

Rearranging Formulas Worksheet

Changing the Subject of a Formula

I Do

Make y the subject of the formula: $P = \sqrt{\frac{2y+5}{3y-k}}$

We Do

Make x the subject of the formula: $T = \sqrt{\frac{5x-3}{2x+w}}$

You Do

Make m the subject of the formula: $R = \sqrt{\frac{4m+p}{m-7}}$

Challenge

Make x the subject of the formula: $V = \frac{3x^2+a}{x^2-b}$

Answers & Worked Solutions

• I Do:

Square both sides: $P^2 = \frac{2y+5}{3y-k}$

Multiply by the denominator: $P^2(3y-k) = 2y+5 \implies 3yP^2 - kP^2 = 2y+5$

Collect y terms on one side: $3yP^2 - 2y = kP^2 + 5$

Factorise out y : $y(3P^2 - 2) = kP^2 + 5$

Divide: $y = \frac{kP^2+5}{3P^2-2}$ *Answer:* $y = \frac{kP^2+5}{3P^2-2}$

• We Do:

Square both sides: $T^2 = \frac{5x-3}{2x+w}$

Multiply: $T^2(2x+w) = 5x-3 \implies 2xT^2 + wT^2 = 5x-3$

Collect x terms: $wT^2 + 3 = 5x - 2xT^2$

Factorise: $wT^2 + 3 = x(5 - 2T^2)$

Divide: $x = \frac{wT^2+3}{5-2T^2}$ *Answer:* $x = \frac{wT^2+3}{5-2T^2}$

• You Do:

Square both sides: $R^2 = \frac{4m+p}{m-7}$

Multiply: $R^2(m-7) = 4m+p \implies mR^2 - 7R^2 = 4m+p$

Collect m terms: $mR^2 - 4m = 7R^2 + p$

Factorise: $m(R^2 - 4) = 7R^2 + p$

Divide: $m = \frac{7R^2+p}{R^2-4}$ *Answer:* $m = \frac{7R^2+p}{R^2-4}$

• Challenge:

Multiply by denominator: $V(x^2 - b) = 3x^2 + a \implies Vx^2 - Vb = 3x^2 + a$

Collect x^2 terms: $Vx^2 - 3x^2 = a + Vb$

Factorise: $x^2(V - 3) = a + Vb \implies x^2 = \frac{a+Vb}{V-3}$

Square root: $x = \pm \sqrt{\frac{a+Vb}{V-3}}$ **Answer:** $x = \pm \sqrt{\frac{a+Vb}{V-3}}$