

ALGEBRA 2 REVIEW PACKET

5-6

Factor completely.

1. $a^2 - 3ab - 130b^2$ $(a-10b)(a+3b)$
2. $ab + 20a^2b - 12b$ $b(5a+4)(4a-3)$
3. $m^6 + 9m^3 - 10$ $(m^3+10)(m^3-1)$
4. $x^4 - 13x^2 + 36$ $(x+2)(x-2)(x+3)(x-3)$
5. $9x^3y - 25xy^3$ $xy(3x-5y)(3x+5y)$
6. $2x^5 + 16x^2y^3$ $2x^2(x+2y)(x^2-2xy+4y^2)$
7. $xt^6 - 64x$ $x(t^3-4)(t^3+4)$
8. $y^2x^4 - 16y^6$ $y^2(x^2+4y^2)(x+2y)(x-2y)$
9. $xy + yz - xw - wz$ $(x+z)(y-w)$
10. $x^2 + 4x + 4 - y^2$ $(x+2+y)(x+2-y)$
11. $8y^3 + 24y^2 - 7y - 21$ $(8y^2-7)(y+3)$
12. $x^2 + 12x + 36 - 25y^2$ $(x+6+5y)(x+6-5y)$
13. $6a^2b^2 + 29ab + 28$ $(2ab+7)(3ab+4)$
14. $36c^2 - 80cd + 16d^2$ $4(ac-2d)(c-2d)$
15. $6x^2 - 33x + 45$ $3(2x-5)(x-3)$
16. $12c^2 - 11c - 15$ $(4c+3)(3c-5)$
17. $12d^2 - 41d - 15$ $(4d-15)(3d+1)$
18. $32c^3 - 108d^3$ $4(2c-3d)(4c^2+4cd+9d^2)$

5-7

Solve

19. $12x^2 + 11x - 15 = 0$ $x = -3/4, 5/3$
20. $12x^2 - 36x + 15 = 0$ $1/2, 5/2$
21. $12y^2 - 8y - 15 = 0$ $y = 5/6, 3/2$
22. $2x^2 - 11x + 15 = 0$ $3, 5/2$
23. $s^2 + 10s = 0$ $s = 0, -10$
24. $z^2 = 121$ $11, -11$
25. $w^2 - 169 = 0$ $w = 13, -13$
26. $9x^2 - 3x = 20$ $5/3, -4/3$
27. $20 - 36x + 9x^2 = 0$ $x = 2/3, 10/3$
28. $20 + 57x - 9x^2 = 0$ $20/3, -1/3$
29. $9y^2 - 31y = 20$ $y = -5/9, 4$
30. $2x^2 + 15x = -7$ $-1/2, -7$
31. $5y^2 = 45$ $y = 3, -3$
32. $9z^2 - z = 0$ $0, 1/9$
33. $5w^2 = 20w$ $w = 0, 4$
34. $36a^2 = 169$ $13/6, -13/6$
35. $21r^2 - 13r - 20 = 0$ $r = -5/7, 4/3$
36. $15t^2 - 11t - 12 = 0$ $4/3, -3/5$

5-8

Solve.

37. The length of an Olympic pool is 30 m greater than the width. If the area is 1000 m^2 , find the length and the width.

$L = 50 \text{ m}$
 $W = 20 \text{ m}$

38. When the Great Pyramid of Khufu at Giza, Egypt, was built, the area of each face was $225,000 \text{ ft}^2$. The height was 150 ft less than the base. Find the length of the base and the height.

$B = 750'$
 $H = 600'$

SKILLS PRACTICE 15

For use with Lessons 6-1 through 6-3

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6-1

Simplify.

1. $\frac{12x^3}{6x} = 2x^2$

2. $\frac{15a-5}{5} = 3a-1$

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

4. $\frac{a^3-b^3}{a-b} = a^2+ab+b^2$

5. $\frac{p^3+q^3}{p^2-pq+q^2} = p+q$

6-1

Multiply or divide and simplify.

6. $\frac{x^2-25}{x^3} \cdot \frac{x^3+5x^2}{x^2-10x+25} = \frac{(x+5)^2}{x(x-5)}$

7. $\frac{p^3-q^3}{p^2-2pq+q^2} \cdot \frac{p^2-q^2}{p+q} = \frac{p^2(p+q)+q^2}{p+q}$

8. $\frac{a^2-8a+16}{a^2-10a+16} \cdot \frac{a^2-4}{a^2-16} = \frac{(a-4)(a+2)}{(a-8)(a+4)}$

9. $\frac{x^2-9}{x^2} \div \frac{x+3}{x^3-3x^2} = \frac{(x-3)^2}{x^2}$

10. $\frac{x^3-27}{x^3+27} \div \frac{x^2+3x+9}{x^2+6x+9} = \frac{(x-3)(x+3)}{(x^2-3x+9)}$

11. $\frac{x^2-x-12}{x^2+8x+15} \div \frac{x^2+2x-24}{x^2+9x+20} = \frac{x+4}{x+6}$

6-2

Add or subtract.

12. $\frac{8x^2}{y} + \frac{3x^2}{y} = \frac{11x^2}{y}$

13. $\frac{6x}{x-y} - \frac{-9x}{x-y} = \frac{15x}{x-y}$

14. $\frac{7x^2-3y}{a-b} + \frac{5x^2+4y}{b-a} = \frac{2x^2-7y}{a-b}$

15. $\frac{x}{x-y} - \frac{2x}{x^2-y^2} = \frac{x^2+xy-2x}{x^2-y^2}$

16. $\frac{2}{a^2-2a} - \frac{3}{a^2-a-2} = \frac{-1}{a(a+1)}$

17. $\frac{3}{c^2+3c+2} - \frac{4}{c^2+4c+4} = \frac{-c+2}{(c+1)(c+2)^2}$

18. $\frac{c}{c+1} - \frac{4}{c+4} + \frac{3}{c^2+5c+4} = \frac{c-1}{c+4}$

19. $\frac{2x+1}{x^2+2x-15} - \frac{x}{x^2+x-20} = \frac{x^2-4x-4}{(x-3)(x+4)(x+5)}$

6-3

Simplify.

20. $\frac{1+\frac{1}{x}}{1-\frac{1}{x^2}} = \frac{x}{x-1}$

21. $\frac{1-\frac{4}{a^2}}{a+2} = \frac{a-2}{a^2}$

22. $\frac{\frac{a^2-b^2}{ab}}{\frac{1}{a}+\frac{1}{b}} = a-b$

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

24. $\frac{6a^{-1}-3b^{-1}-6a^{-1}b^{-1}}{6a^{-1}+24b^{-1}+12a^{-1}b^{-1}} = \frac{b-a-2}{2(b+4a+2)}$

25. $\frac{\frac{x^2+5x-6}{x^2+8x+12}}{\frac{x^2+2x-15}{x^2+9x+20}} = \frac{(x-1)(x+4)}{(x+2)(x-3)}$

SKILLS PRACTICE 16

For use with lessons 6-4 through 6-6

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6-4

Divide and check.

1. $(9x^5 - 3x^3 + 27x) \div 3x$ $3x^4 - x^2 + 9$
2. $(24x^9 + 12x^6 - 32x^4) \div 4x^4$ $6x^5 + 3x^2 - 8$
3. $(28a^3b^3 + 14ab^2 - 7a^2b) \div (-7ab)$ $-4a^2b^2 - 2b + a$
4. $(2c^4d^4 - 12c^7d + 6c^3d^3) \div 2c^3d$ $cd^3 - 6c^4 + 3d^2$
5. $(y^2 + 12y + 36) \div (y + 6)$ $y + 6$
6. $(x^2 - 16) \div (x - 4)$ $x + 4$
7. $(a^3 - 27) \div (a - 3)$ $a^2 + 3a + 9$
8. $(4x^4 + 11x^3 + 4x^2 - 3x + 2) \div (x + 2)$ $4x^3 + 3x^2 - 2x + 1$
9. $(y^5 + 6y^3 - y^2 + 9y - 3) \div (y^2 + 3)$ $y^3 + 3y - 1$
10. $(9y^4 - 9y^3 + 5y^2 - 4y + 2) \div (3y - 1)$ $3y^3 - 2y^2 + y - 1 + \frac{1}{3y-1}$

6-5

Use synthetic division to find the quotient and remainder.

11. $(x^2 - 3x + 2) \div (x - 1)$ $x - 2$ R: 0
12. $(x^2 - 3x + 2) \div (x + 1)$ $x - 4$ R: 6
13. $(x^2 - x - 12) \div (x + 3)$ $x - 4$ R: 0
14. $(3x^3 - 7x^2 + 2x - 4) \div (x - 3)$ $3x^2 + 2x + 8$ R: 20
15. $(x^3 - x^2 - 12x + 4) \div (x + 3)$ $x^2 - 4x$ R: 4
16. $(3x^3 - 7x^2 + 2x - 4) \div (x + 1)$ $3x^2 - 10x + 12$ R: -16
17. $(4x^4 - 9x^3 - 7x^2 - 6x + 1) \div (x - 3)$ $4x^3 + 3x^2 + 2x$ R: 1
18. $(2x^5 + 63) \div (x + 2)$ $2x^4 - 4x^3 + 8x^2 - 10x + 32$ R: -1

6-6

Solve.

19. $\frac{2}{15} + \frac{1}{3} = \frac{x}{15}$ 7
20. $\frac{4}{3} - \frac{2}{5} = \frac{1}{x}$ $\frac{15}{14}$
21. $\frac{y-6}{y-3} = \frac{2}{5}$ 8
22. $\frac{a+3}{a-5} = \frac{8}{a-5}$ No solution
23. $\frac{3}{b} - \frac{5}{b} + \frac{17}{b} = 3$ 5
24. $\frac{4}{3y} - \frac{1}{4} = -\frac{1}{6y} + \frac{3}{2}$ $\frac{61}{7}$
25. $\frac{4}{3x-5} = \frac{3}{2x}$ 15
26. $\frac{4}{3w} - \frac{2}{5w} = 1 - \frac{16}{15w}$ 2

SKILLS PRACTICE 21

For use with Lessons 8-1 through 8-3

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8-1

Solve.

1. $x^2 - 8x + 7 = 0$ $(x-7)(x-1) = 0$
 $x=7$ $x=1$

3. $8x^2 - 2x - 3 = 0$ $3/4, -1/2$

5. $9x^2 + 6x - 8 = 0$ $2/3, -4/3$

7. $4b(3b + 6) = -9$ $-1/2, -3/2$

9. $2x^2 + 5x = 12$ $3/2, -4$

12. $-4t^2 + 3 = 0$ $\pm \frac{\sqrt{3}}{2}$

15. $\frac{9}{16}x^2 - 1 = 0$ $\pm \frac{4}{3}$

18. $4x^2 + 20x = 0$ $x=0$
 $x=-5$
 $4x(x+5)$

2. $x^2 + 11x + 18 = 0$ $(x+9)(x+2) = 0$
 $x=-9$ $x=-2$

4. $4y^2 + 9x - 9 = 0$ $3/4, -3$

6. $(y + 4)(y - 1) = 24$ $4, -7$

8. $4x(x + 1) = (2x + 3)(x - 5)$ _____

10. $p(3p + 2) = 5$ $1, -5/3$

13. $16x^2 + 25 = 0$ $\pm \frac{5}{4}i$

16. $3x^2 = 10$ $\pm \frac{\sqrt{30}}{3}$

19. $8x^2 - 5x = 0$ $x=0$
 $x=5/8$
 $x(8x-5)$

11. $3x^2 = 18$ $x = \pm \sqrt{6}$

14. $4x^2 + 12 = 0$ $\pm \sqrt{3}$

17. $9x^2 + 25 = 0$ $\pm \frac{5}{3}i$

20. $x^2 + 9x = 0$ $0, -9$

8-1

Solve by completing the square.

21. $x^2 + 4x = 1$ $-2 \pm \sqrt{5}$

22. $y^2 + 6y + 7 = 0$ $-3 \pm \sqrt{2}$

23. $x^2 + 7x + 1 = 0$ $\frac{-7 \pm \sqrt{45}}{2}$

8-2

Solve.

24. The width of a rectangular mural is 5 m less than the height. The area is 126 m^2 . Find the height and the width.

$H = 14 \text{ m}$
 $W = 9 \text{ m}$

25. The outside of a picture frame measures 13 cm by 18 cm. 176 cm^2 of picture shows inside the frame. Find the width of the frame.

2 cm

26. The outside of a picture frame measures 15 cm by 20 cm. 176 cm^2 of picture shows inside the frame. Find the width of the frame.

4 cm

8-3

Solve.

27. $x^2 + 6x + 2 = 0$ $-3 \pm \sqrt{7}$

29. $t^2 + 4t = 21$ $3, -7$

31. $5x^2 = 13x - 6$ $3/5, 2$

33. $m^2 + 11 = 6m$ $3 \pm i\sqrt{2}$

35. $2x + x(x - 3) = 0$ $1, 0$

28. $x^2 - 5x - 14 = 0$ $7, -2$

30. $3p^2 + 2p - 5 = 0$ $1, -5/3$

32. $x^2 - 2x + 3 = 0$ $1 \pm i\sqrt{2}$

34. $x^2 + 7 = 0$ $\pm i\sqrt{7}$

36. $4t^2 + 2t + 1 = 0$ $-1/4, \pm \frac{i\sqrt{3}}{2}$

8-6 Solve for the indicated letter.

1. $V = hw^2$; w $\sqrt{\frac{V}{h}}$ 2. $x = \frac{1}{2}at^2$; t $\sqrt{\frac{2x}{a}}$ 3. $\sqrt{\frac{F}{k}} = x$; F kx^2
4. $F = \frac{kq_1q_2}{r^2}$; r $\sqrt{\frac{kq_1q_2}{F}}$ 5. $P = I^2R$; I $\sqrt{\frac{P}{R}}$
6. $P = \frac{V^2}{R}$; V \sqrt{PR} 7. $h = 2v + 10t^2$; t $\sqrt{\frac{h-2v}{10}}$
8. $x = \frac{1}{2}at^2 + vt$; t $\frac{-v \pm \sqrt{v^2 + 2ax}}{a}$ 9. $t^2 + 3g = \pi t$; t $\frac{\pi \pm \sqrt{\pi^2 - 12g}}{2}$

8-6 Solve. Use the formula $s = 0.8t^2 + v_0t$ (for objects falling to the moon).

10. a. If an object is dropped from an orbiting spacecraft that is 5000 m above the surface of the moon, how long does it take to reach the ground? 79.06 s
- b. If the spacecraft's initial downward velocity is 100 m/s and the braking rockets fail to fire, how long does it take the spacecraft to reach the ground? 38.28 s
- c. If the braking rockets fire, the equation of motion changes to $s = -\frac{1}{2}t^2 + 100t$. How far will the spacecraft fall in 100 seconds? 5000 m

8-7 Find an equation of variation where

11. y varies directly as the square of x , and $y = 80$ when $x = 4$. $y = 5x^2$
12. y varies inversely as the square of x , and $y = 5$ when $x = 3$. $y = \frac{45}{x^2}$
13. z varies jointly as x and y , and $z = 42$ when $x = 2$ and $y = 7$. $z = 3xy$
14. z varies directly as x and inversely as y , and $z = 1$ when $x = 4$ and $y = 4$. $z = \frac{x}{y}$
15. w varies jointly as x and y and inversely as the square of z , and $w = 9$ when $x = 3$, $y = 6$, and $z = 2$.
 $w = \frac{2xy}{z^2}$

8-7 Solve.

16. The force (F) due to gravity varies inversely as the square of the distance (r) between two objects. If the gravitational force between Peter and Rocío is 50 dynes when they are 2 cm apart, find the force of attraction when they are 10 cm apart. 2 dynes

SKILLS PRACTICE 26

For use with Lessons 9-6 through 9-8

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9-6 For each function find standard form, the vertex, the line of symmetry, and the maximum or minimum value.

1. $f(x) = x^2 - 6x + 13$ $f(x) = (x-3)^2 + 4$ $v(3, 4)$ min: 4 line of sym $x=3$
2. $f(x) = -x^2 - 4x - 6$ $f(x) = -(x+2)^2 - 2$ $v(-2, -2)$ max: -2 line of sym $x=-2$
3. $f(x) = -3x^2 + 6x - 1$ $f(x) = -3(x-1)^2 + 2$ $v(1, 2)$ max: 2 line of sym $x=1$
4. $f(x) = 2x^2 + 16x + 29$ $f(x) = 2(x+4)^2 - 3$ $v(-4, -3)$ min: -3 line of sym $x=-4$

9-6 Solve.

5. A farmer is subdividing a portion of his farm for his livestock. He will make the area rectangular and will fix the perimeter at 100 m with fencing he already owns. What dimensions would yield the maximum area? What is the maximum area?

$625m^2$
 $25m \times 25m$

9-7 Find the x-intercepts.

6. $f(x) = x^2 + 2x - 15$ $3, -5$
7. $f(x) = 9x^2 + 12x + 4$ $-2/3$
8. $f(x) = x^2 - 4x + 2$ $2 \pm \sqrt{2}$
9. $f(x) = x^2 + 6x + 10$ None
10. $f(x) = x^2 + 4x + 13$ None
11. $f(x) = 4x^2 + 20x + 25$ $-5/2$

9-8 Find the quadratic function that fits each set of data points.

12. (1, 2), (3, 14), (-1, 14) $3x^2 - 6x + 5$
13. (0, 5), (2, 15), (-2, 3) $x^2 + 3x + 5$
14. (1, 7), (-1, -7), (-2, -8) $2x^2 + 7x - 2$
15. (1, 3), (2, 12), (-1, 9) $4x^2 - 3x + 2$

9-8 Solve.

16. A new floral shop makes a gross profit of \$600 in its first month, \$400 in its third month, and \$1000 in its fifth month. The owner plots the points (1, 600), (3, 400), and (5, 1000).
- a. Find a quadratic function that fits the data.
- b. Predict how much gross profit the shop will make in its seventh month.

$100x^2 - 500x + 1000$
 $\$2400$

SKILLS PRACTICE 35

For use with Lessons 12-7 through 12-8

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12-7 Solve.

1. $2^x = 64$ 6 2. $3^x = 243$ 5 3. $3^{2x+3} = 81$ $\frac{1}{2}$
 4. $5^{3x} = 125$ 1 5. $8^x = 4$ $\frac{2}{3}$ 6. $2^x = \frac{1}{8}$ -3
 7. $3^x = 5^{x-1}$ 3.15 8. $(54)^{3x} = 19$ 1.246 9. $(7.4)^x = 18.6$ 1.46

12-7 Solve.

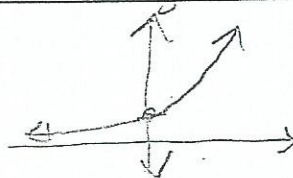
10. $\log_3(2x + 5) = 2$ 2 11. $\log_5(4x - 1) = 3$ 31.5
 12. $\log \sqrt{x^2 - 1} = 2$ $\sqrt{10001}$ 13. $\log(x + 9) - \log x = 1$ 1
 14. $\log_2 x + \log_2(x + 3) = 2$ 1 15. $\log_6 x + \log_6(x + 5) = 2$ 4

12-7 Solve.

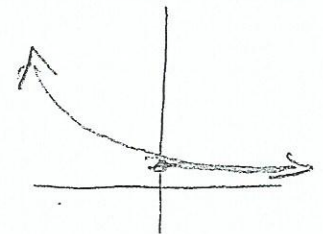
16. How many years will it take an investment of \$1000 to double itself when interest is compounded annually at 4%?
17.7 yrs
17. Find the loudness in decibels of the sound of a tractor having an intensity of 7,400,000 times I_0 .
69 decibels

12-8 Graph.

18. $y = e^{x\sqrt{3}}$



19. $y = e^{-x\sqrt{3}}$



12-8 Find each natural logarithm: Use a calculator or Table 3.

20. $\ln 4.32$ 1.4633 21. $\ln 43.2$ 3.7658 22. $\ln 432$ 6.0684
 23. $\ln 0.432$ -1.8393 24. $\ln 8700$ 9.0711 25. $\ln 93,000$ 11.4404

12-8 Solve.

26. The approximate population of Albuquerque was 330,000 in 1980. In 1985 it was 370,000. Estimate the population in the year 2000.
522,000
27. The half-life of a lead isotope is 22 years. After 88 years, how much of a 2000-gram sample will remain as the original isotope?
125 g

12-8 Use common (base 10) logarithms to find the following.

28. $\log_6 25$ 1.7965 29. $\log_5 0.27$ -1.8135 30. $\log_8 39$ 1.7618
 31. $\log_{11} 14,000$ 3.9913 32. $\ln 14$ 2.6391 33. $\ln 0.52$ -0.6539

SKILLS PRACTICE 39

For use with Lessons 14-1 through 14-2

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14-1 The general term of a sequence is given. Find the 12th term.

1. $a_n = 4n + 3$ 51 2. $a_n = n - \frac{1}{n}$ 11 $\frac{11}{12}$ 3. $a_n = (-1)^n 2^{n-7}$ 32

14-1 For each sequence find a general term.

4. $\sqrt{3}, \sqrt{6}, \sqrt{9}, \sqrt{12}, \sqrt{15}, \dots$ $\sqrt{3n}$ 5. $\frac{2}{1}, \frac{3}{2}, \frac{4}{3}, \frac{5}{4}, \frac{6}{5}, \dots$ $\frac{n+1}{n}$
 6. $-2, 5, -8, 11, -14, \dots$ $(-1)^n (3n-1)$ 7. $\log 1, \log 2, \log 4, \log 8, \log 16, \dots$ $\log 2^{n-1}$

14-1 Find S_2 and S_4 for each sequence.

8. $1, 10, 100, 1000, 10,000, \dots$ 11, 1111 9. $3, 6, 9, 12, 15, \dots$ 9, 30

14-1 Rename and evaluate each sum.

10. $\sum_{n=1}^5 \frac{1}{3}n$ 5 11. $\sum_{n=3}^6 \sqrt{2n+3}$ $3 + \sqrt{11} + \sqrt{13} + \sqrt{15}$

14-1 Write sigma notation for each sum.

12. $1 + 4 + 7 + 10 + 13$ $\sum_{n=1}^5 (3n-2)$ 13. $\frac{1}{4} - \frac{1}{9} + \frac{1}{16} - \frac{1}{25} + \frac{1}{36} - \frac{1}{49}$ $\sum_{n=2}^7 (-1)^n \frac{1}{n^2}$

14-2 Find the specified term of the given arithmetic sequences.

14. 10th term of $3, 5, 7, \dots$ 21 15. 12th term of $0.16, 0.11, 0.06, \dots$ -0.39

14-2 In the given sequences, what term has the specified value?

16. $1, 4, 7, \dots; 34$ 12th 17. $0.03, 0.07, 0.11, \dots; 0.51$ 13th

14-2 ~~14-2~~ Insert three arithmetic means between each pair of numbers.

18. 8 and 28 13, 19, 23 19. 2 and 14 5, 8, 11 20. 10 and 34 16, 22, 28

14-2 Find the sum of the numbers described.

21. The even numbers from 4 to 40, inclusive 418 22. The odd numbers from 1 to 111, inclusive 3136

14-2 Find the sum of each series.

23. $\sum_{n=1}^{12} (2n-5)$ 96 24. $\sum_{n=1}^{20} 4n$ 840 25. $\sum_{n=1}^{18} n$ 171