Factored Form: $f(x)=a(x-r_1)(x-r_2)$

Write a quadratic function in factored form with each set of given characteristics.

14. Write a quadratic function that represents a parabola that opens downward and has x-intercepts (2, 0) and (14, 0).

15. Write a quadratic function that represents a parabola that opens upward and has x-intercepts (−8, 0) and (−1, 0).

17. Write a quadratic function that represents a parabola that opens downward and has x-intercepts (−5, 0) and (2, 0).

18. Write a quadratic function that represents a parabola that opens upward and has x-intercepts (−12, 0) and (−4, 0).

Determine the x-intercepts for each function. If necessary, rewrite the function in factored form.

25. $f(x) = (3x + 18)(x - 2)$

26. $f(x) = (x + 8)(3 - x)$

27. $f(x) = (-2x + 8)(x - 14)$

28. $f(x) = (x + 16)(2x + 16)$

29. $f(x) = x(x + 7)$

30. $f(x) = (-3x + 9)(x + 3)$

Vertex Form: $f(x)=a(x-h)^2+k$

a) Determine the vertex of each parabola.   b) Determine the axis of symmetry

19. $f(x) = x^2 + 2x - 15$

20. $f(x) = x^2 - 8x + 7$

> **For 19-20 use**
>
> Vertex's $x = -\dfrac{b}{2a}$

21. $f(x) = x^2 + 4x - 12$
x-intercepts: (2, 0) and (−6, 0)

22. $f(x) = -x^2 - 14x - 45$
x-intercepts: (−9, 0) ar

23. $f(x) = -x^2 + 8x + 20$
two symmetric points on the parabola:
(−1, 11) and (9, 11)

> **For 21-23 use**
>
> Vertex's $x = \dfrac{x_1+x_2}{2}$

Determine the vertex of each quadratic function given in vertex form.

1. $f(x) = (x - 3)^2 + 8$

2. $f(x) = (x + 4)^2 + 2$

3. $f(x) = -2(x - 1)^2 - 8$

4. $f(x) = \frac{1}{2}(x - 2)^2 + 6$

> **For 1-4 use**
>
> $f(x) = a(x - h)^2 + k$