

TEST BANK

EIGHTH EDITION

TAN | APPLIED CALCULUS FOR THE MANAGERIAL, LIFE, AND SOCIAL SCIENCES



Tan.ApplCalc-ch01sec02

Student: _____

1. Rationalize the numerator of the expression.

$$\frac{\sqrt[7]{y^4}}{x}$$

A. $\frac{y}{x\sqrt[7]{y^3}}$

B. $\frac{y}{x + \sqrt[7]{y^3}}$

C. $\frac{y^2}{x\sqrt[7]{y^3}}$

D. $\frac{y}{x\sqrt[7]{y^4}}$

E. $\frac{yx}{\sqrt[7]{y^3}}$

2. Rationalize the denominator of the expression.

$$\frac{a}{5 - \sqrt{a}}$$

A. $\frac{a(5 + \sqrt{a})}{25 + a}$

B. $\frac{a(5 - \sqrt{a})}{25 - a}$

C. $\frac{a(5 - \sqrt{a})}{25 + a}$

D. $\frac{a(5 + \sqrt{a})}{25 - a}$

E. $\frac{(5 + \sqrt{a})}{25 - a}$

3. Perform the indicated operations and simplify the expression.

$$\frac{\frac{4}{x} + \frac{5}{y}}{1 - \frac{2}{xy}}$$

A. $\frac{5x + 4y}{xy}$

B. $\frac{5x - 4y}{xy - 2}$

C. $\frac{5y + 4x}{xy - 2}$

D. $\frac{5y - 4x}{xy + 2}$

E. $\frac{5x + 4y}{xy - 2}$

4. Simplify the expression.

$$\frac{x^3 + 2x^2 - 3x}{-2x^2 - x + 3}$$

A. $-\frac{x^2 + 3}{2x + 3}$

B. $-\frac{x(x - 3)}{2x + 3}$

C. $-\frac{x(x + 3)}{2x + 3}$

D. $\frac{x(x + 3)}{2x + 3}$

E. $-\frac{x^2 - 3}{2x + 3}$

5. Find the real roots of the equation by factoring.

$$\frac{1}{4}a^2 + a - 8 = 0$$

A. $a = 4$

B. $a = -8$

C. $a = 8, -4$

D. $a = 4, -8$

E. $a = 4, 8$

6. Perform the indicated operations and simplify the expression.

$$7x^2(4x^2 + 1)^4(9x) + (4x^2 + 1)^5(3x)$$

- A. $9x(25x^2 + 1)(4x^2 + 1)^4$
B. $3x(4x^2 + 1)(25x^2 + 1)^4$
C. $3x(25x^2 + 2)(4x^2 + 1)^4$
D. $3x(25x^2 + 1)^2(4x^2 + 1)^3$
E. $3x(25x^2 + 1)(4x^2 + 1)^4$
7. Rationalize the numerator of the expression.

$$\frac{2 - \sqrt{7}}{7}$$

- A. $-\frac{2}{7(2 + \sqrt{7})}$
B. $-\frac{3}{7(2 + \sqrt{7})}$
C. $\frac{2}{7(2 + \sqrt{7})}$
D. $-\frac{5}{14(2 + \sqrt{7})}$
E. $\frac{3}{7(2 + \sqrt{7})}$

8. Rationalize the numerator of the expression.

$$\frac{6 + \sqrt{x+5}}{\sqrt{x+5}}$$

A. $-\frac{x-62}{(6-\sqrt{x+5})}$

B. $-\frac{x-31}{\sqrt{x+5}(6-\sqrt{x+5})}$

C. $\frac{x+31}{\sqrt{x+5}(6-\sqrt{x+5})}$

D. $-\frac{x-93}{\sqrt{x+5}(12+\sqrt{x+5})}$

E. $\frac{x+36}{(x+5)(6-\sqrt{x+5})}$

9. Rationalize the denominator of the expression.

$$\frac{1}{\sqrt{5x} - 6\sqrt{y}}$$

A. $\frac{\sqrt{5x} + \sqrt{6y}}{5y + 36x}$

B. $\frac{\sqrt{5x} - 6\sqrt{y}}{5x + 6y}$

C. $\frac{\sqrt{5x} - 36\sqrt{y}}{5x - 36y}$

D. $\frac{\sqrt{5x} + 6\sqrt{y}}{5x - 36y}$

E. $\frac{\sqrt{5x} + 6\sqrt{y}}{5y - 36x}$

10. Perform the indicated operations and simplify the expression.

$$\frac{2x(x+7)^{-\frac{1}{2}} - (x+7)^{\frac{1}{2}}}{x^2}$$

A. $\frac{-7x}{x\sqrt{x+7}}$

B. $\frac{x-7}{x^2(x+14)}$

C. $\frac{x-7}{x^2\sqrt{x+7}}$

D. $\frac{x+7}{x^2\sqrt{x+7}}$

E. $\frac{x+7}{x^2\sqrt{x+9}}$

11. Perform the indicated operations and simplify the expression.

$$\frac{10x^2 + 39x - 4}{2x + 14} \div \frac{x^2 - 16}{x^2 + 3x - 28}$$

A. $\frac{11x - 8}{4}$

B. $\frac{9x - 5}{2}$

C. $\frac{8x - 1}{4}$

D. $\frac{8x - 5}{3}$

E. $\frac{10x - 1}{2}$

12. Perform the indicated operations and simplify the expression.

$$\frac{1 + \frac{5}{x}}{1 - \frac{3}{x}}$$

A. $\frac{x - 5}{x + 3}$

B. $\frac{x + 3}{x - 5}$

C. $\frac{x + 5}{x - 3}$

D. $\frac{x + 10}{x - 6}$

E. $\frac{8x + 1}{x - 3}$

13. Simplify the expression.

$$\frac{(5x - 1)(5) - (5x + 1)(5)}{(5x - 1)^2}$$

A. $-\frac{10}{(5x - 1)^2}$

B. $-\frac{15}{(4x - 1)^2}$

C. $-\frac{11}{(4x - 1)^2}$

D. $-\frac{15}{(5x - 1)}$

E. $\frac{8}{(5x - 1)^2}$

14. Solve the equation by using the quadratic formula.

$$2x^2 + 4x - 3 = 0$$

A. $-6 + \frac{\sqrt{10}}{2}$ and $-6 - \frac{\sqrt{10}}{2}$

B. $-1 + \frac{\sqrt{10}}{3}$ and $-1 - \frac{\sqrt{10}}{3}$

C. $-3 + \frac{\sqrt{10}}{2}$ and $-3 - \frac{\sqrt{10}}{2}$

D. $-1 + \frac{\sqrt{10}}{6}$ and $-1 - \frac{\sqrt{10}}{6}$

E. $-1 + \frac{\sqrt{10}}{2}$ and $-1 - \frac{\sqrt{10}}{2}$

15. Find the real roots of the equation by factoring.

$$x^2 + 2x - 8 = 0$$

- A. 3 and -4
- B. 3 and -5
- C. 4 and -2
- D. 2 and -4
- E. 2 and -5

16. Perform the indicated operations and simplify the expression.

$$\left(x^2 + 3\right)^2 \left[4\left(x^2 + 3\right)^2 - 7\right](3x)$$

A. $3x\left(x^2 + 3\right)^2 \left(4x^4 + 24x^2 + 29\right)$

B. $3x\left(x^2 + 3\right)^2 \left(4x^4 + 24x^2 + 28\right)$

C. $3x\left(x^2 + 3\right)^2 \left(4x^4 + 29x^2 + 28\right)$

D. $3x\left(x^2 + 3\right)^2 \left[4\left(x^2 + 3\right)^2 - 7\right]$

E. $3x\left(x^2 + 3\right)^2 \left(4x^4 + 29x^2 + 29\right)$

17. Perform the indicated operations and simplify the expression.

$$\left(x^2 + 2y^2\right)x - xy(6y)$$

A. $x^3 - 4xy^2$

B. $3x^3 - 7xy^2$

C. $2x^3 - 7xy^2$

D. $x^3 - 7xy^2$

E. $3x^3 - 4xy^2$

18. Factor the expression.

$$12ac + 4bc - 9ad - 3bd$$

- A. $(3a - b)(4c + 3d)$
- B. $(3a + 3b)(2c - 3d)$
- C. $(3a - 3b)(2c + 3d)$
- D. $(3a + b)(4c - 3d)$
- E. $(5a + b)(2c - 4d)$

19. Factor the expression.

$$x^6 + 64$$

- A. $(x^2 - 8)(x^4 + 4x^2 + 12)$
- B. $(x^2 + 4)(x^4 - 4x^2 + 16)$
- C. $(x^2 - 4)(x^4 - 4x^2 + 16)$
- D. $(x^2 - 4)(x^4 + 4x^2 - 16)$
- E. $(x^2 + 5)(x^4 - 4x^2 + 24)$

20. Factor out the greatest common factor from the expression.

$$4x^{-\frac{7}{2}} - \frac{7}{2}x^{-\frac{5}{2}}$$

A. $\frac{1}{2}x^{-\frac{5}{2}}(8x - 7)$

B. $\frac{1}{2}x^{-\frac{7}{2}}(8x - 7)$

C. $\frac{1}{2}x^{-\frac{5}{2}}(8 - 7x)$

D. $\frac{1}{2}x^{-\frac{7}{2}}(8 - 7x)$

E. $x^{-\frac{7}{2}}(8 - \frac{7}{2}x)$

21. Factor out the greatest common factor from the expression.

$$4a^4 - 20a^2b^2 + 32a^3b$$

A. $5a^2(a^2 + 10ab - 6b^2)$

B. $4a^2(a^2 + 8ab - 9b^2)$

C. $4a^2(a^2 + 8ab - 5b^2)$

D. $5a^2(a^2 + 4ab - 5b^2)$

E. $4a^2(a^2 + 11ab - 9b^2)$

22. Perform the indicated operations and simplify the expression.

$$\left(\frac{1}{3} - 8 + e\right) - \left(-\frac{1}{3} - 8 + e^{-1}\right)$$

A. $\frac{2}{3} + 2e$

B. $\frac{2}{3} - e + e^{-1}$

C. $\frac{1}{3} - 16 + e - e^{-1}$

D. $\frac{26}{3} + e - e^{-1}$

E. $\frac{2}{3} + e - e^{-1}$

23. Perform the indicated operations and simplify the expression.

$$4(t + 5\sqrt{t})^2 - 4t^2$$

A. $21t(2\sqrt{t} + 3)$

B. $21t(4\sqrt{t} + 5)$

C. $20t(2\sqrt{t} + 5)$

D. $20t(2\sqrt{t} + 3)$

E. $23t(2\sqrt{t} + 9)$

24. Perform the indicated operations and simplify the expression.

$$x - \{2x - [-x - (8 - x)]\}$$

A. $x + 1$

B. $x - 1$

C. $-x - 8$

D. $-x + 8$

E. $x + 8$

25. Perform the indicated operations and simplify the expression.

$$(4y^2 - 5y + 7) - (2y^2 - 9y - 8)$$

A. $2y^2 + 4y + 15$

B. $2y^2 + 4y + 19$

C. $4y^2 + 4y + 19$

D. $2y^2 + 6y + 17$

E. $4y^2 + 6y + 19$

26. Perform the indicated operations and simplify the expression.

$$7x^2(4x^2 + 1)^4(9x) + (4x^2 + 1)^5(3x)$$

27. Simplify the expression.

$$\frac{x^3 + 2x^2 - 3x}{-2x^2 - x + 3}$$

28. Perform the indicated operations and simplify the expression.

$$\frac{\frac{2}{x} + \frac{5}{y}}{1 - \frac{2}{xy}}$$

29. Rationalize the denominator of the expression.

$$\frac{5a}{4 - \sqrt{a}}$$

30. Rationalize the numerator of the expression.

$$\frac{\sqrt[3]{y^2}}{x}$$

31. Perform the indicated operations and simplify the expression.

$$(x^2 + 5)^2 \left[(x^2 + 5)^2 - 1 \right] (5x)$$

32. Rationalize the numerator of the expression.

$$\frac{1 - \sqrt{7}}{7}$$

33. Rationalize the numerator of the expression.

$$\frac{2 + \sqrt{x+6}}{\sqrt{x+6}}$$

34. Rationalize the denominator of the expression.

$$\frac{1}{\sqrt{3x} - \sqrt{y}}$$

35. Perform the indicated operations and simplify the expression.

$$\frac{2x(x+1)^{-\frac{1}{2}} - (x+1)^{\frac{1}{2}}}{x^2}$$

36. Perform the indicated operations and simplify the expression.

$$\frac{4x^2 + 35x - 9}{2x + 20} \div \frac{x^2 - 81}{x^2 + x - 90}$$

37. Perform the indicated operations and simplify the expression.

$$\frac{1 + \frac{1}{x}}{1 - \frac{6}{x}}$$

38. Simplify the expression.

$$\frac{(3x - 1)(3) - (3x + 1)(3)}{(3x - 1)^2}$$

39. Solve the equation by using the quadratic formula.

$$x^2 + 2x - 2 = 0$$

40. Perform the indicated operations and simplify the expression.

$$(x^2 + 3y^2)x - xy(8y)$$

41. Factor the expression.

$$15ac + 3bc - 25ad - 5bd$$

42. Factor the expression.

$$x^6 + 27$$

43. Factor out the greatest common factor from the expression.

$$3x^{-\frac{9}{2}} - \frac{7}{2}x^{-\frac{7}{2}}$$

44. Factor out the greatest common factor from the expression.

$$2a^4 - 12a^2b^2 + 6a^3b$$

45. Perform the indicated operations and simplify the expression.

$$5(t + 3\sqrt{t})^2 - 5t^2$$

46. Perform the indicated operations and simplify the expression.

$$\left(\frac{1}{7} - 4 + e\right) - \left(-\frac{1}{7} - 4 + e^{-1}\right)$$

47. Perform the indicated operations and simplify the expression.

$$8x - \{9x - [-x - (4 - x)]\}$$

48. Perform the indicated operations and simplify the expression.

$$\left(8y^2 - 5y + 5\right) - \left(5y^2 - 7y - 6\right)$$

49. Find the real roots of the equation by factoring.

$$\frac{1}{2}x^2 + x - 12 = 0$$

50. Find the real roots of the equation by factoring.

$$x^2 + x - 20 = 0$$

Tan.ApplCalc-ch01sec02 Key

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B. $\frac{y}{x + \sqrt[3]{y^3}}$

C. $\frac{y^2}{x\sqrt[3]{y^3}}$

D. $\frac{y}{x\sqrt[3]{y^4}}$

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2. Rationalize the denominator of the expression.

$$\frac{a}{5 - \sqrt{a}}$$

A. $\frac{a(5 + \sqrt{a})}{25 + a}$

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C. $\frac{a(5 - \sqrt{a})}{25 + a}$

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3. Perform the indicated operations and simplify the expression.

$$\frac{\frac{4}{x} + \frac{5}{y}}{1 - \frac{2}{xy}}$$

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C. $\frac{5y + 4x}{xy - 2}$

D. $\frac{5y - 4x}{xy + 2}$

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A. $-\frac{x^2 + 3}{2x + 3}$

B. $-\frac{x(x - 3)}{2x + 3}$

C. $-\frac{x(x + 3)}{2x + 3}$

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C. $\frac{2}{7(2 + \sqrt{7})}$

D. $-\frac{5}{14(2 + \sqrt{7})}$

E. $\frac{3}{7(2 + \sqrt{7})}$

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$$\frac{6 + \sqrt{x+5}}{\sqrt{x+5}}$$

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E.
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9. Rationalize the denominator of the expression.

$$\frac{1}{\sqrt{5x} - 6\sqrt{y}}$$

A. $\frac{\sqrt{5x} + \sqrt{6y}}{5y + 36x}$

B. $\frac{\sqrt{5x} - 6\sqrt{y}}{5x + 6y}$

C. $\frac{\sqrt{5x} - 36\sqrt{y}}{5x - 36y}$

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C. $\frac{x+5}{x-3}$

D. $\frac{x+10}{x-6}$

E. $\frac{8x+1}{x-3}$

13. Simplify the expression.

$$\frac{(5x-1)(5) - (5x+1)(5)}{(5x-1)^2}$$

A. $-\frac{10}{(5x-1)^2}$

B. $-\frac{15}{(4x-1)^2}$

C. $-\frac{11}{(4x-1)^2}$

D. $-\frac{15}{(5x-1)}$

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$$2x^2 + 4x - 3 = 0$$

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B. $-1 + \frac{\sqrt{10}}{3}$ and $-1 - \frac{\sqrt{10}}{3}$

C. $-3 + \frac{\sqrt{10}}{2}$ and $-3 - \frac{\sqrt{10}}{2}$

D. $-1 + \frac{\sqrt{10}}{6}$ and $-1 - \frac{\sqrt{10}}{6}$

E. $-1 + \frac{\sqrt{10}}{2}$ and $-1 - \frac{\sqrt{10}}{2}$

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C. $3x(x^2 + 3)^2 (4x^4 + 29x^2 + 28)$

D. $3x(x^2 + 3)^2 \left[4(x^2 + 3)^2 - 7 \right]$

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17. Perform the indicated operations and simplify the expression.

$$(x^2 + 2y^2)x - xy(6y)$$

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D. $(3a + b)(4c - 3d)$
E. $(5a + b)(2c - 4d)$

19. Factor the expression.

$$x^6 + 64$$

- A. $(x^2 - 8)(x^4 + 4x^2 + 12)$
B. $(x^2 + 4)(x^4 - 4x^2 + 16)$
C. $(x^2 - 4)(x^4 - 4x^2 + 16)$
D. $(x^2 - 4)(x^4 + 4x^2 - 16)$
E. $(x^2 + 5)(x^4 - 4x^2 + 24)$

20. Factor out the greatest common factor from the expression.

$$4x^{-\frac{7}{2}} - \frac{7}{2}x^{-\frac{5}{2}}$$

A. $\frac{1}{2}x^{-\frac{5}{2}}(8x - 7)$

B. $\frac{1}{2}x^{-\frac{7}{2}}(8x - 7)$

C. $\frac{1}{2}x^{-\frac{5}{2}}(8 - 7x)$

D. $\frac{1}{2}x^{-\frac{7}{2}}(8 - 7x)$

E. $x^{-\frac{7}{2}}(8 - \frac{7}{2}x)$

21. Factor out the greatest common factor from the expression.

$$4a^4 - 20a^2b^2 + 32a^3b$$

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C. $4a^2(a^2 + 8ab - 5b^2)$

D. $5a^2(a^2 + 4ab - 5b^2)$

E. $4a^2(a^2 + 11ab - 9b^2)$

22. Perform the indicated operations and simplify the expression.

$$\left(\frac{1}{3} - 8 + e\right) - \left(-\frac{1}{3} - 8 + e^{-1}\right)$$

A. $\frac{2}{3} + 2e$

B. $\frac{2}{3} - e + e^{-1}$

C. $\frac{1}{3} - 16 + e - e^{-1}$

D. $\frac{26}{3} + e - e^{-1}$

E. $\frac{2}{3} + e - e^{-1}$

23. Perform the indicated operations and simplify the expression.

$$4(t + 5\sqrt{t})^2 - 4t^2$$

A. $21t(2\sqrt{t} + 3)$

B. $21t(4\sqrt{t} + 5)$

C. $20t(2\sqrt{t} + 5)$

D. $20t(2\sqrt{t} + 3)$

E. $23t(2\sqrt{t} + 9)$

24. Perform the indicated operations and simplify the expression.

$$x - \{2x - [-x - (8 - x)]\}$$

A. $x + 1$

B. $x - 1$

C. $-x - 8$

D. $-x + 8$

E. $x + 8$

25. Perform the indicated operations and simplify the expression.

$$(4y^2 - 5y + 7) - (2y^2 - 9y - 8)$$

A. $2y^2 + 4y + 15$

B. $2y^2 + 4y + 19$

C. $4y^2 + 4y + 19$

D. $2y^2 + 6y + 17$

E. $4y^2 + 6y + 19$

26. Perform the indicated operations and simplify the expression.

$$7x^2(4x^2 + 1)^4(9x) + (4x^2 + 1)^5(3x)$$

$$3x(25x^2 + 1)(4x^2 + 1)^4$$

27. Simplify the expression.

$$\frac{x^3 + 2x^2 - 3x}{-2x^2 - x + 3}$$

$$\frac{x(x + 3)}{2x + 3}$$

28. Perform the indicated operations and simplify the expression.

$$\frac{\frac{2}{x} + \frac{5}{y}}{1 - \frac{2}{xy}}$$

$$\frac{5x + 2y}{xy - 2}$$

29. Rationalize the denominator of the expression.

$$\frac{5a}{4 - \sqrt{a}}$$

$$\frac{5a(4 + \sqrt{a})}{16 - a}$$

30. Rationalize the numerator of the expression.

$$\frac{\sqrt[3]{y^2}}{x}$$

$$\frac{y}{xy^{\frac{1}{3}}}$$

31. Perform the indicated operations and simplify the expression.

$$(x^2 + 5)^2 \left[(x^2 + 5)^2 - 1 \right] (5x)$$

$$5x(x^2 + 5)^2(x^4 + 10x^2 + 24)$$

32. Rationalize the numerator of the expression.

$$\frac{1 - \sqrt{7}}{7}$$

$$\frac{6}{7(1 + \sqrt{7})}$$

33. Rationalize the numerator of the expression.

$$\frac{2 + \sqrt{x+6}}{\sqrt{x+6}}$$

$$\frac{x+2}{\sqrt{x+6}(2 - \sqrt{x+6})}$$

34. Rationalize the denominator of the expression.

$$\frac{1}{\sqrt{3x} - \sqrt{y}}$$

$$\frac{\sqrt{3x} + 1\sqrt{y}}{3x - 1y}$$

35. Perform the indicated operations and simplify the expression.

$$\frac{2x(x+1)^{-\frac{1}{2}} - (x+1)^{\frac{1}{2}}}{x^2}$$

$$\frac{x-1}{x^2 \sqrt{x+1}}$$

36. Perform the indicated operations and simplify the expression.

$$\frac{4x^2 + 35x - 9}{2x + 20} \div \frac{x^2 - 81}{x^2 + x - 90}$$

$$\frac{4x-1}{2}$$

37. Perform the indicated operations and simplify the expression.

$$\frac{1 + \frac{1}{x}}{1 - \frac{6}{x}}$$

$$\frac{x+1}{x-6}$$

38. Simplify the expression.

$$\frac{(3x - 1)(3) - (3x + 1)(3)}{(3x - 1)^2}$$

$$-\frac{6}{(3x - 1)^2}$$

39. Solve the equation by using the quadratic formula.

$$x^2 + 2x - 2 = 0$$

$$-1 + \frac{\sqrt{3}}{1}, -1 - \frac{\sqrt{3}}{1}$$

40. Perform the indicated operations and simplify the expression.

$$(x^2 + 3y^2)x - xy(8y)$$

$$1x^3 - 5xy^2$$

41. Factor the expression.

$$15ac + 3bc - 25ad - 5bd$$

$$(5a + b)(3c - 5d)$$

42. Factor the expression.

$$x^6 + 27$$

$$(x^2 + 3)(x^4 - 3x^2 + 9)$$

43. Factor out the greatest common factor from the expression.

$$3x^{-\frac{9}{2}} - \frac{7}{2}x^{-\frac{7}{2}}$$

$$\frac{1}{2}x^{-\frac{9}{2}}(6 - 7x)$$

44. Factor out the greatest common factor from the expression.

$$2a^4 - 12a^2b^2 + 6a^3b$$

$$2a^2(a^2 + 3ab - 6b^2)$$

45. Perform the indicated operations and simplify the expression.

$$5(t + 3\sqrt{t})^2 - 5t^2$$

$$15t(2\sqrt{t} + 3)$$

46. Perform the indicated operations and simplify the expression.

$$\left(\frac{1}{7} - 4 + e\right) - \left(-\frac{1}{7} - 4 + e^{-1}\right)$$

$$\frac{2}{7} + e - e^{-1}$$

47. Perform the indicated operations and simplify the expression.

$$8x - \{9x - [-x - (4 - x)]\}$$

$$-x - 4$$

48. Perform the indicated operations and simplify the expression.

$$\left(8y^2 - 5y + 5\right) - \left(5y^2 - 7y - 6\right)$$

$$3y^2 + 2y + 11$$

49. Find the real roots of the equation by factoring.

$$\frac{1}{2}x^2 + x - 12 = 0$$

$$4, -6$$

50. Find the real roots of the equation by factoring.

$$x^2 + x - 20 = 0$$

$$4, -5$$

