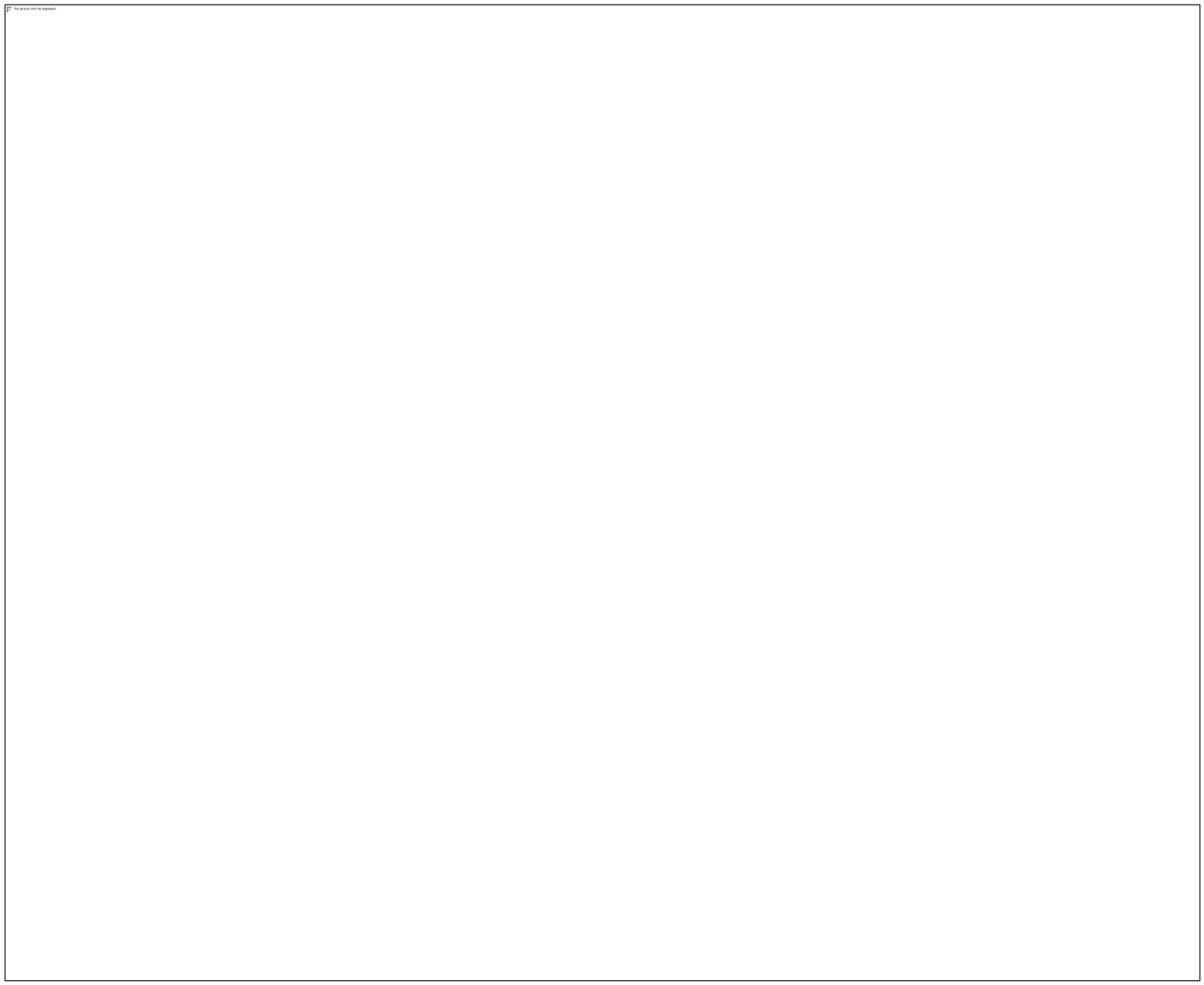

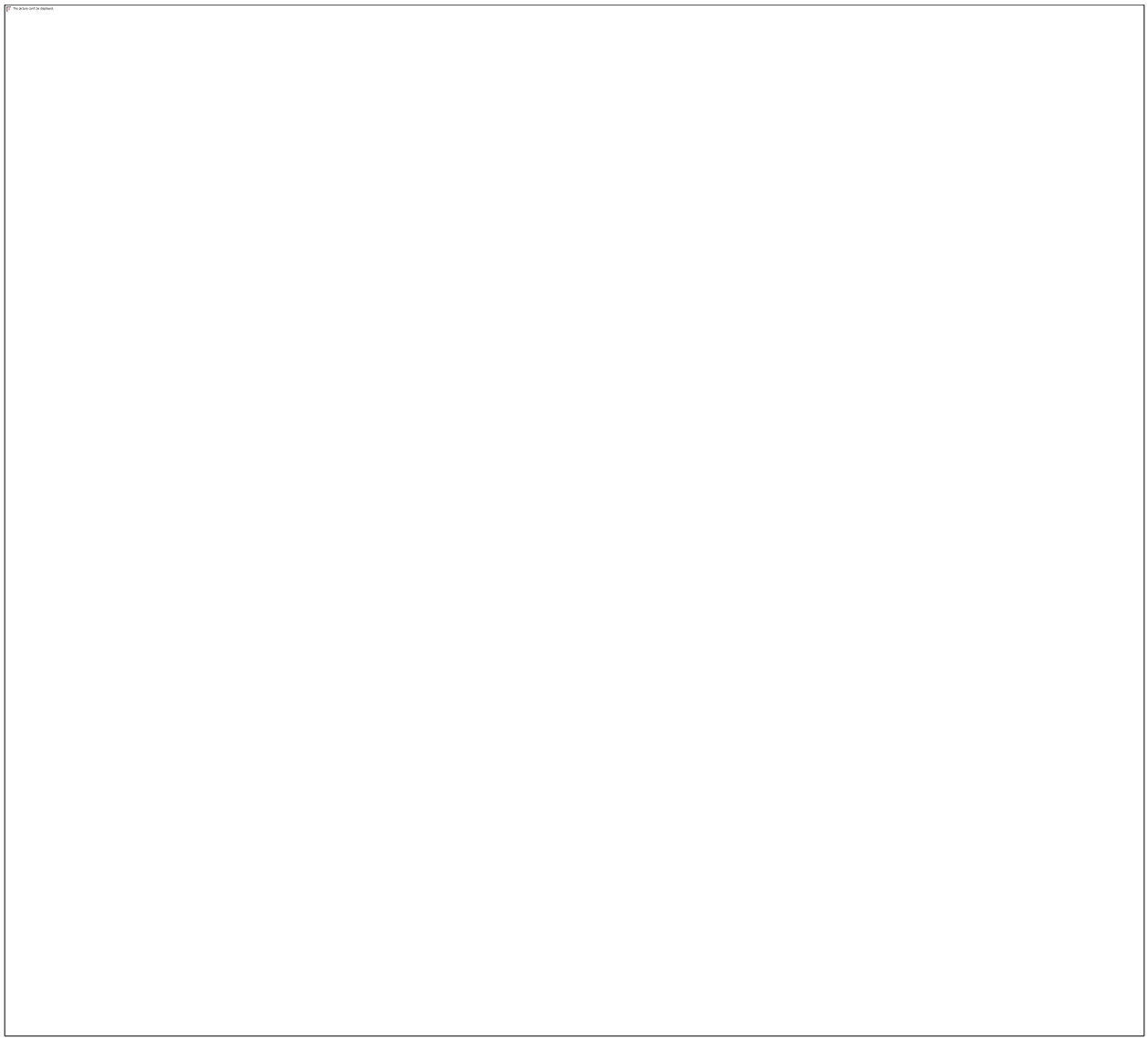
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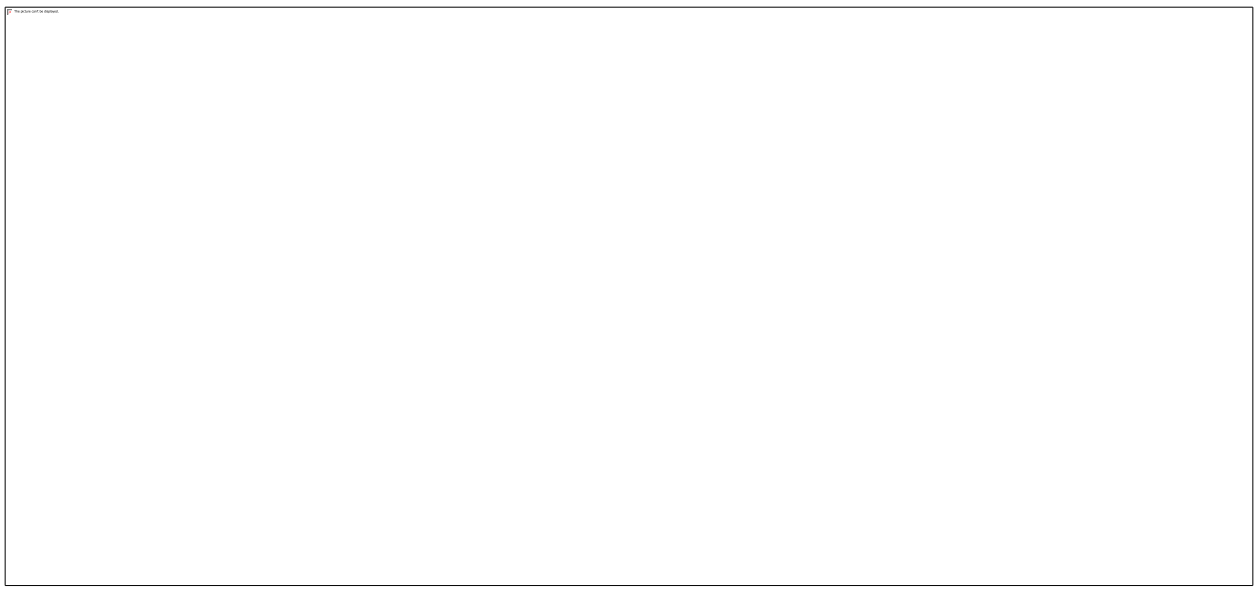
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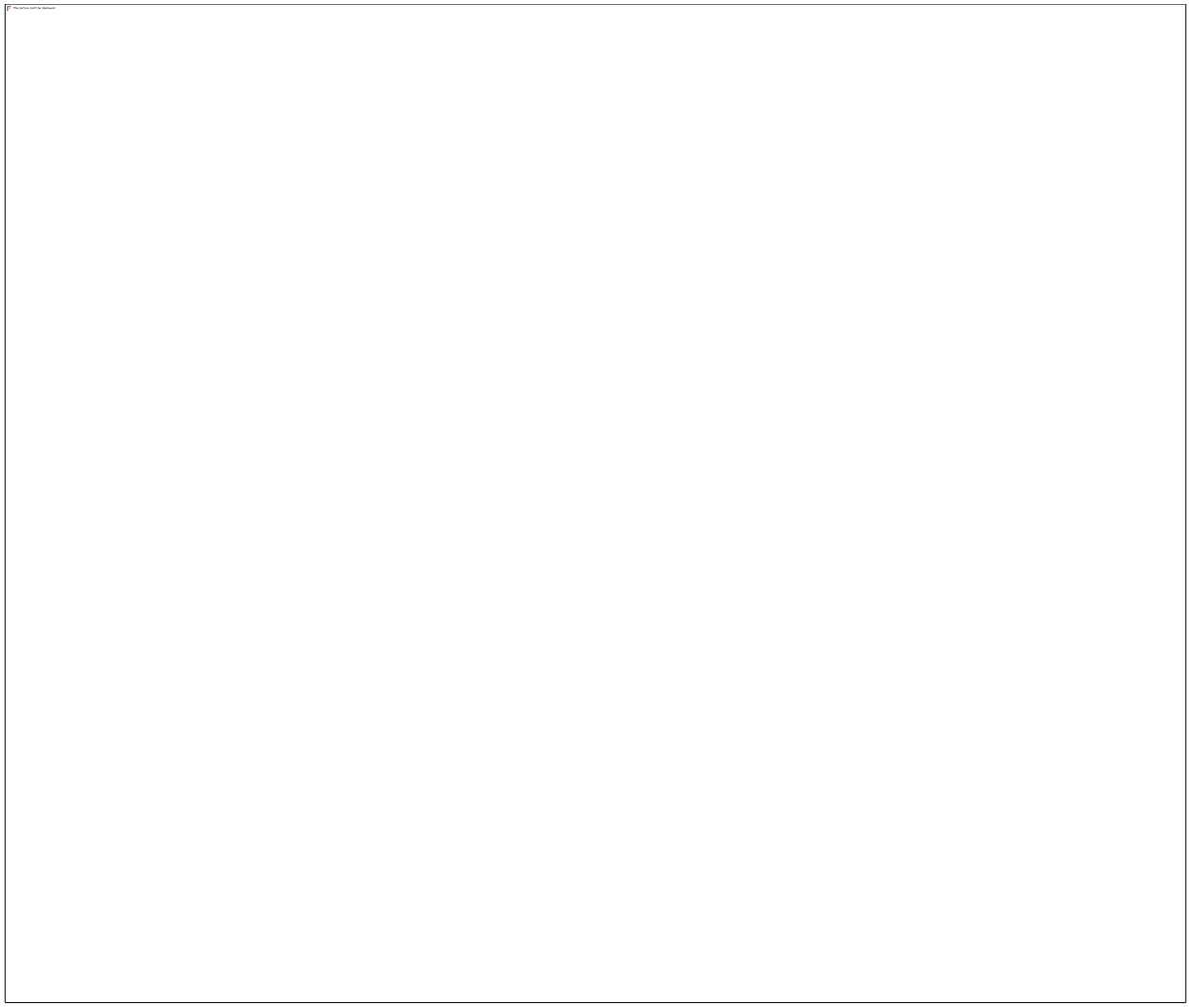

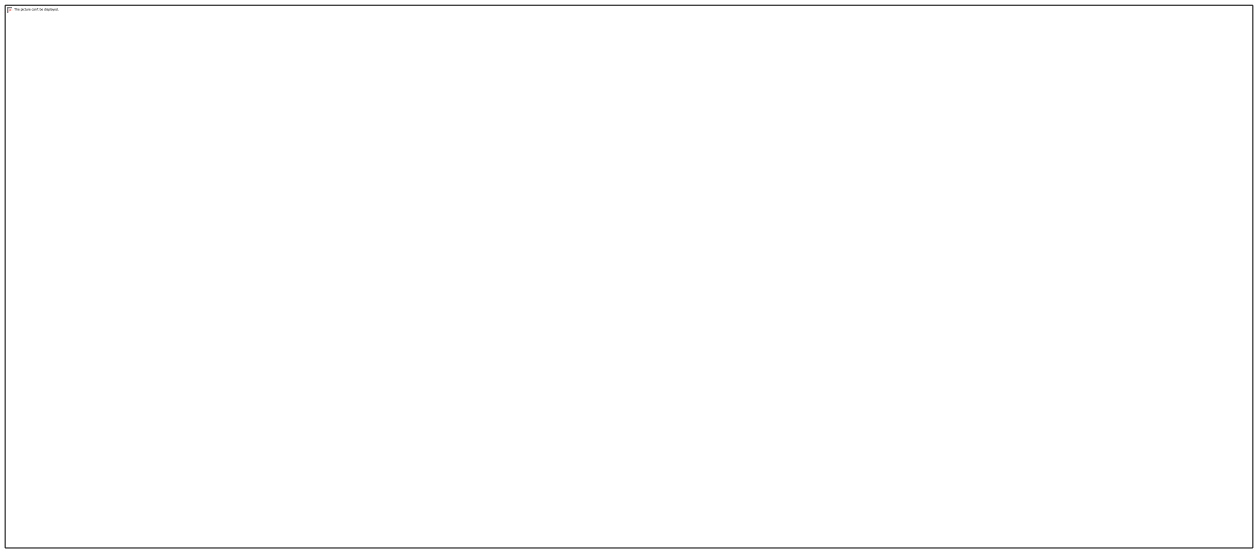

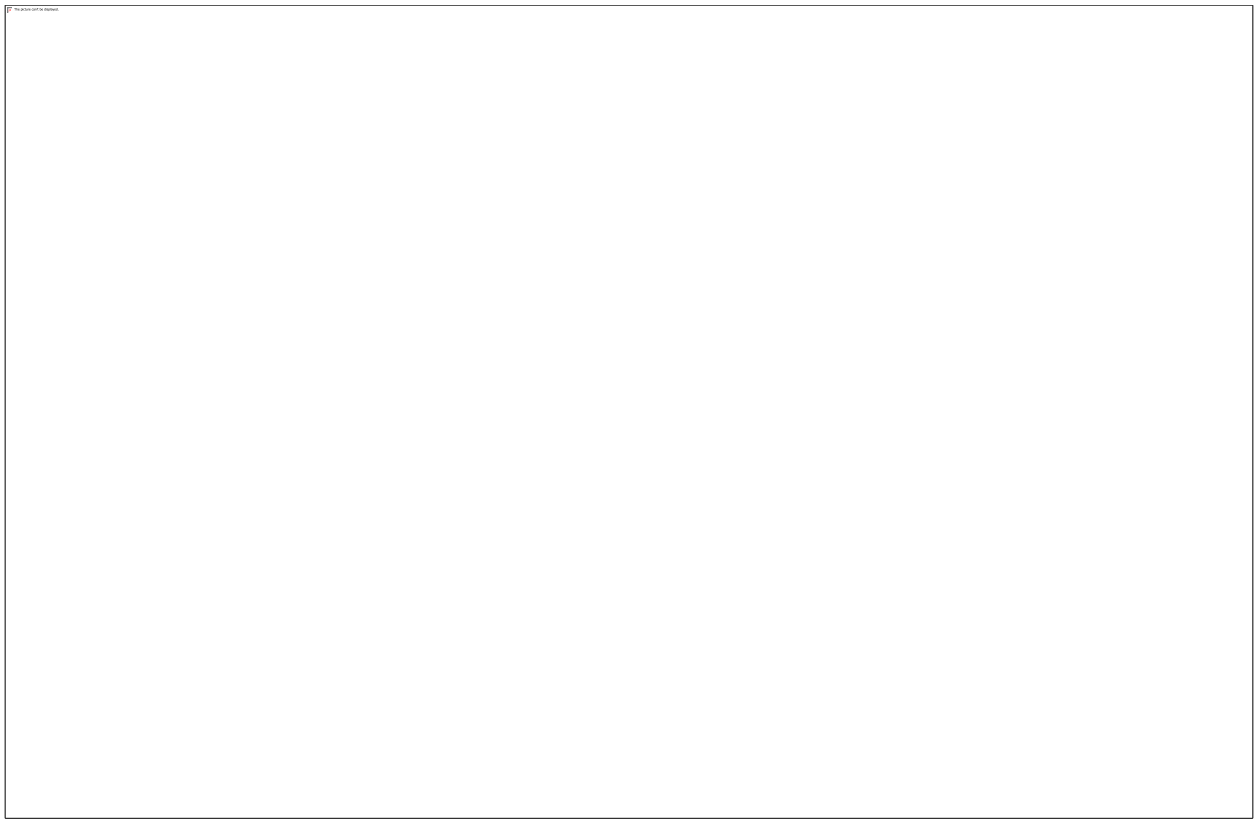
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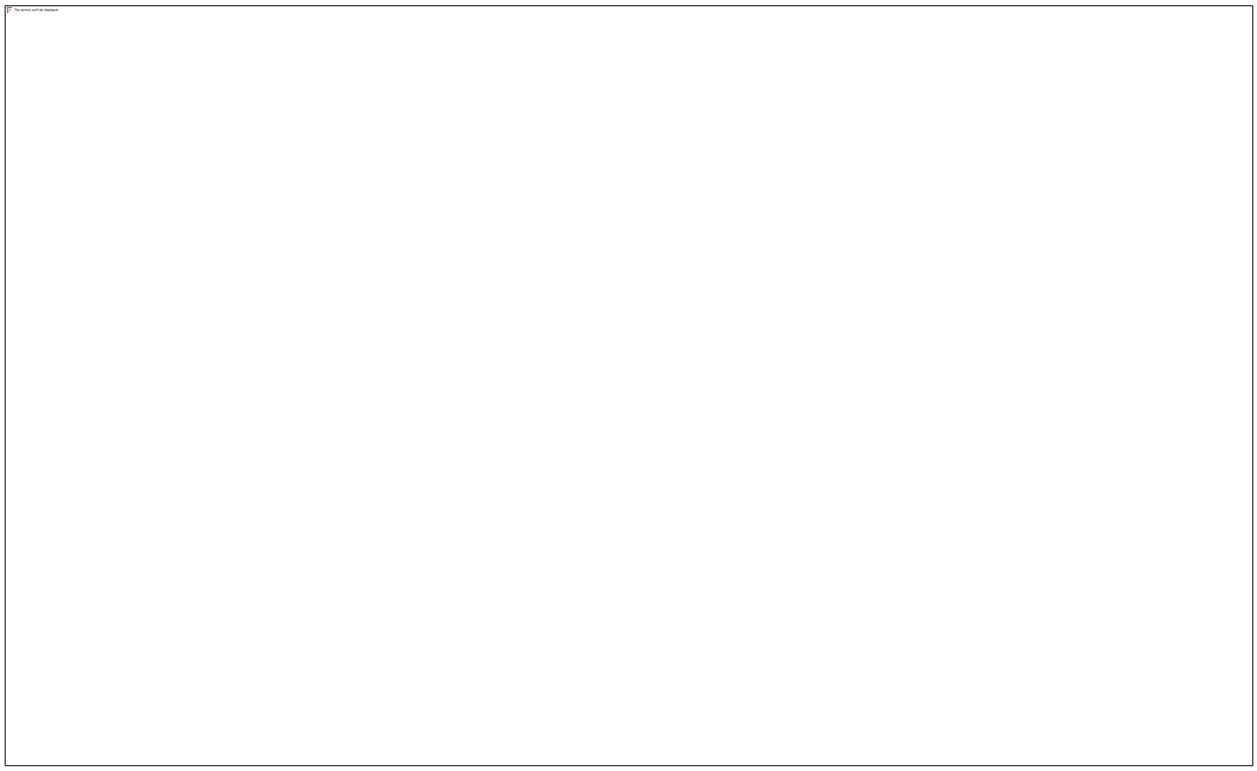
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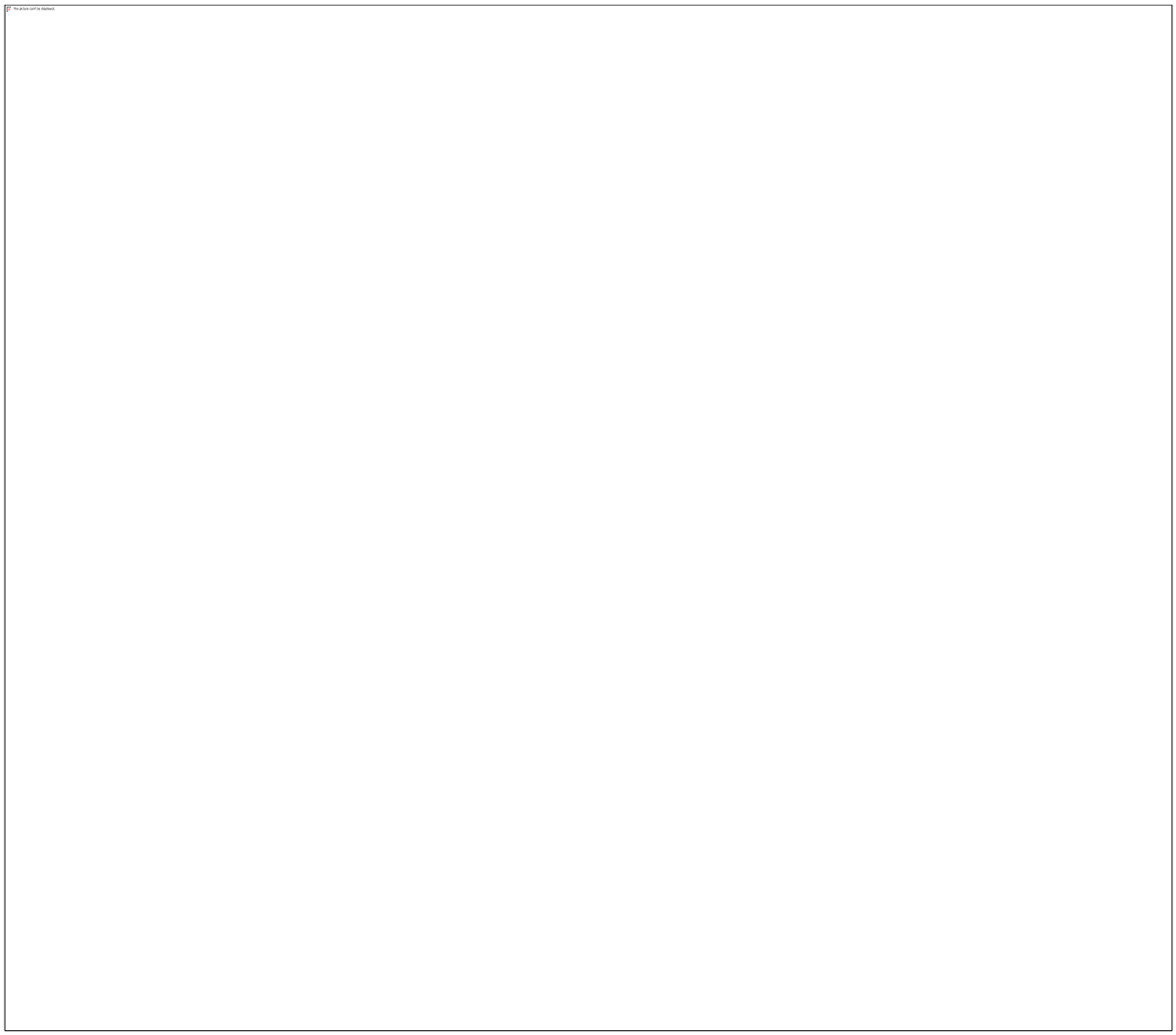
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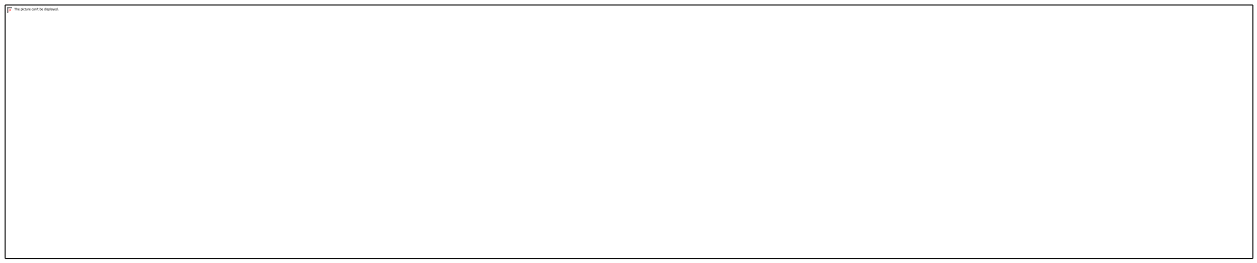
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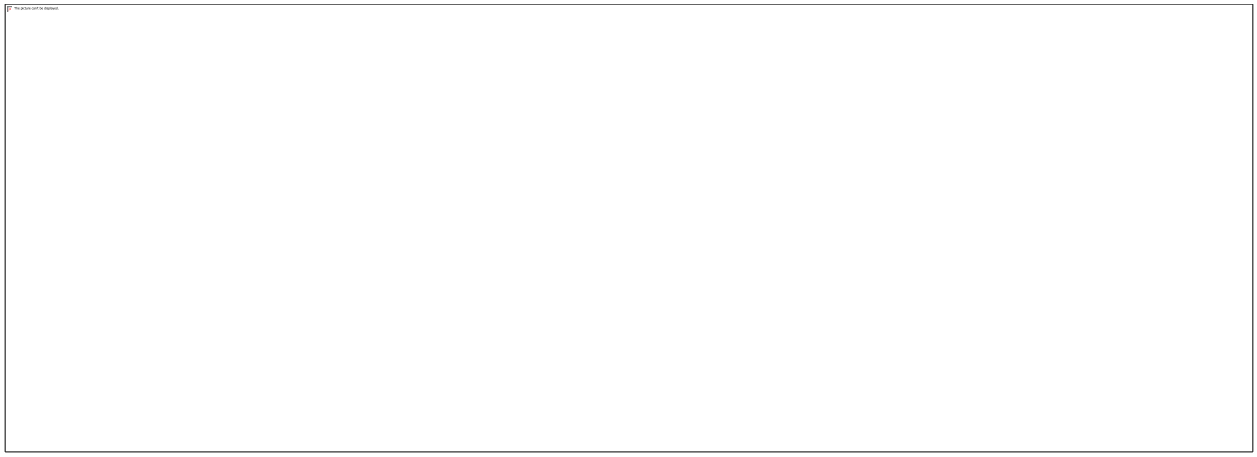
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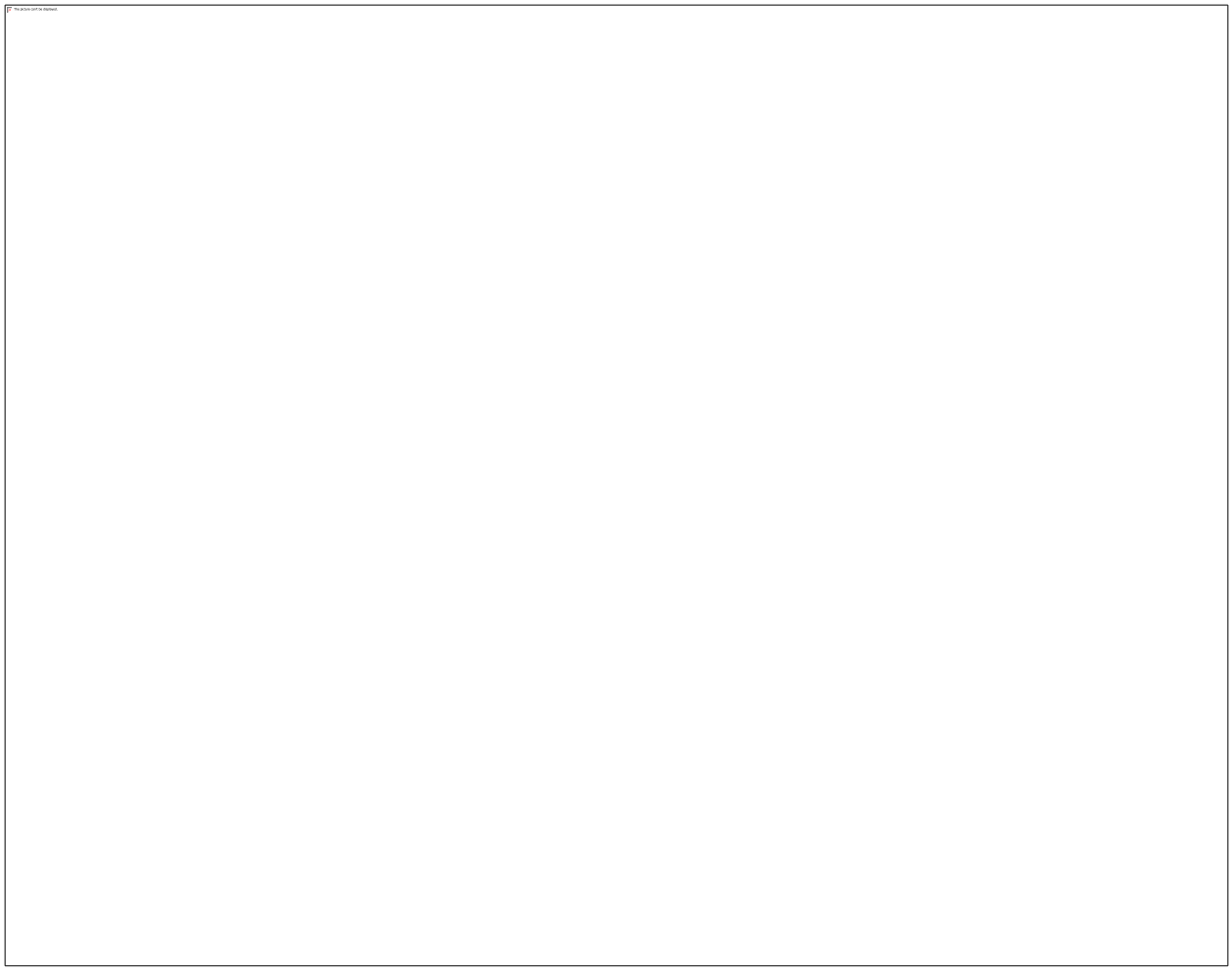
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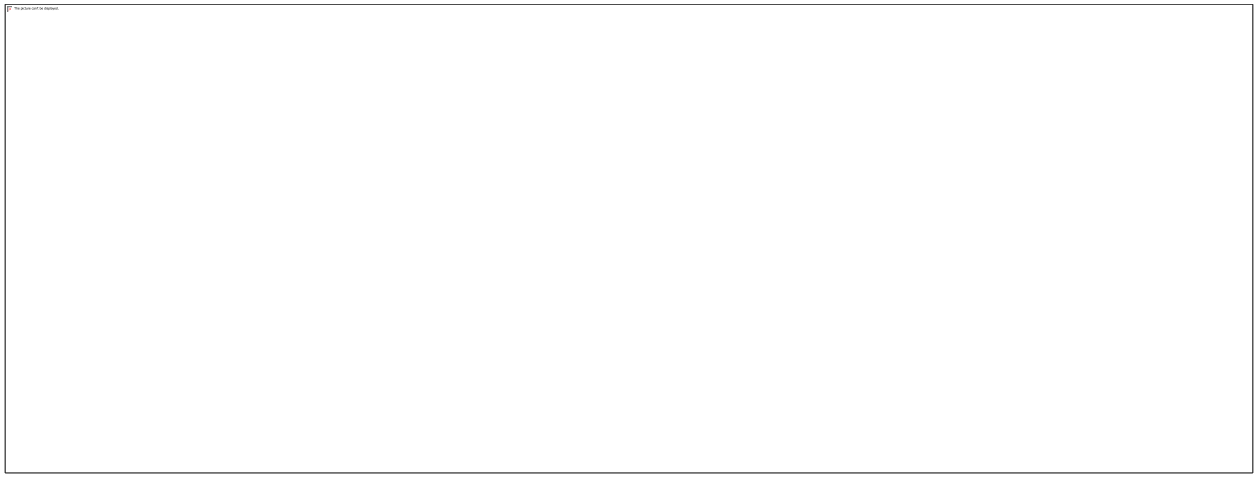
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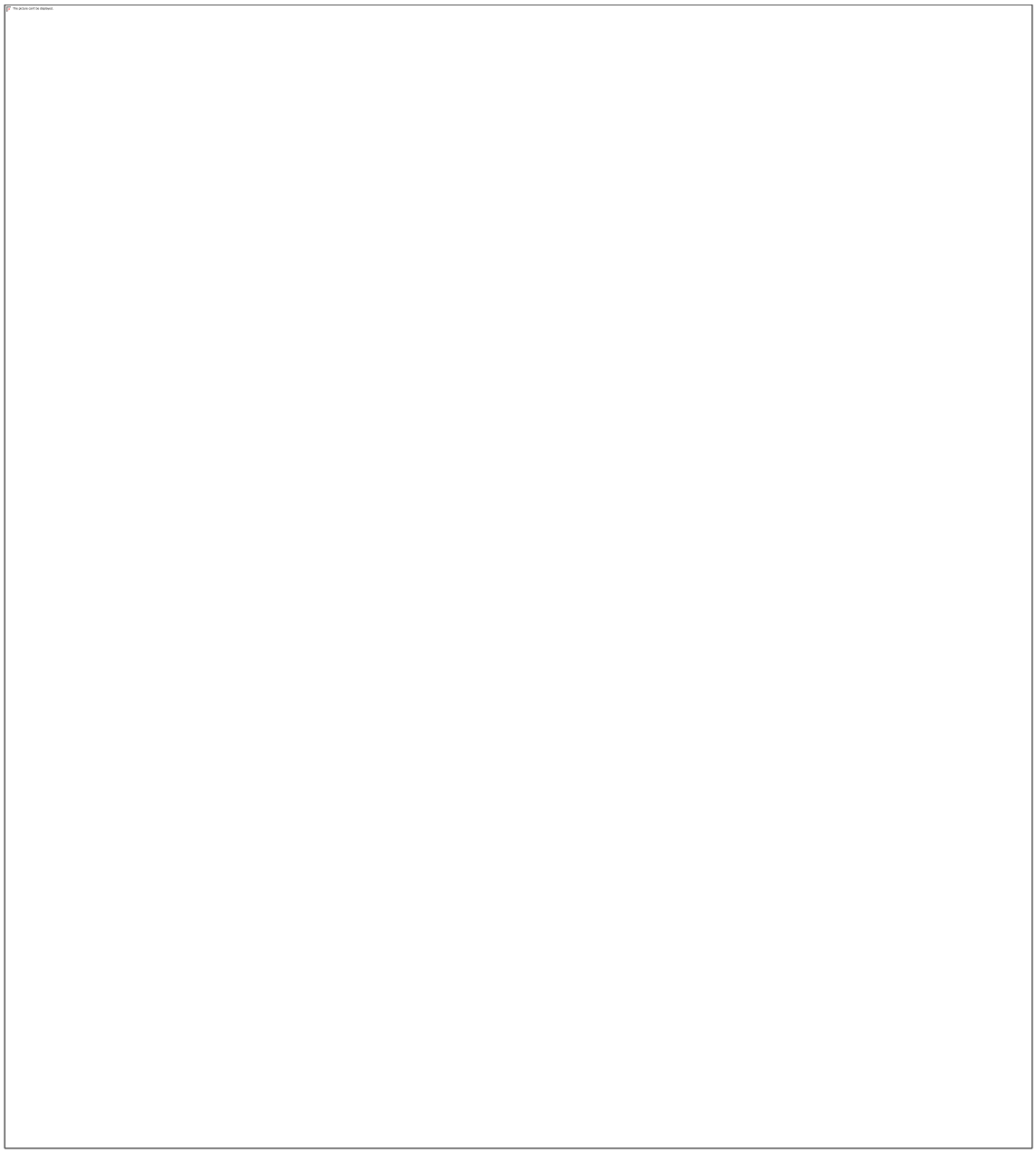
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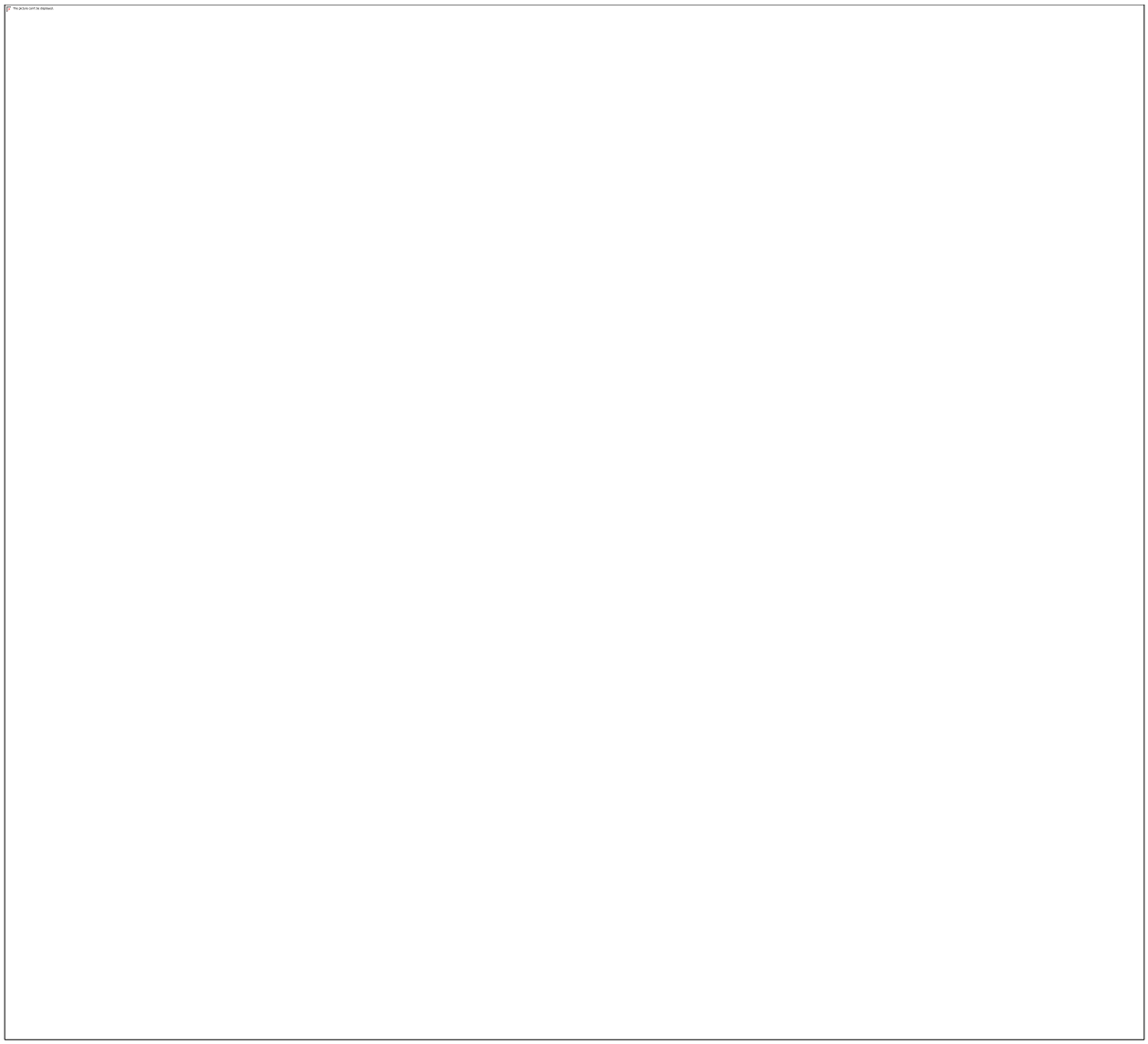

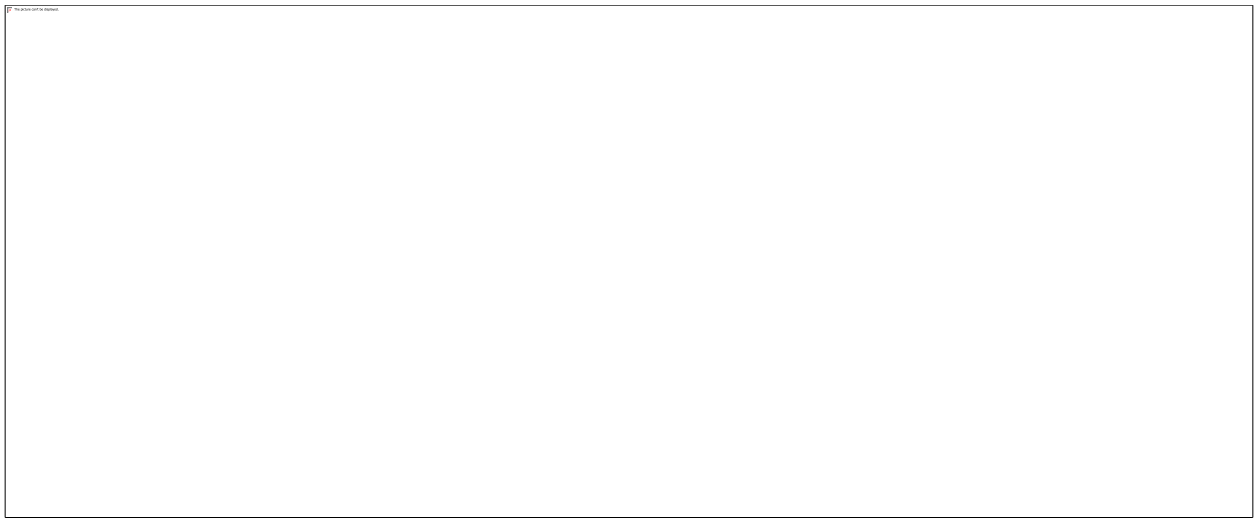
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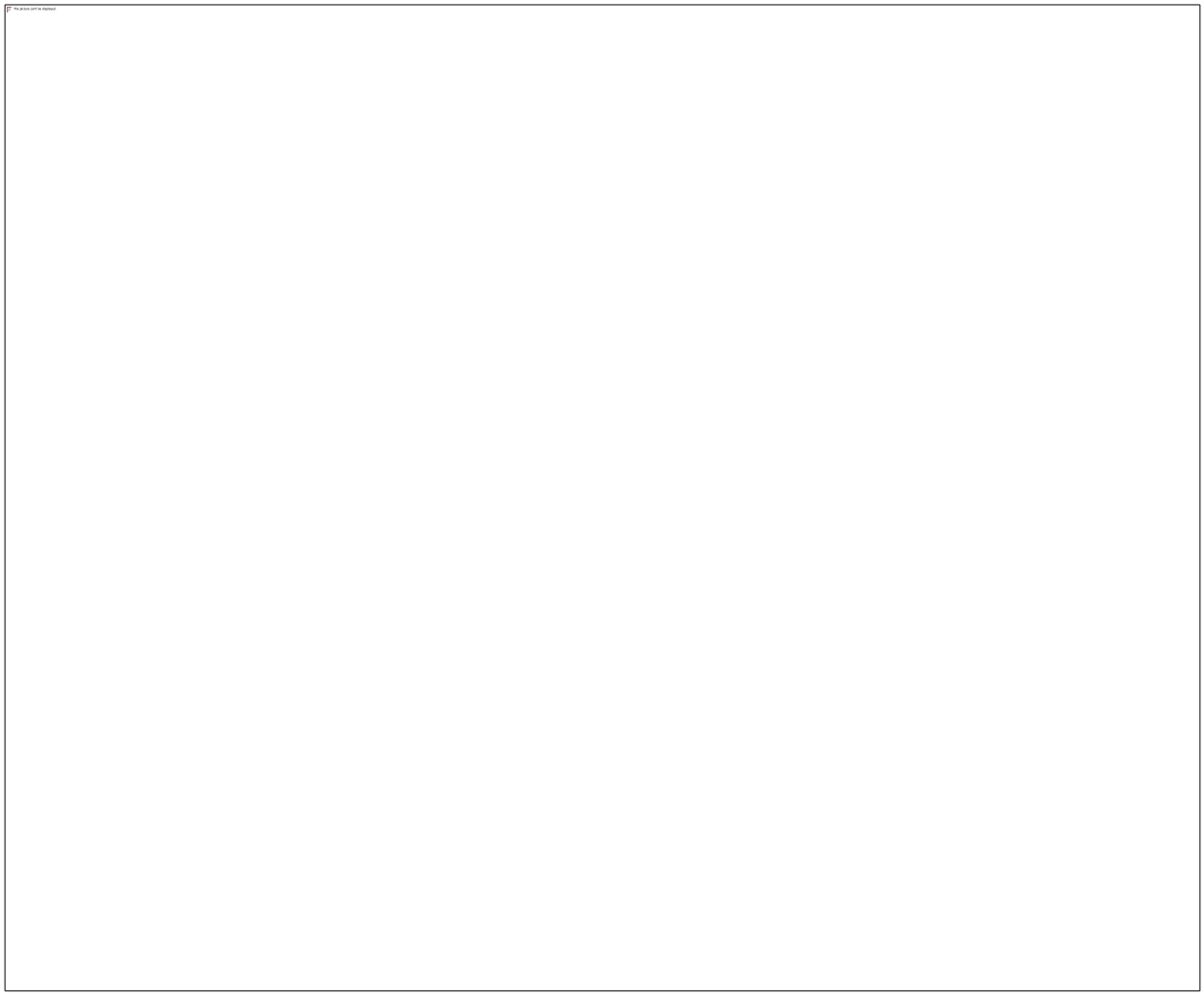
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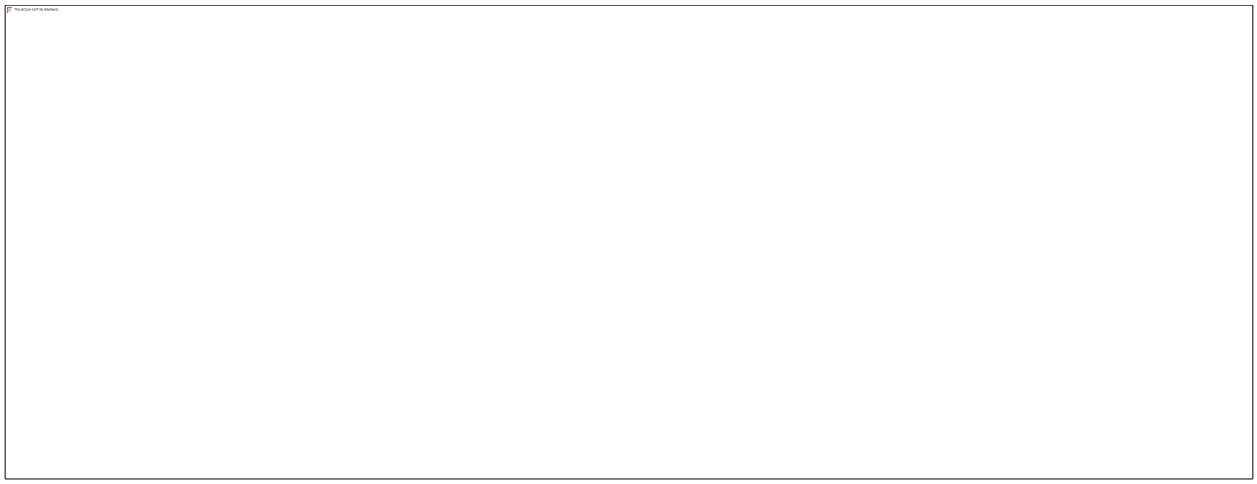

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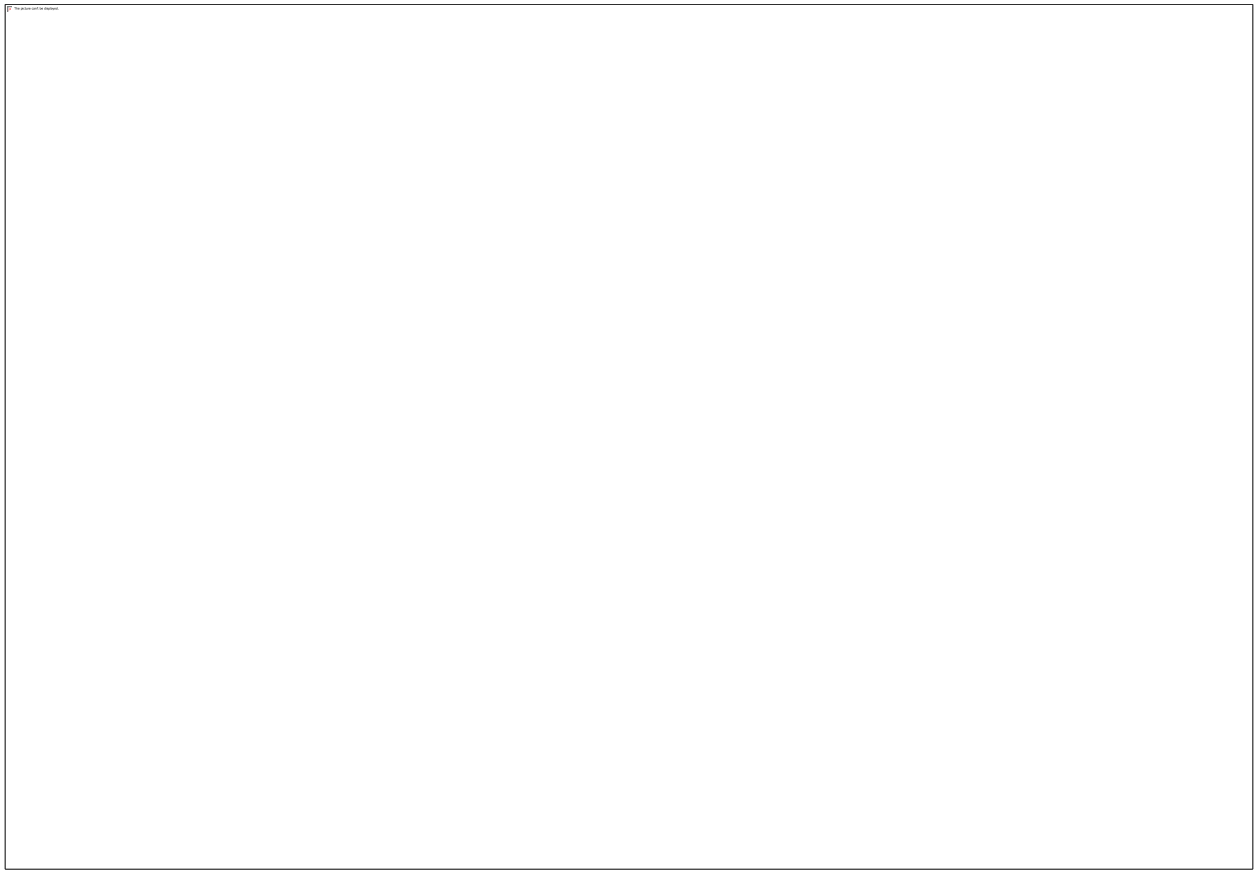
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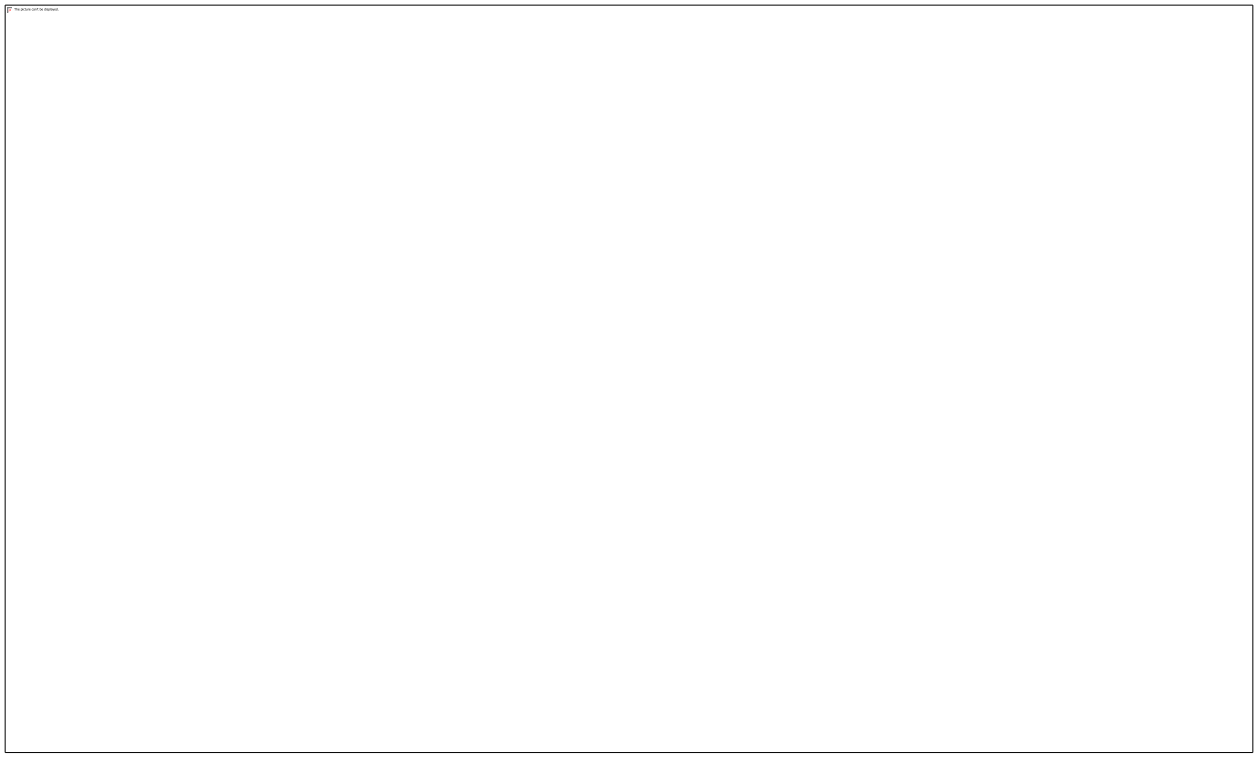
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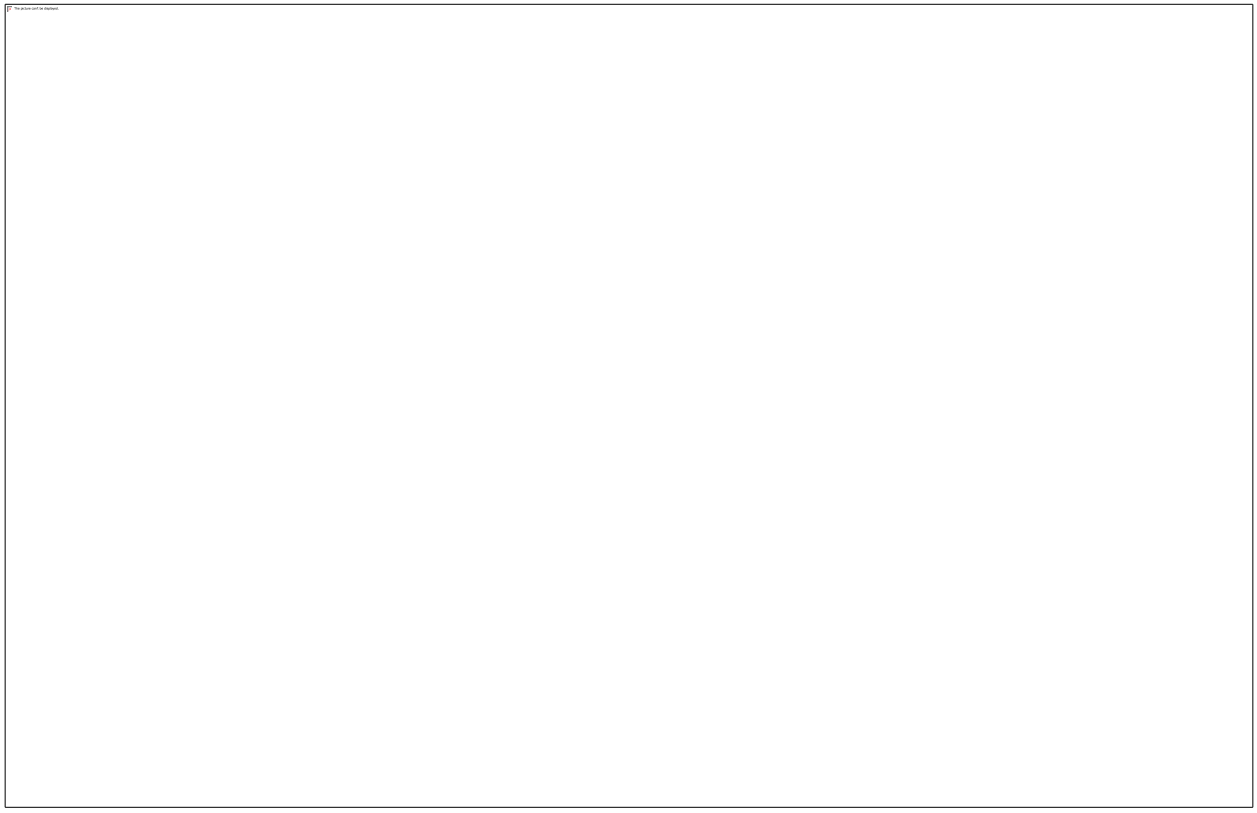
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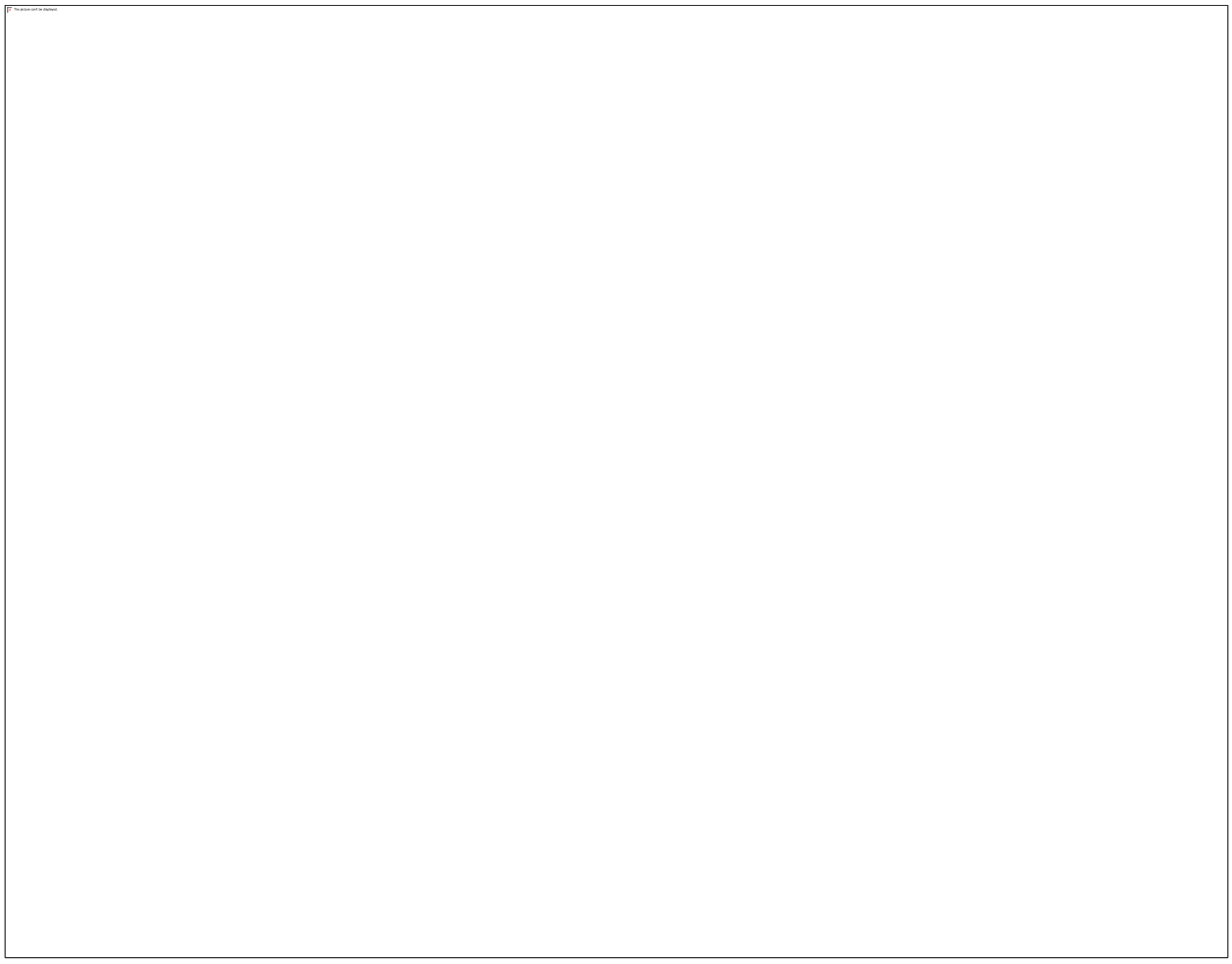
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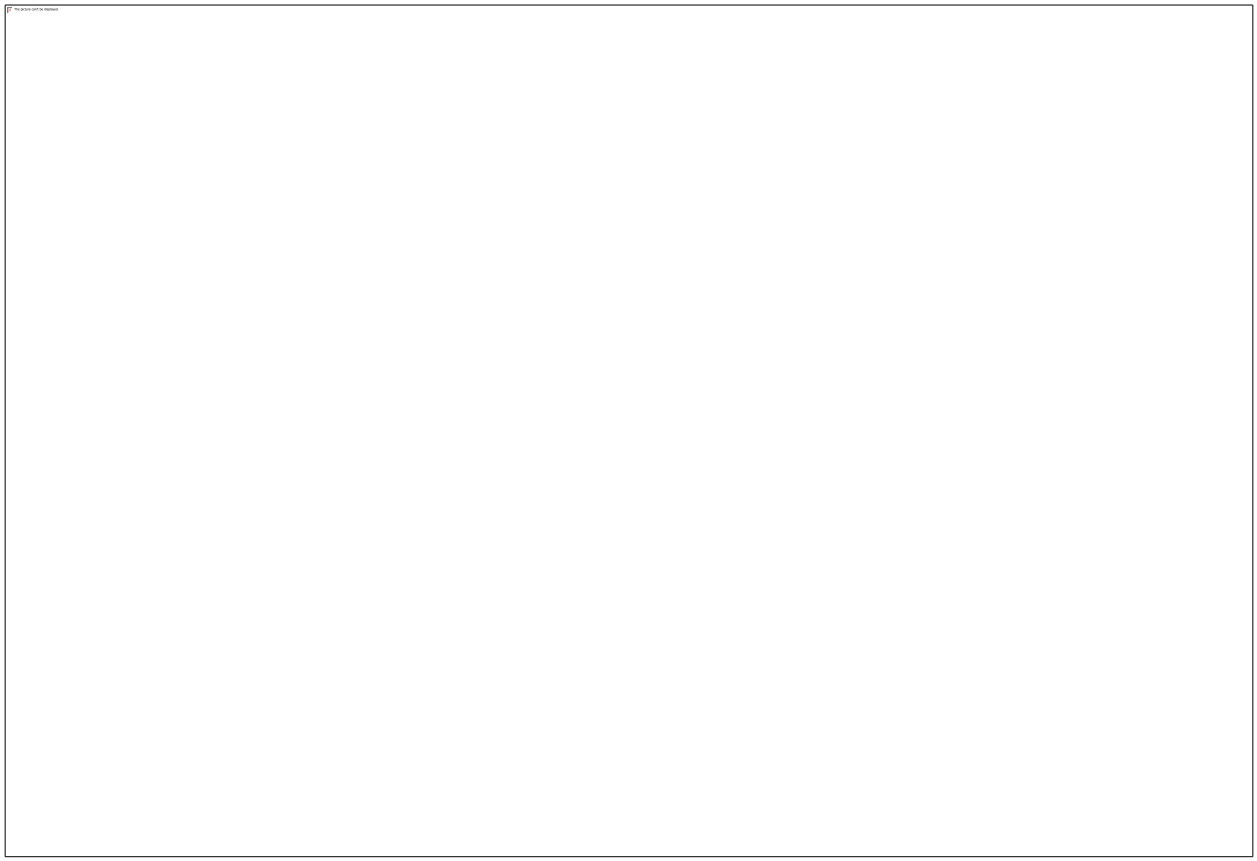

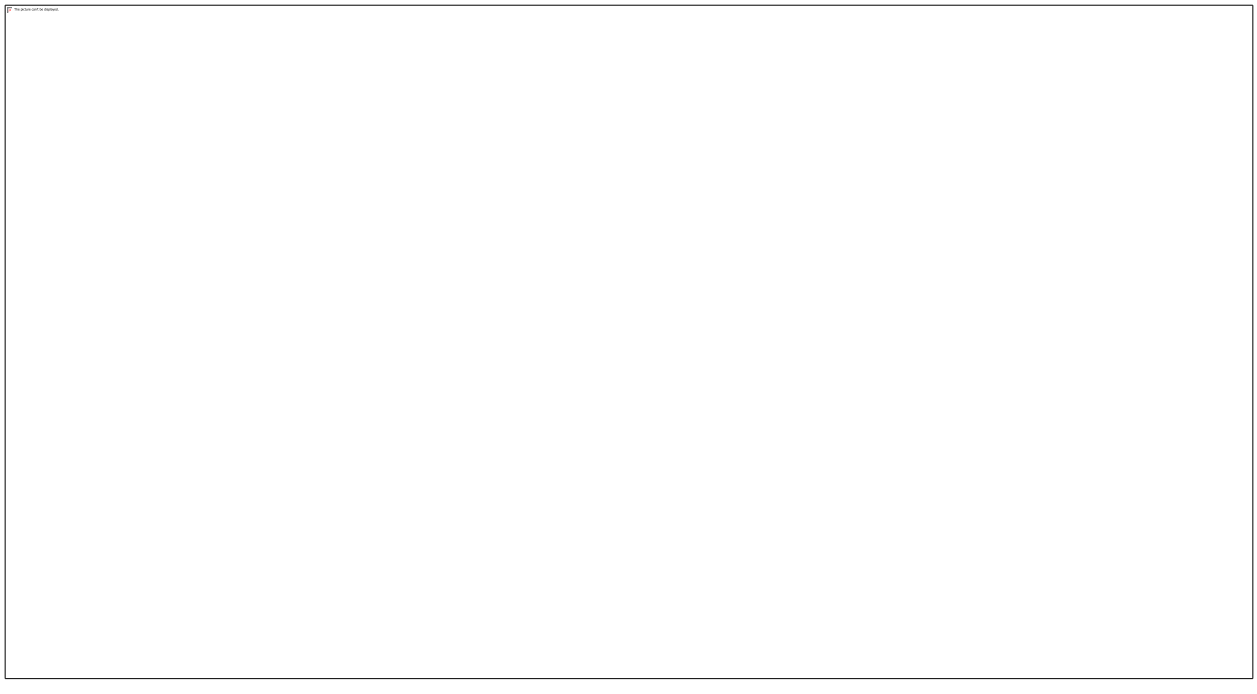

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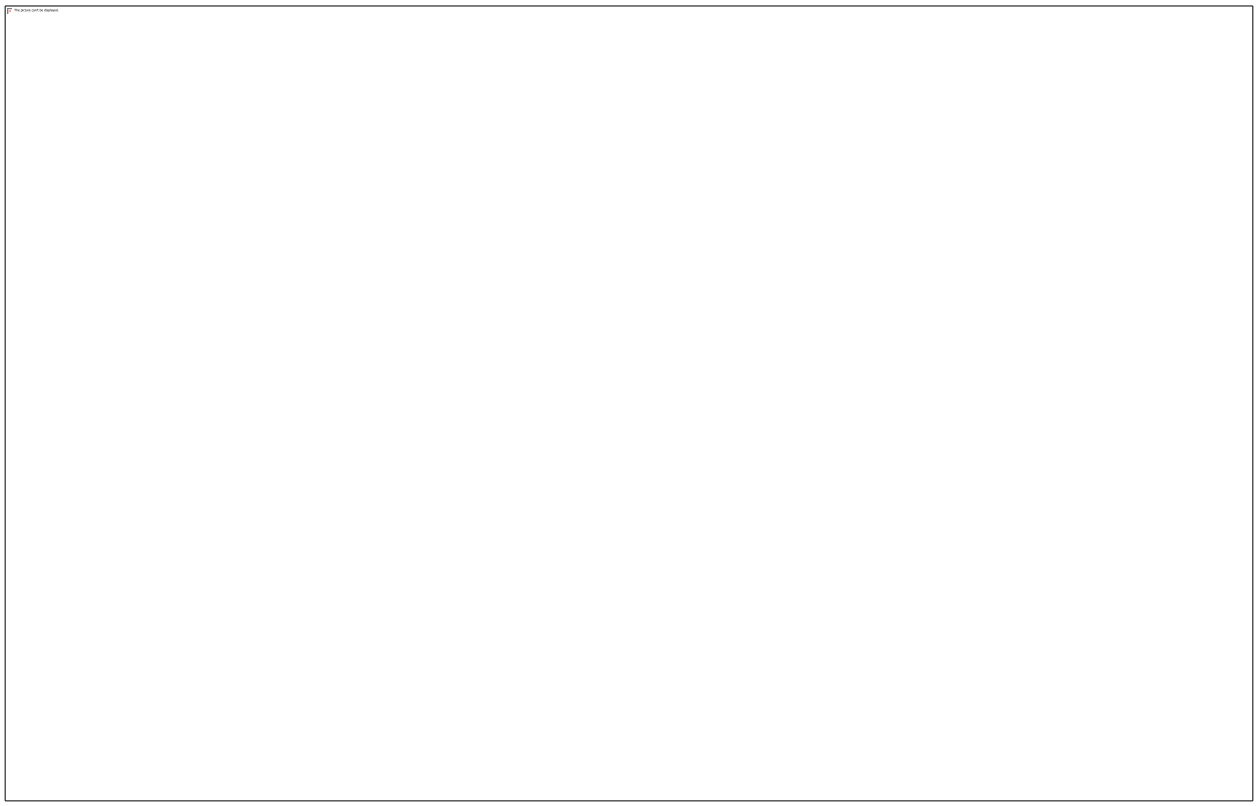

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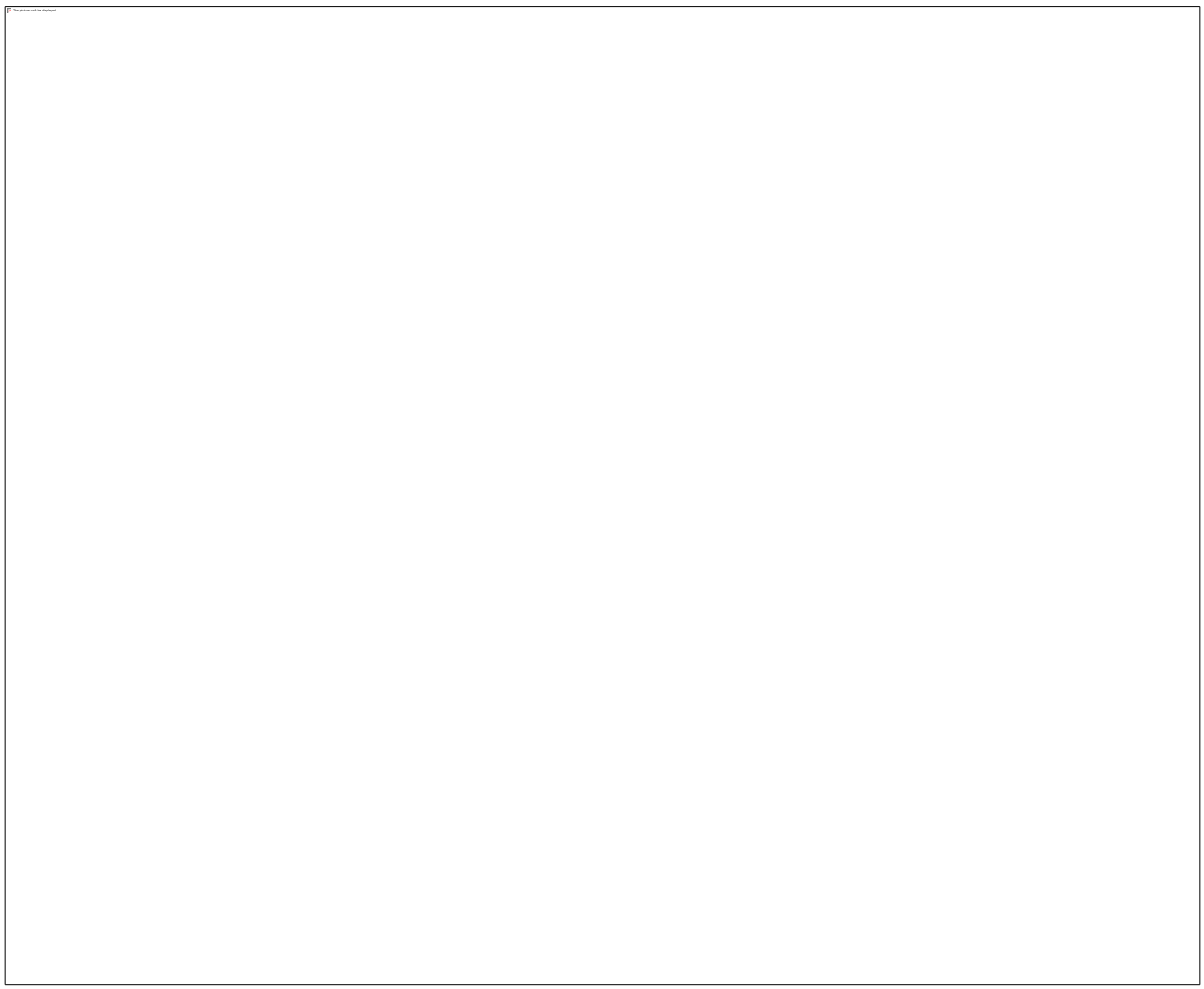
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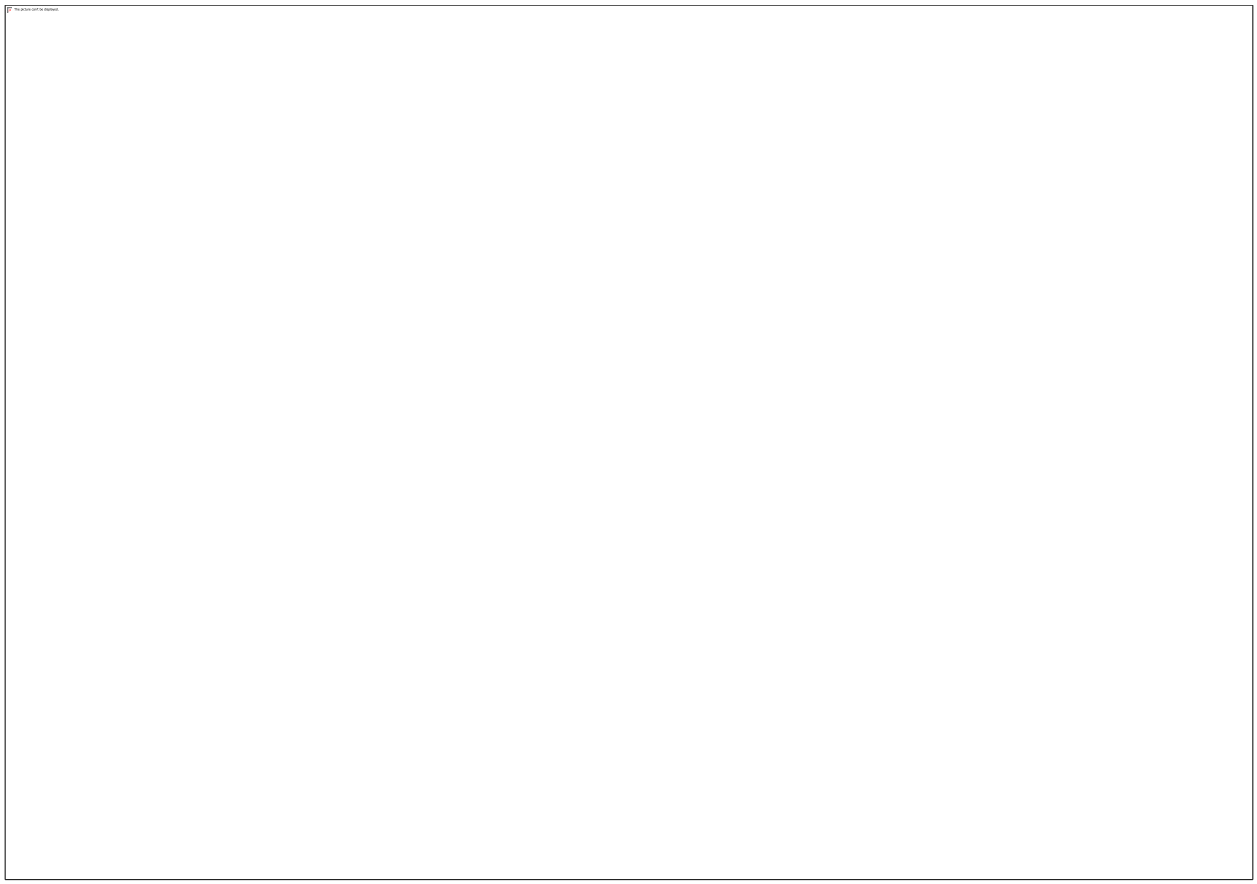

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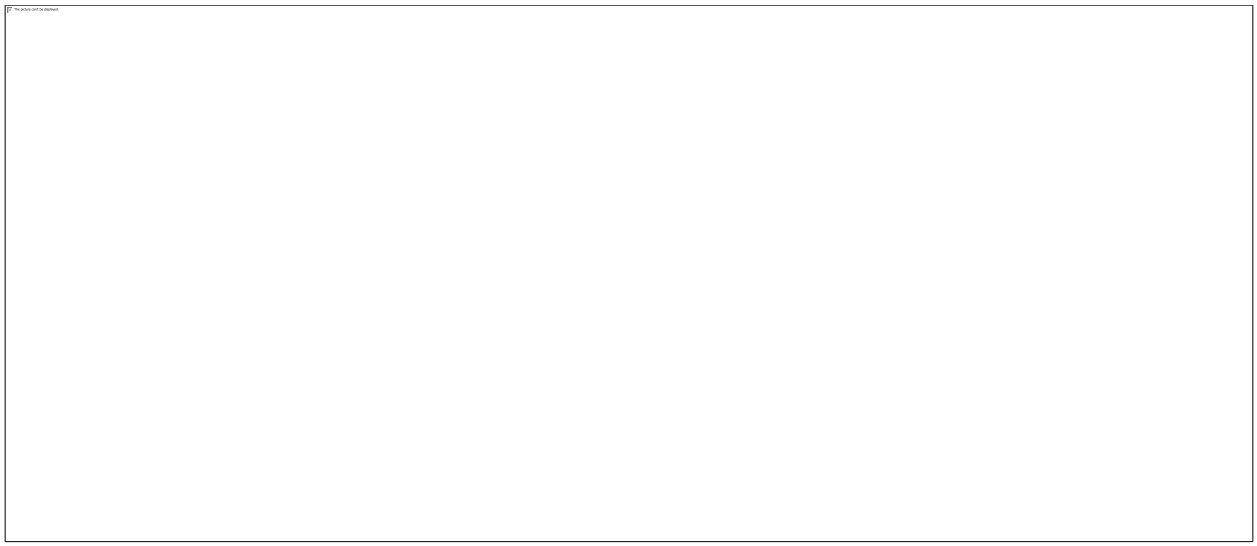

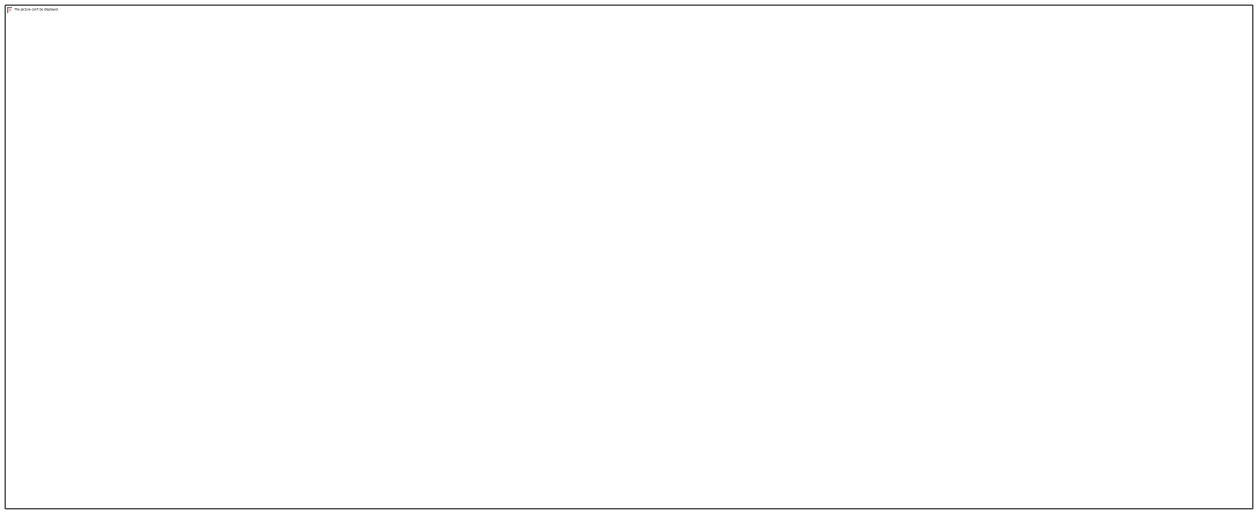

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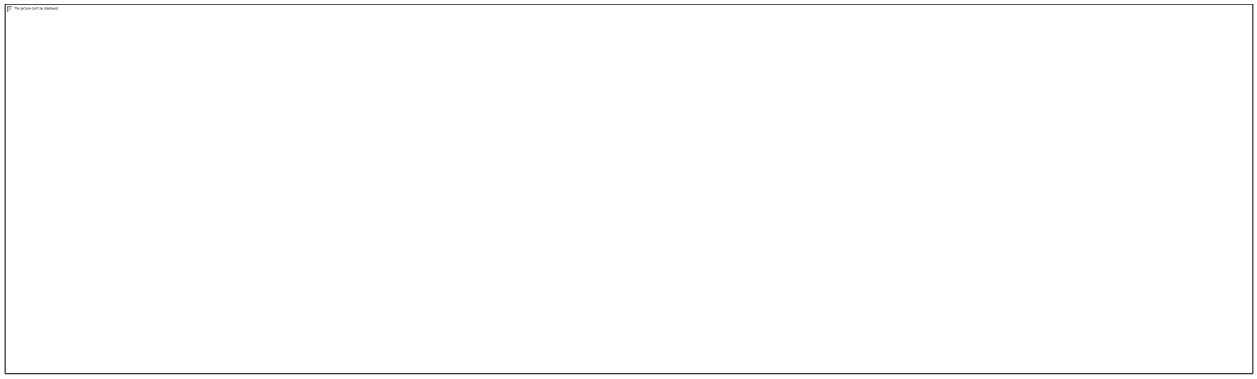

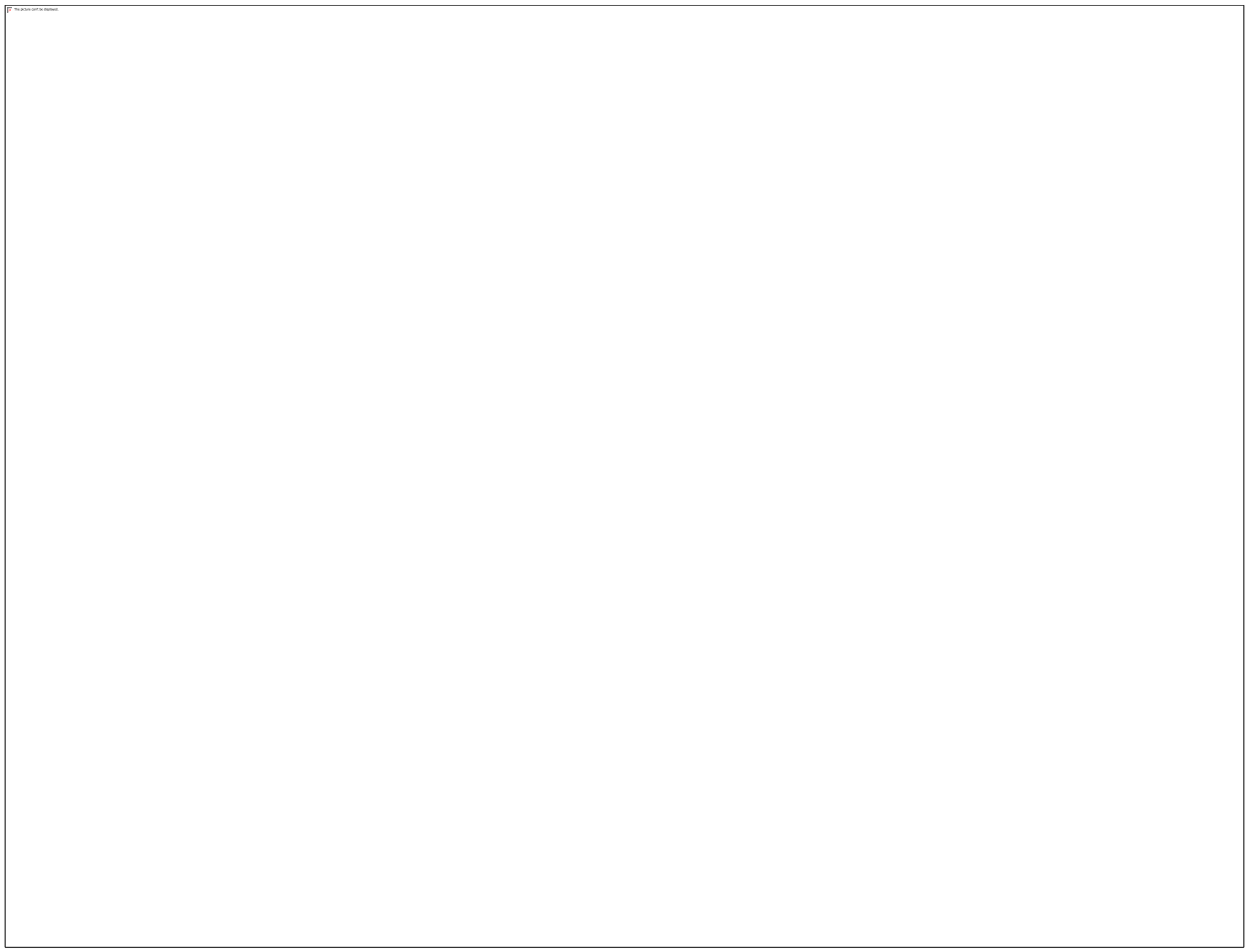
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		Question 3 Notes
(a)	**M1**	Allow for $\{PQ=\}\ \sqrt{(7-10)^2+(8-13)^2}$ or for $\{PQ=\}\ \sqrt{3^2+5^2}$. Can be implied by answer.
	A1	Need to see $\sqrt{34}$. You can ignore subsequent work so $\sqrt{34}$ followed by 5.83 earns M1 A1, but $\{PQ=\}\ \sqrt{3^2+5^2}=5.83$, with no exact value for the answer given, earns M1A0. Allow $\pm\sqrt{34}$ this time. NB Some use equation of circle to find this distance Achieving $\sqrt{34}$ gets M1A1 Others find half of their $\pm\sqrt{34}$. Do not isw here as it is an error – confusing *d* with diameter. Give M1A0
(b)	**M1**	Either of the correct approaches for equation of circle (as shown on scheme)
	A1	Correct equation (two are shown and any correct equivalent is acceptable)
(c)		A correct start to finding the gradient of the tangent (see each scheme)
	B1	Complete method for finding the gradient of the tangent (see each scheme) Where implicit differentiation has been used the only slips allowed here should be sign slips.
	1st M1	Correct attempt at line equation for tangent at correct point (10, 13) with **their tangent** gradient. If the $y=mx+c$ method is used to find the equation, this M1 is earned at the point where the *x*- and *y*-values are substituted to find *c* e.g. $13=-3/5\times10+c$
	2nd M1	Accept any correct answer of the required format; so integer multiple of $3x+5y-95=0$ or $3x-95+5y=0$ or $-3x-5y+95=0$ (must include "=0") e.g. $6x+10y-190=0$ earns A1
	A1	Also allow $5y+3x-95=0$ etc
	Common error	$\frac{dy}{dx}=2(x-7)+2(y-8)=6+10=16$ so (*y*-13)=16(*x*-10) is marked B0 M0 M1 A0 (Way 2)