Calculus 3 Workbook

Cylinders and quadric surfaces

krista king MATH

REDUCING EQUATIONS TO STANDARD FORM

1. What is the standard form and identity of the quadratic surface?

$$16x^2 + 49y^2 + 784z^2 + 128x - 294y - 87 = 0$$

2. What is the standard form and identity of the quadratic surface?

$$25y^2 + 9z^2 - 50y + -36z - 225x - 839 = 0$$

3. What is the standard form and identity of the quadratic surface?

$$9x^2 - 9y^2 + 4z^2 + 18x - 36y - 8z = 23$$

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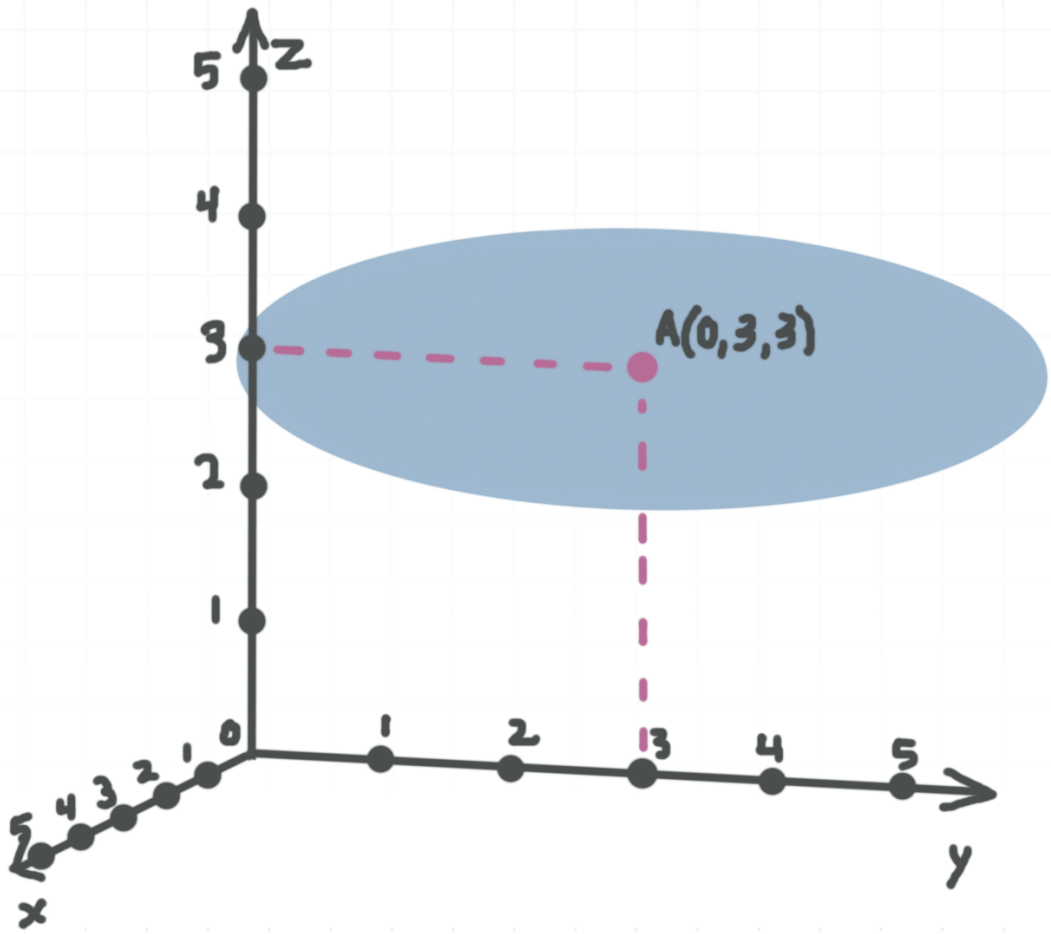
SKETCHING THE SURFACE

■ 1. Find the equation of the surface if its x- and z- principal axes have length 4 and 2 respectively.



■ 2. Find the equation of the circular paraboloid that passes through $K(1,1,2)$.

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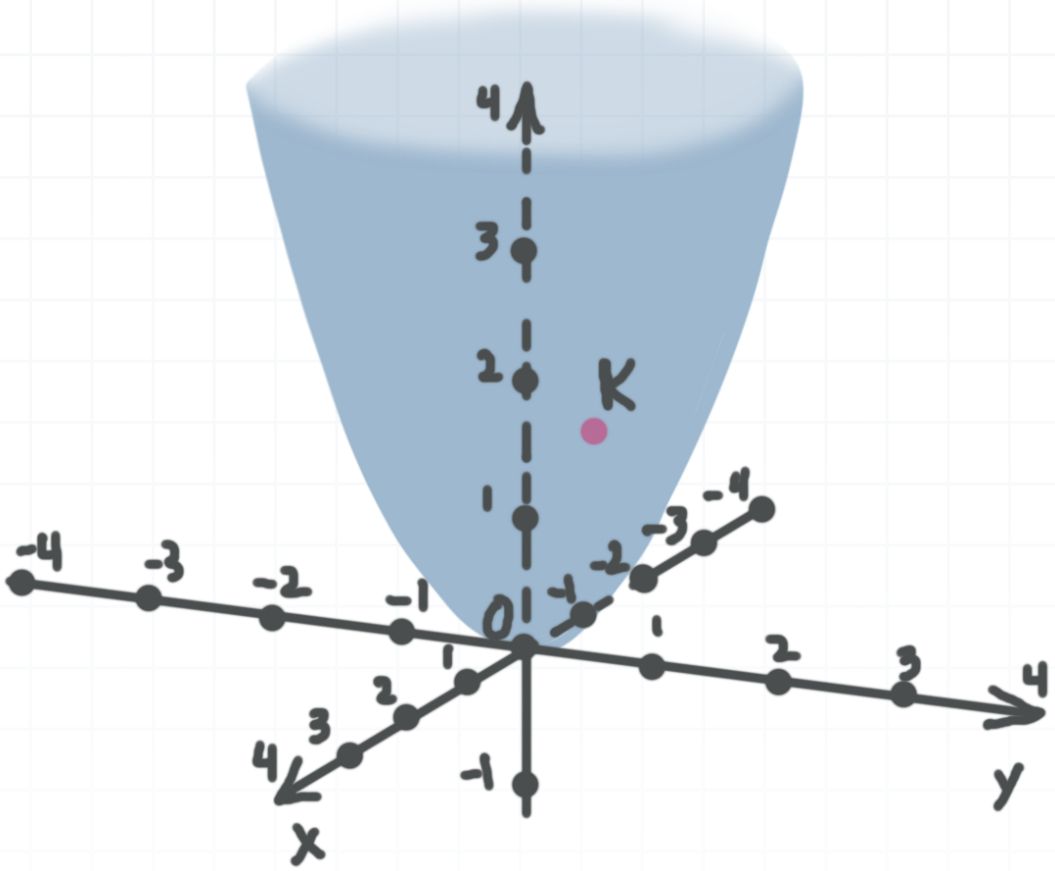
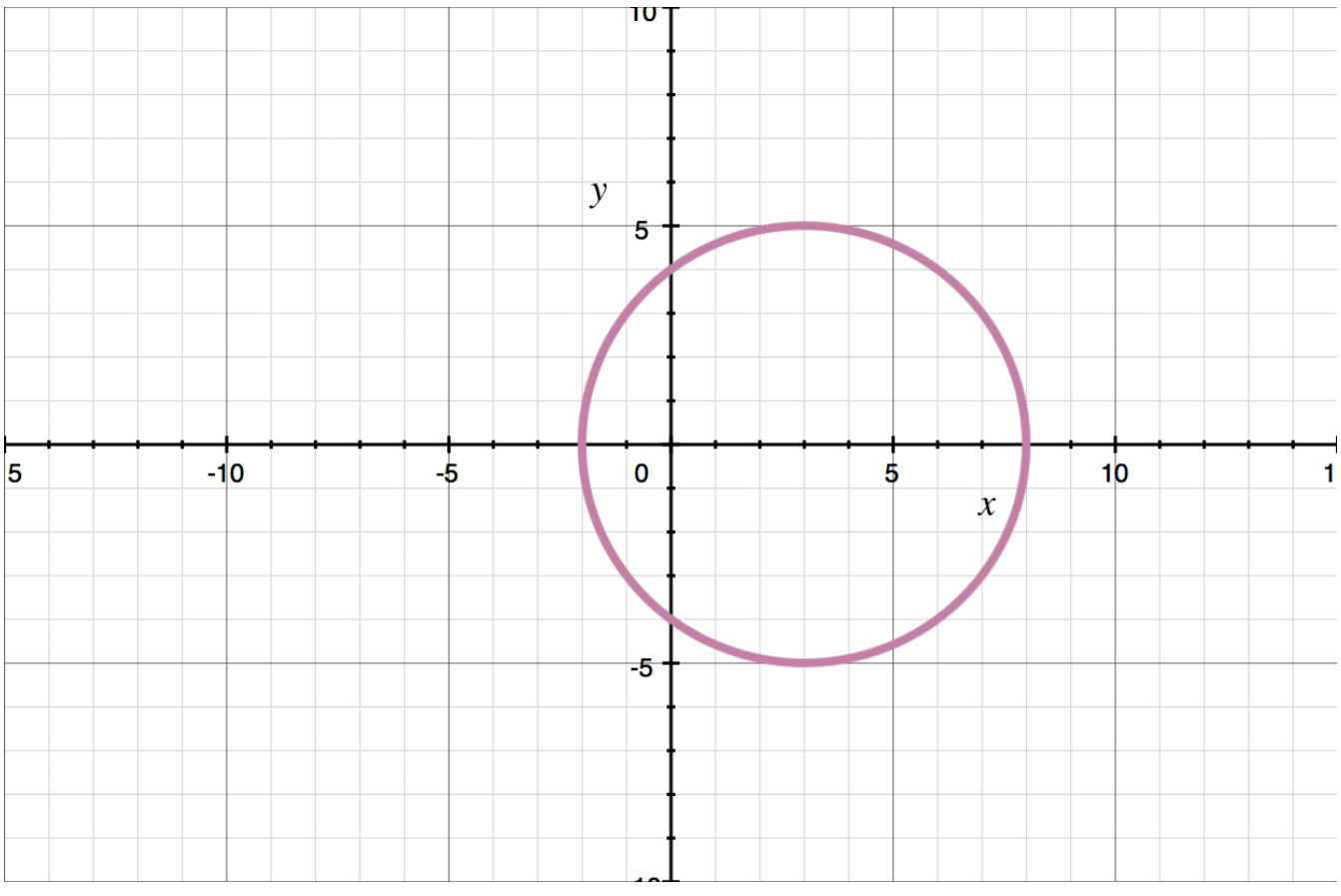


■ 3. Find the equation of the surface obtained by rotating the circle about the x-axis.



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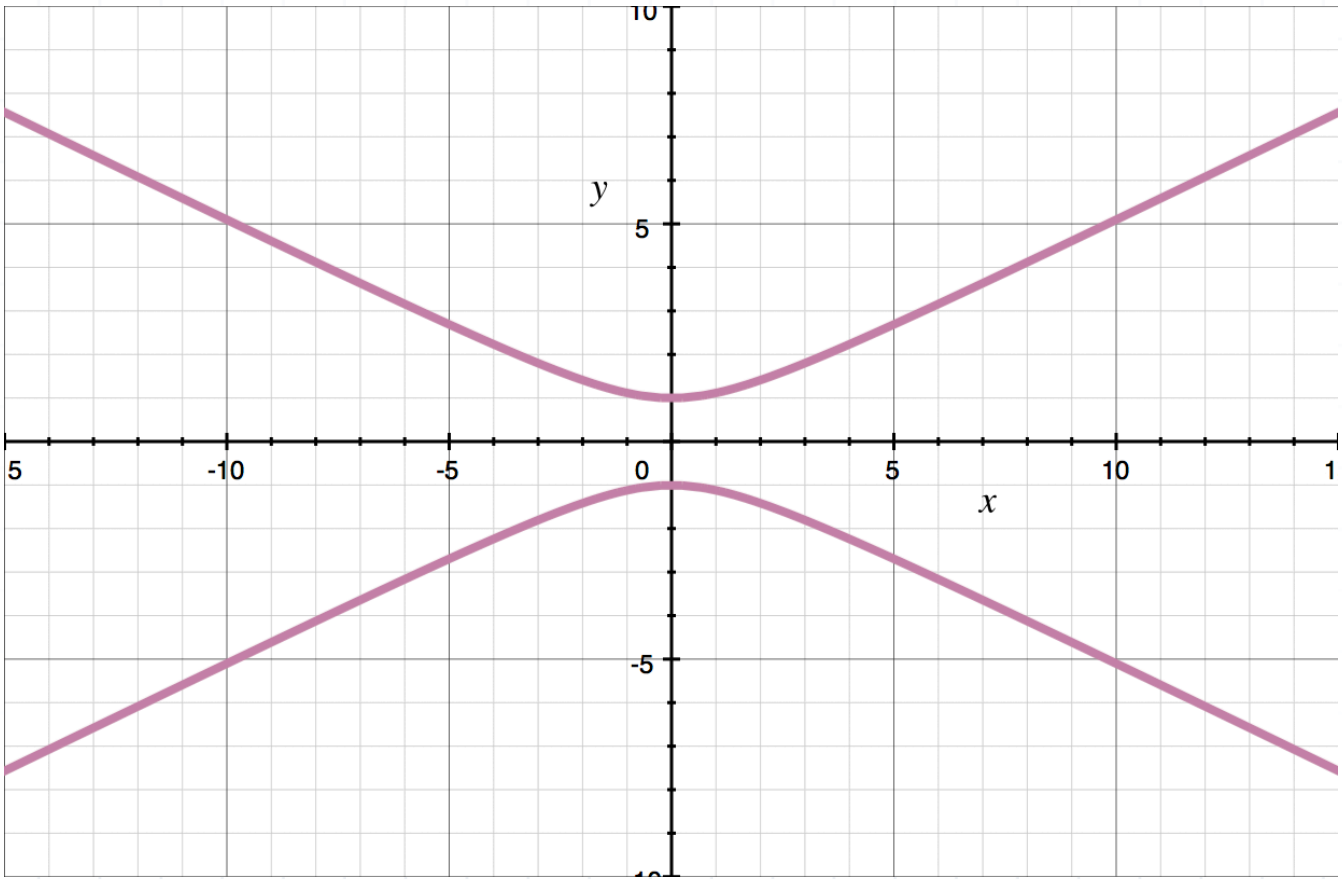
■ 4. Determine the identity and the equation of the surface obtained by rotating the hyperbola about the x-axis.

$$\frac{x^2}{2^2} - z^2 = -1$$



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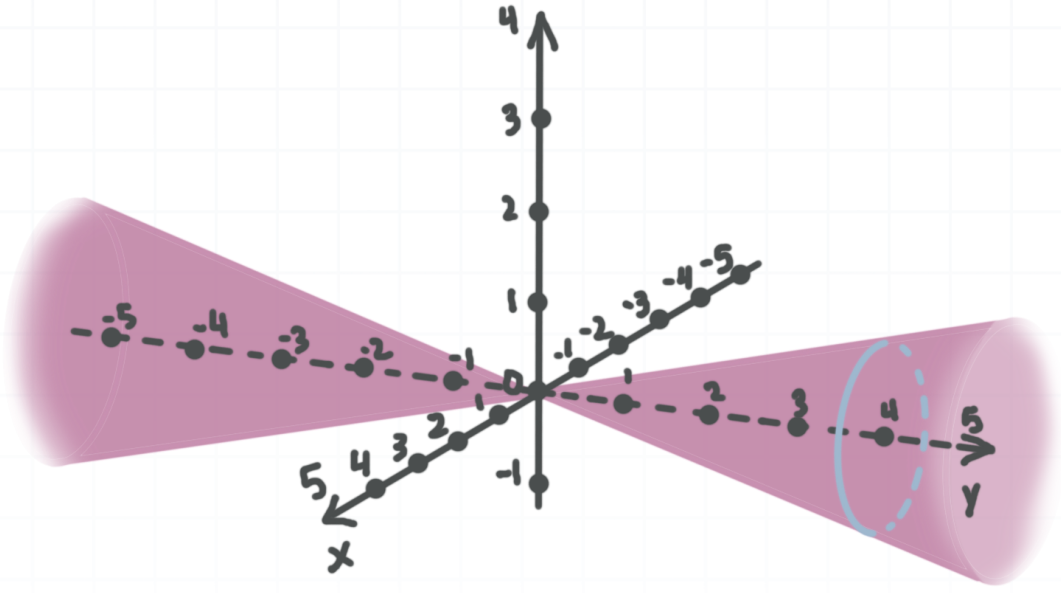
TRACES TO SKETCH AND IDENTIFY THE SURFACE

■ 1. Find the identity and the equation of the surface that has a trace $x^2 + z^2 = 1$ for $y = 4$.



■ 2. Find the trace of the surface in the plane $y = 7$ and identify it.

$$\frac{(x+5)^2}{81} + \frac{(y-3)^2}{4} - \frac{(z+8)^2}{49} = 1$$

■ 3. Find the traces of the surface in the planes $x = -2$, $y = 8$, and $z = -4$ and use them to identify the surface.

$$\frac{(x+2)^2}{49} + \frac{(y-8)^2}{16} = z + 5$$

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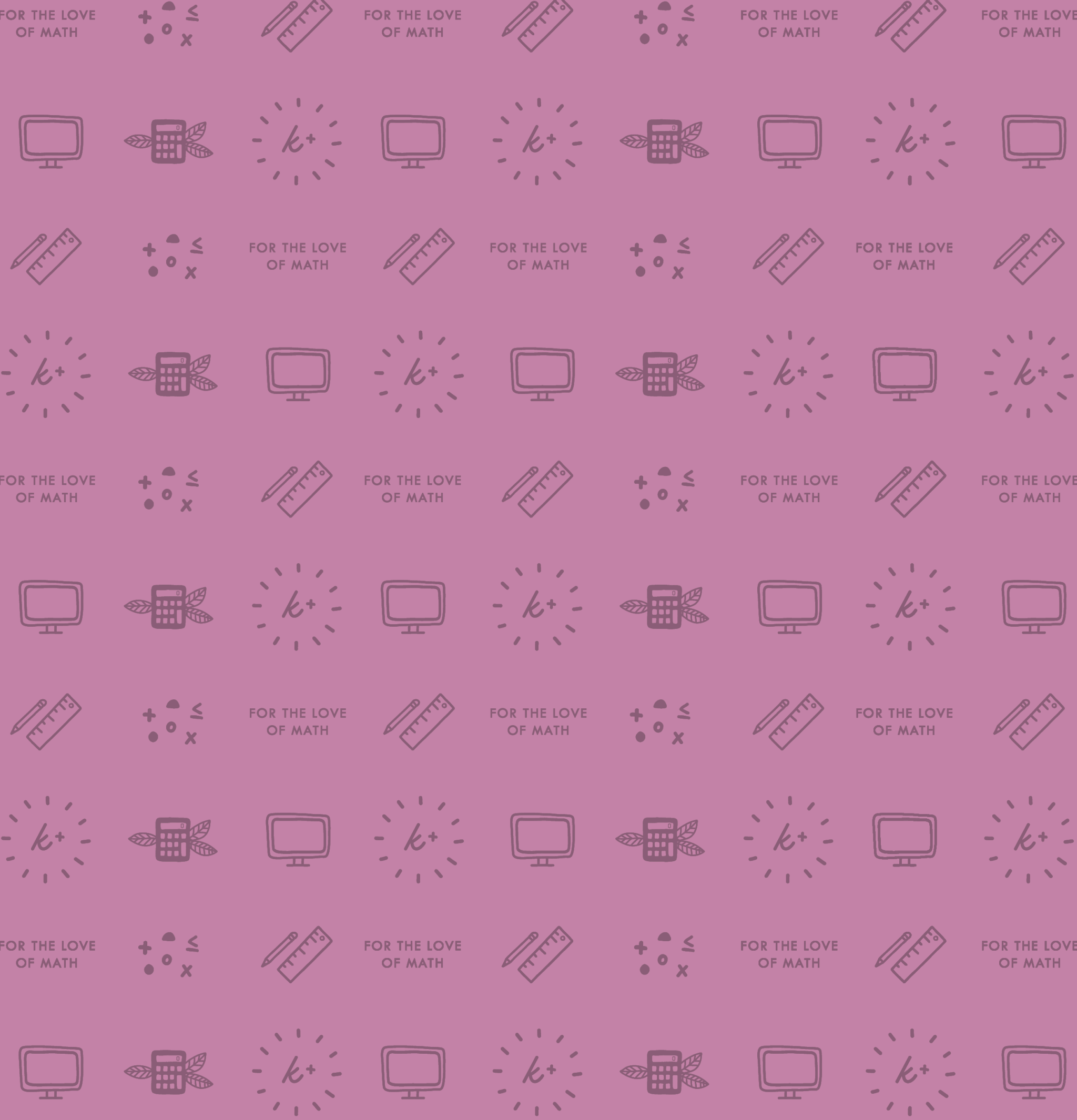

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