

1 - 3: Factor the polynomial.

1. $k^2 + 14k + 49$

$$\frac{(k+7)(k+7)}{(k+7)^2}$$

2. $m^2 - 18m + 81$

$$\frac{(m-9)(m-9)}{(m-9)^2}$$

3. $x^2 + 34x + 289$

$$\frac{(x+17)(x+17)}{(x+17)^2}$$

4 - 9: Factor the polynomial.

$$(a-b)^2 = (a+b)(a-b)$$

4. $x^2 - 36$

$$(x+6)(x-6)$$

5. $m^2 - 49$

$$(m-7)(m+7)$$

6. $1 - 25y^2$

$$(1+5y)(1-5y)$$

7. $5x^2 - 20$

$$\frac{5(x^2-4)}{5(x+2)(x-2)}$$

8. $4x^2 - 24x + 36$

$$\frac{4(x^2-6x+9)}{4(x-3)(x-3)} = 4(x-3)^2$$

9. $9x^2 + 90x + 225$

$$\frac{9(x^2+10x+25)}{9(x+5)(x+5)} = 9(x+5)^2$$

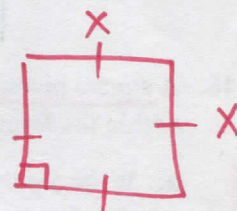
Real World Problem: Use appropriate units. Then draw and label a diagram to get a visual.

10. The area (in square centimeters) of a square thank-you card can be represented by $x^2 + 6x + 9$.

- a. Write an expression that represents the side length of the card.

$$(x+3)(x+3) = x^2 + 6x + 9$$

$$\text{side} = x + 3$$



- b. What is the perimeter of the card when $x = 4$?

$$4(x+3)$$

$$4x + 12$$

$$f(4) = 4(4) + 12 = 16 + 12 = 28$$

$$P = 28 \text{ cm}$$

11 - 14: Solve the equation.

11. $v^2 - 25 = 0$

$(v+5)(v-5) = 0$
 $v+5=0$ $v-5=0$
 $v = -5$ $v = 5$

12. $p^2 + 8p + 16 = 0$

$(p+4)(p+4) = 0$
 $p+4=0$ $p+4=0$
 $p = -4$ $p = -4$
 $(p+4)^2 = 0$
 $p+4=0$
 $p = -4$

13. $q^2 - 14q + 49 = 0$

$(q-7)(q-7) = 0$
 $q-7=0$ $q-7=0$ $q-7=0$
 $q = 7$ $q = 7$ $q = 7$

14. $16x^2 = 25$

$16x^2 - 25 = 0$
 $(4x+5)(4x-5) = 0$
 $4x+5=0$ $4x-5=0$
 $4x = -5$ $4x = 5$
 $x = -\frac{5}{4}$ $x = \frac{5}{4}$

15 - 16: Real-World Problems. Sketch an image to get a better visual. Use appropriate units.

15. While standing on a roof, you drop a hammer. The function $y = 16 - 16t^2$ represents the height y (in feet) of the hammer t seconds after it is dropped. After how many seconds does the hammer land on the ground?

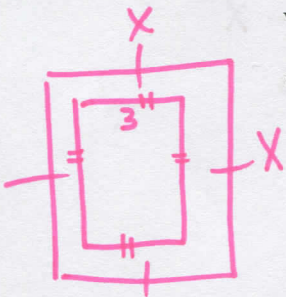
$t = ?$

$y = 0$

$0 = 16 - 16t^2$
 $0 = 16(1 - t^2)$
 $0 = 16(1+t)(1-t)$
 $1+t=0$ $1-t=0$
 $t = -1$ $-t = -1$
 $t = 1$

1 second

16. A square picture frame has side length x inches. The square opening for a picture within the frame has side length 3 inches.



- a. Write a polynomial that represents the area of the picture frame, not including the picture.

$(x-3)(x-3)$
 $f(x) = x^2 - 6x + 9$

- b. The area in part (a) is 55 square inches. What is the side length of the picture frame? Explain your reasoning.

$a=1$ $b=-6$ $c=-46$
 $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(-46)}}{2(1)}$
 $= \frac{6 \pm \sqrt{220}}{2} \Rightarrow x \approx 10.416$

$55 = x^2 - 6x + 9$
 $0 = x^2 - 6x - 46$

≈ 10.5 in