

SOLUTIONS

Test Tune-up 2: Quadratic Relations | MPM2D

1) Expand the following 2 quadratic relations to convert them into standard form. Make a graph of the parabola so that you can check your answer.

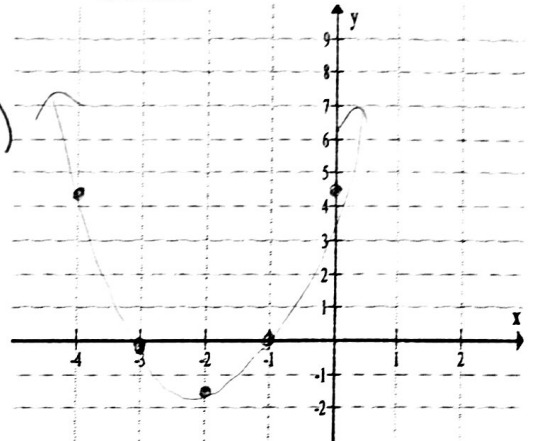
a) Vertex Form:

$$\begin{aligned} y &= 1.5(x+2)^2 - 1.5 \\ &= 1.5(x+2)(x+2) - 1.5 \\ &= 1.5(x^2 + 2x + 2x + 4) - 1.5 \\ &= 1.5(x^2 + 4x + 4) - 1.5 \\ &= 1.5x^2 + 6x + 6 - 1.5 \\ &= 1.5x^2 + 6x + 4.5 \end{aligned}$$

b) Factored Form:

$$\begin{aligned} y &= 1.5(x+1)(x+3) \\ &= 1.5(x^2 + 3x + x + 3) \\ &= 1.5(x^2 + 4x + 3) \\ &= 1.5x^2 + 6x + 4.5 \end{aligned}$$

Sketch:



2) Expand and simplify the following expressions:

a) $2(x-3)(x+4) + (2x-1)(3x+1)$

$$\begin{aligned} &= 2(x^2 + 4x - 3x - 12) + (6x^2 + 2x - 3x - 1) \\ &= 2x^2 + 2x - 24 + 6x^2 - x - 1 \\ &= 8x^2 + x - 25 \end{aligned}$$

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

$$\begin{aligned} &= x^2 + 5x + 5x + 25 - (x^2 - 5x - 5x + 25) \\ &= 20x \end{aligned}$$

3) Evaluate the following by rewriting with positive exponents first. Leave your answer as a fraction instead of a decimal where applicable.

a) 6^{-3}

$$= \frac{1}{6^3}$$

$$= \frac{1}{216}$$

b) $(-5)^{-4}$

$$= \frac{1}{(-5)^4}$$

$$= \frac{1}{625}$$

c) $(7^{-1} + 2^{-3})^0$

$$= 1$$

d) $\left(\frac{5}{4}\right)^{-3}$

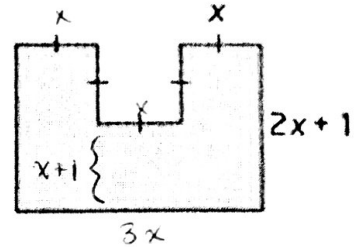
$$= \left(\frac{4}{5}\right)^3$$

$$= \frac{64}{125}$$

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4) Write an algebraic expression for the area of the following figure. Expand and simplify. Then, find the area in another way to verify your result.

$$\begin{aligned} \textcircled{1} \quad A &= 3x(2x+1) - x^2 \\ &= 6x^2 + 3x - x^2 \\ &= 5x^2 + 3x \end{aligned}$$



$$\begin{aligned} \textcircled{2} \quad A &= x(2x+1) + x(2x+1) + x(x+1) \\ &= 2x^2 + x + 2x^2 + x + x^2 + x \\ &= 5x^2 + 3x \end{aligned}$$

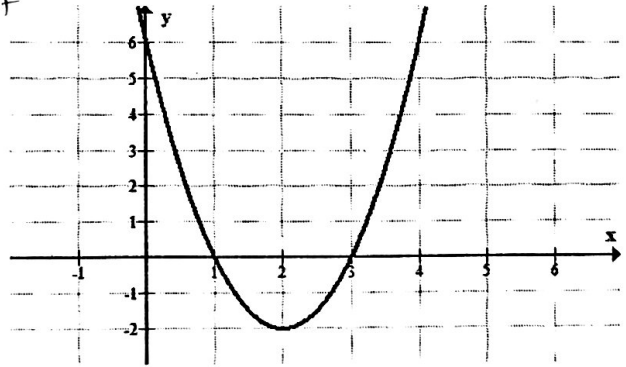
$$\begin{aligned} \textcircled{3} \quad A &= 3x(x+1) + x^2 + x^2 \\ &= 3x^2 + 3x + x^2 + x^2 \\ &= 5x^2 + 3x \end{aligned}$$

5) What is the standard form, factored form, and vertex form of the quadratic relation graphed below.

Expand: $y = 2(x-1)(x-3)$

$$\begin{aligned} &= 2(x^2 - 3x - x + 3) \\ &= 2(x^2 - 4x + 3) \\ &= 2x^2 - 8x + 6 \end{aligned}$$

Need first



Standard Form	Vertex Form	Factored Form
$y = 2x^2 - 8x + 6$	$y = 2(x-2)^2 - 2$	$y = 2(x-1)(x-3)$