Factor the following if possible.

1. $12x - 15$

$3(4x-5)$

2. $4y^2 + 12y$

$4y(y+3)$

3. $7t^2 + 10t$

$t(7t+10)$

4. $5m^4 + 10m^2$

$5m^2(m^2+2)$

5. $x^2 - 9x$

$x(x-9)$

6. $4x^2 - 10$

$2(2x^2-5)$

7. $7x + 12$

Does Not Factor!

8. $3x^2 - 9x + 12$

$3(x^2-3x+4)$

9. $14x^3 + 7x^2 - 21x$

$7x(2x^2+x-3)$

10. $8x^3 - 15x^2$

$x^2(8x-15)$

11. $5y^3 - 15y^2 + 3y$

$y(5y^2-15y+3)$

12. $9n^2 - 15n$

$3n(3n-5)$

Use the Zero Product Rule to solve the following factored equations.

13. $3x(x+5) = 0$

$3x=0$ | $x+5=0$

$\frac{3x}{3}=\frac{0}{3}$ | $-5 \quad -5$

$x=0$ | $x=-5$

$x=-5, 0$

14. $0 = (x-2)(x+3)$

$x-2=0$ | $x+3=0$

$+2 \quad +2$ | $-3 \quad -3$

$x=2$ | $x=-3$

$x=-3, 2$

15. $2(x-1) = 0$

$x-1=0$

$+1 \quad +1$

$x=1$

16. $0 = (2t+1)(t-7)$

$2t+1=0$ | $t-7=0$

$-1 \quad -1$ | $+7 \quad +7$

$\frac{2t}{2}=\frac{-1}{2}$ | $t=7$

$t=-1/2$

$t=-\frac{1}{2}, 7$

17. $(3d-2)(2d+5) = 0$

$3d-2=0$ | $2d+5=0$

$+2 \quad +2$ | $-5 \quad -5$

$\frac{3d}{3}=\frac{2}{3}$ | $\frac{2d}{2}=\frac{-5}{2}$

$d=2/3$ | $d=-5/2$

18. $0 = 5x(2x+7)(x-8)$

$5x=0$ / $2x+7=0$ / $x-8=0$

$\frac{5x}{5}=\frac{0}{5}$ / $-7 \quad -7$ / $+8 \quad +8$

$x=0$ / $\frac{2x}{2}=\frac{-7}{2}$ / $x=8$

$x=-\frac{7}{2}$

$x=-\frac{7}{2}, 0, 8$

19. $4x(x+5)(2x-1)(4x+7) = 0$

$4x=0$ / $x+5=0$ / $2x-1=0$ / $4x+7=0$

$\frac{4x}{4}=\frac{0}{4}$ / $-5 \quad -5$ / $+1 \quad +1$ / $-7 \quad -7$

$x=0$ / $x=-5$ / $\frac{2x}{2}=\frac{1}{2}$ / $\frac{4x}{4}=\frac{-7}{4}$

$x=-5, -7/4, 0, 1/2$

$x=\frac{1}{2}$

$x=-7/4$

20. $0 = 2(r+3)(r-2)(3r+1)$

$r+3=0$ / $r-2=0$ / $3r+1=0$

$-3 \quad -3$ / $+2 \quad +2$ / $-1 \quad -1$

$r=-3$ / $r=2$ / $\frac{3r}{3}=\frac{-1}{3}$

$r=-3, -\frac{1}{3}, 2$

$r=-\frac{1}{3}$

Solve the following by factoring.

21. $3x^2 - 12x = 0$

$3x(x-4)=0$

$\frac{3x}{3}=\frac{0}{3}$ | $x-4=0$, $+4$ $+4$

$x=0$ $x=4$

$x=0, 4$

22. $0 = 5x^2 + 25x$

$0=5x(x+5)$

$\frac{5x}{5}=\frac{0}{5}$ | $x+5=0$, -5 -5

$x=0$ $x=-5$

$x=-5, 0$

23. $4a^2 - 10a = 0$

$2a(2a-5)=0$

$\frac{2a}{2}=\frac{0}{2}$ | $2a-5=0$, $+5$ $+5$

$a=0$ $\frac{2a}{2}=\frac{5}{2}$

$a=5/2$

$a=0, 5/2$

24. $3x^2 = 9x$

$-9x$ | $-9x$

$3x^2-9x=0$

$3x(x-3)=0$

$\frac{3x}{3}=\frac{0}{3}$ | $x-3=0$, $+3$ $+3$

$x=0$ $x=3$

$x=0, 3$

Solve the following by factoring.

25. $15g + 6g^2 = 0$

$3g(5+2g)=0$

$\frac{3g}{3}=\frac{0}{3}$ | $5+2g=0$, -5 -5

$g=0$ $\frac{2g}{2}=\frac{-5}{2}$

$g=\frac{-5}{2}$

$g=\frac{-5}{2}, 0$

26. $21y = 6y^2$ $-21y$

$-21y$

$0=6y^2-21y$

$0=3y(2y-7)$

$\frac{3y}{3}=\frac{0}{3}$ | $2y-7=0$, $+7$ $+7$

$y=0$ $2y=7$

$y=7/2$

$y=0, \frac{7}{2}$

27. $8x^2 = 20x$

$-20x$ $-20x$

$8x^2-20x=0$

$4x(2x-5)=0$

$\frac{4x}{4}=\frac{0}{4}$ | $2x-5=0$, $+5$ $+5$

$x=0$ $\frac{2x}{2}=\frac{5}{2}$

$x=\frac{5}{2}$

$x=0, \frac{5}{2}$

28. $0 = 4h + 2h^2 + 12h$

$0=2h^2+16h$

$0=2h(h+8)$

$\frac{2h}{2}=\frac{0}{2}$ | $h+8=0$, -8 -8

$h=0$ $h=-8$

$h=-8, 0$

29. $3x^2 - 12x = 3x$

$-3x \quad -3x$

$3x^2 - 15x = 0$

$3x(x-5) = 0$

$3x = 0 \mid x - 5 = 0$

$x = 0 \quad x = 5$

$x = 0, 5$

30. $2c^2 = 5c^2 + 18c$

$-2c^2 \quad -2c^2$

$0 = 3c^2 + 18c$

$0 = 3c(c+6)$

$3c = 0 \mid c + 6 = 0$

$c = 0 \quad c = -6$

$c = 0, -6$

Answer the following.

31. Simplify

$(3x^2 - 2x + 1) + (3x^2 - x + 5)$

$6x^2 - 3x + 6$

32. Simplify $(3x - 2)(x + 5)$

$3x^2 + 15x - 2x - 10$

$3x^2 + 13x - 10$

33. Solve $3(x + 5) = 0$

$3x + 15 = 0$

$-15 \quad -15$

$\frac{3x}{3} = \frac{-15}{3}$

$x = -5$

34. Write the equation of the linear function.

x	0	2	4	6
$f(x)$	15	12	9	6

$+2 \quad +2 \quad +2$

$-3 \quad -3 \quad -3$

$y = mx + b$

$m = -\frac{3}{2} \quad b = 15$

$f(x) = 15 - \frac{3}{2}x$

35. Write the equation of the exponential function.

x	0	1	2	3
$f(x)$	4	12	36	108

$\times 3 \quad \times 3 \quad \times 3$

$y = a \cdot b^x$

$f(x) = 4(3)^x$

36. If $f(x) = 12 - 3x$, find $f(3) + 1$

$f(3) = 12 - 3(3)$

$12 - 9$

$f(3) = 3$

$f(3) + 1$

$3 + 1$

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