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Section 5.6 Solve Problems Involving Quadratic Relations

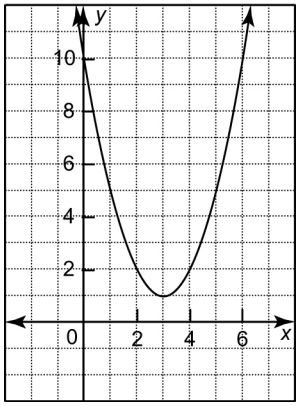
1. Find the zeros of each relation.
a) $y = (x + 6)(x – 4)$
b) $y = 3(x + 5)(x – 2)$
c) $y = –2(x + 2)(x – 2)$
d) $y = 4(x – 6)(x + 12)$

2. Express each relation in intercept form.
a) $y = x^2 + 10x – 24$
b) $y = 2x^2 + 2x – 60$

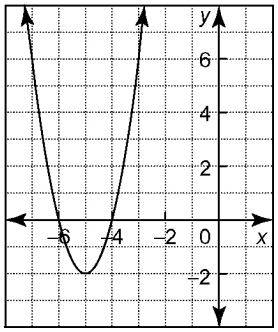
3. Find the zeros of each relation.
a) $y = x^2 – 12x + 32$
b) $y = 2x^2 + 14x + 24$
c) $y = –x^2 + 4x + 5$
d) $y = –3x^2 + 48$
e) $y = –0.5x^2 + x – 12$
f) $y = 3.5x^2 – 126$

4. Write the equation of the axis of symmetry for each quadratic relation.

a)



b)



5. Find the equation of the axis of symmetry for each quadratic relation.
a) $y = (x – 6)(x – 4)$
b) $y = 2x(x + 6)$
c) $y = 6(x + 4)(x – 10)$
d) $y = 0.5x(x – 8)$

6. Refer to question 5. Write the relations in parts a) and b) in standard form and in vertex form.

7. A picture that measures 10 cm by 5 cm is surrounded by a matte of uniform width. The total area of the picture and matte is 150 cm^2.
a) Write expressions for the total length and the total width of the picture and matte.
b) Write an expression for the total area of the picture and the matte.
c) Find the width of the matte.

8. A rectangle has dimensions $2x – 12$ by $3x + 9$ and area 60 cm^2. What are the actual dimensions of the rectangle?

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9. A ball was tossed from the roof of a 5-m tall building. The path of the ball can be modelled by the relation $y = -x^2 + 4x + 5$, where x is the horizontal distance travelled and y is the height, both in metres.

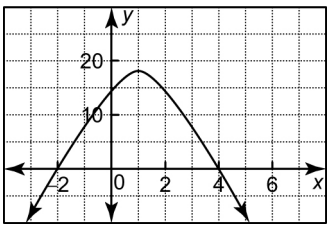
a) Express the relation in intercept form.

b) Find the zeros of the relation.

c) What is the y-intercept? Explain the meaning of the y-intercept in this context.

d) At what horizontal distance did the ball hit the ground?

10. Write an equation in the form $y = ax^2 + bx + c$ for the parabola shown.



11. a) Write two different equations, in standard form, for quadratic relations with zeros at $x = 4$ and $x = -6$.

b) Graph your relations from part a).

