Algebra 1 Name_____

3rd 9 Weeks Benchmark Study Guide

Date_____ Period____

Factor each completely.

1) $7a^3 + 54a^2 - 16a$

2) $15x^4 + 81x^3 + 30x^2$

3) $3x^2 - 8x - 60$

4) $5n^2 + 21n + 18$

5) $54x^2 + 564x + 240$

6) $8n^3 - 71n^2 + 56n$

7) $9k^3 - 24k^2 + 16k$

8) $30x^3 + 180x^2$

9) $x^2 - 7x - 30$

10) $b^2 + 2b$

11) $n^2 - n - 20$

12) $x^2 + 2x - 8$

13) $x^2 - 16$

14) $25x^2 - 49$

15) $8x^3 - 50x$

16) $169x^2 - 1$

Solve each equation by factoring.

17) $p^2 - 2p - 40 = 8$

18) $8x^2 - 16x - 24 = 0$

19) $k^2 - 4k - 12 = 0$

20) $p^2 - p - 56 = 0$

Solve each equation by taking square roots.

21) $5v^2 + 3 = 478$

22) $25n^2 - 9 = 0$

23) $6x^2 + 1 = 55$

24) $n^2 - 9 = 40$

Solve each equation by completing the square.

25) $k^2 + 10k + 16 = 0$

26) $n^2 + 16n - 36 = 0$

27) $k^2 - 18k + 72 = 0$

28) $x^2 + 4x - 72 = 5$

Solve each equation with the quadratic formula.

29) $2p^2 - p - 14 = 0$

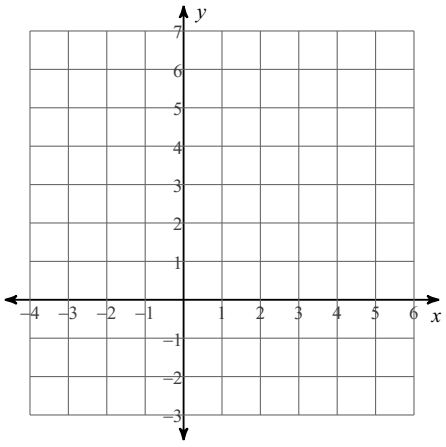
30) $3x^2 + 5x - 50 = 0$

31) $6n^2 - 8n + 2 = 0$

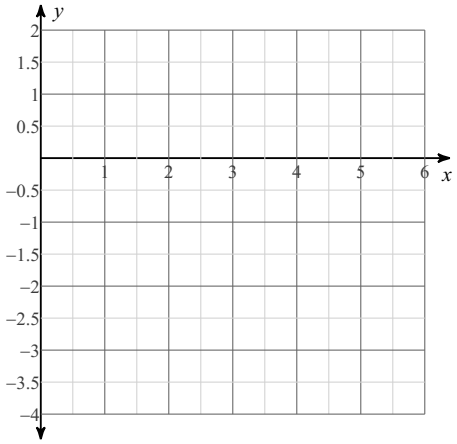
32) $9b^2 + 2b - 9 = 3$

Sketch the graph of each function.

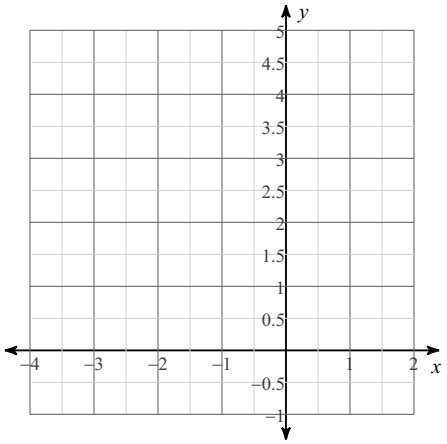
33) $y = 2x^2 + 4x$



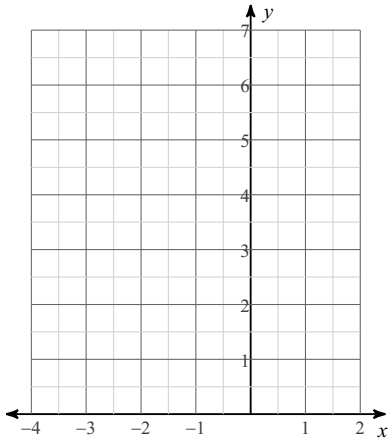
34) $y = -(x - 3)^2 + 1$



35) $f(x) = -x^2 - 2x + 3$



36) $f(x) = (x + 1)^2 + 2$



Simplify each expression.

37) $(2r + 6r^4) - (4r + 4r^2 + 2r^4)$

38) $(a^4 + a^2) - (a^3 + a^2 - 6a^4)$

39) $(5x - 4 + 5x^3) + (6x^4 + 2x^3 + 1)$

40) $(4n^4 - 3n^3 + 3) - (6n^2 + 6n^3 + 5n^4)$

Find each product.

41) $(8k + 7)(4k + 5)$

42) $(n - 1)(7n + 4)$

43) $(p - 7)(4p + 1)$

44) $(n - 3)(6n - 1)$

Simplify.

45) $2xy^3 \cdot 3x^5y^3$

46) $3y^3 \cdot x^5y^4$

47) $2a^3 \cdot 5a^6b^5$

48) $6y^5 \cdot yx^2$

49) $\sqrt{64 + 36}$

50) $\sqrt{48}$

51) $\dfrac{\sqrt{9 + 9}}{6}$

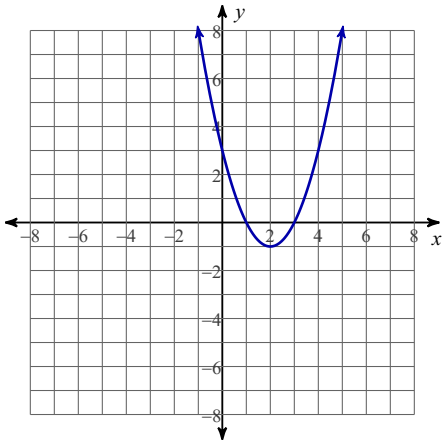
52) $-4\sqrt{50}$

53) $3\sqrt{25 - 1}$

54) $\dfrac{3\sqrt{75}}{25}$

Use the graphs to find each of the characteristics.

55) Vertex:
Domain:
Range:
Increasing:
Decreasing:
Axis of Symmetry:
x-intercept(s):
y-intercept:
Maximum:
Minimum:



56) Vertex:
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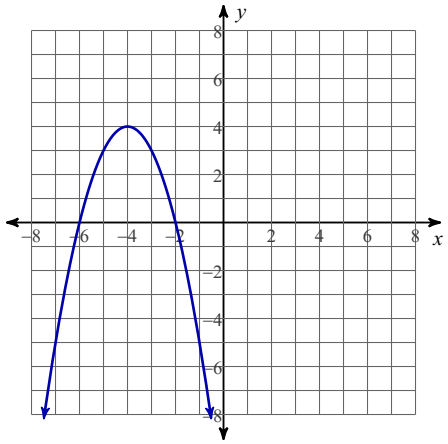

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Factor each completely.

1) $7a^3 + 54a^2 - 16a$

$a(7a - 2)(a + 8)$

2) $15x^4 + 81x^3 + 30x^2$

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

3) $3x^2 - 8x - 60$

$(3x + 10)(x - 6)$

4) $5n^2 + 21n + 18$

$(5n + 6)(n + 3)$

5) $54x^2 + 564x + 240$

$6(x + 10)(9x + 4)$

6) $8n^3 - 71n^2 + 56n$

$n(n - 8)(8n - 7)$

7) $9k^3 - 24k^2 + 16k$

$k(3k - 4)^2$

8) $30x^3 + 180x^2$

$30x^2(x + 6)$

9) $x^2 - 7x - 30$

$(x + 3)(x - 10)$

10) $b^2 + 2b$

$b(b + 2)$

11) $n^2 - n - 20$

$(n + 4)(n - 5)$

12) $x^2 + 2x - 8$

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

13) $x^2 - 16$

$(x + 4)(x - 4)$

14) $25x^2 - 49$

$(5x + 7)(5x - 7)$

15) $8x^3 - 50x$

$2x(2x + 5)(2x - 5)$

16) $169x^2 - 1$

$(13x + 1)(13x - 1)$

Solve each equation by factoring.

17) $p^2 - 2p - 40 = 8$

$\{8, -6\}$

18) $8x^2 - 16x - 24 = 0$

$\{3, -1\}$

19) $k^2 - 4k - 12 = 0$

$\{6, -2\}$

20) $p^2 - p - 56 = 0$

$\{8, -7\}$

Solve each equation by taking square roots.

21) $5v^2 + 3 = 478$

$\{\sqrt{95}, -\sqrt{95}\}$

22) $25n^2 - 9 = 0$

$\left\{\frac{3}{5}, -\frac{3}{5}\right\}$

23) $6x^2 + 1 = 55$

$\{3, -3\}$

24) $n^2 - 9 = 40$

$\{7, -7\}$

Solve each equation by completing the square.

25) $k^2 + 10k + 16 = 0$

$\{-2, -8\}$

26) $n^2 + 16n - 36 = 0$

$\{2, -18\}$

27) $k^2 - 18k + 72 = 0$

$\{12, 6\}$

28) $x^2 + 4x - 72 = 5$

$\{7, -11\}$

Solve each equation with the quadratic formula.

29) $2p^2 - p - 14 = 0$

$\left\{\frac{1 + \sqrt{113}}{4}, \frac{1 - \sqrt{113}}{4}\right\}$

30) $3x^2 + 5x - 50 = 0$

$\left\{\frac{10}{3}, -5\right\}$

31) $6n^2 - 8n + 2 = 0$

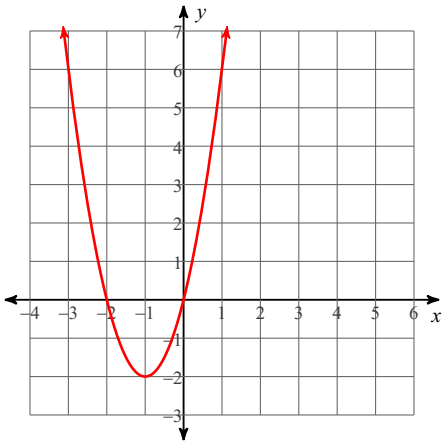
$\left\{1, \frac{1}{3}\right\}$

32) $9b^2 + 2b - 9 = 3$

$\left\{\frac{-1 + \sqrt{109}}{9}, \frac{-1 - \sqrt{109}}{9}\right\}$

Sketch the graph of each function.

33) $y = 2x^2 + 4x$



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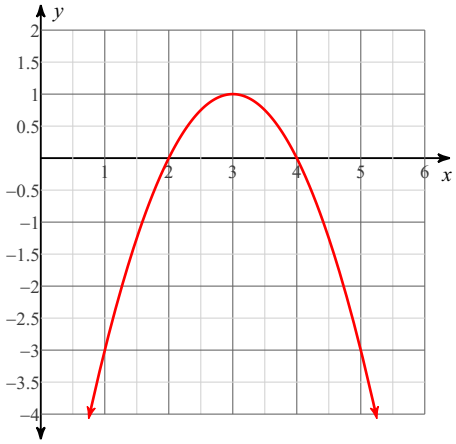
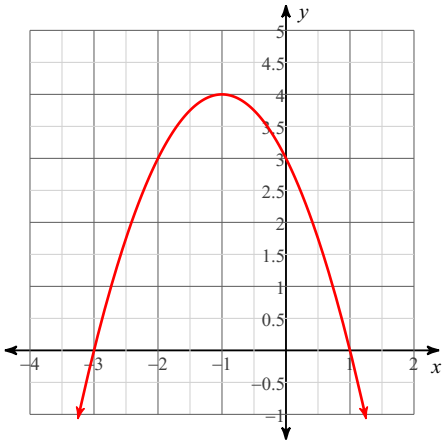
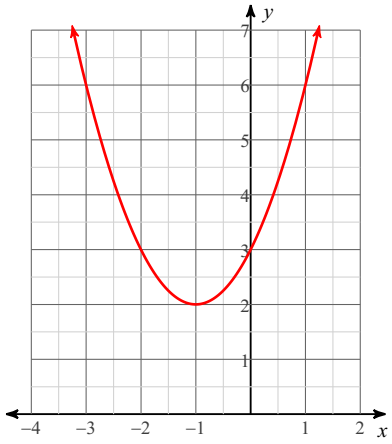


35) $f(x) = -x^2 - 2x + 3$



36) $f(x) = (x + 1)^2 + 2$



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$4r^4 - 4r^2 - 2r$

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$7a^4 - a^3$

39) $(5x - 4 + 5x^3) + (6x^4 + 2x^3 + 1)$

$6x^4 + 7x^3 + 5x - 3$

40) $(4n^4 - 3n^3 + 3) - (6n^2 + 6n^3 + 5n^4)$

$-n^4 - 9n^3 - 6n^2 + 3$

Find each product.

41) $(8k + 7)(4k + 5)$

$32k^2 + 68k + 35$

42) $(n - 1)(7n + 4)$

$7n^2 - 3n - 4$

43) $(p - 7)(4p + 1)$

$4p^2 - 27p - 7$

44) $(n - 3)(6n - 1)$

$6n^2 - 19n + 3$

Simplify.

45) $2xy^3 \cdot 3x^5y^3$

$6x^6y^6$

46) $3y^3 \cdot x^5y^4$

$3y^7x^5$

47) $2a^3 \cdot 5a^6b^5$

$10a^9b^5$

48) $6y^5 \cdot yx^2$

$6y^6x^2$

49) $\sqrt{64+36}$

10

50) $\sqrt{48}$

$4\sqrt{3}$

51) $\dfrac{\sqrt{9+9}}{6}$

$\dfrac{\sqrt{2}}{2}$

52) $-4\sqrt{50}$

$-20\sqrt{2}$

53) $3\sqrt{25-1}$

$6\sqrt{6}$

54) $\dfrac{3\sqrt{75}}{25}$

$\dfrac{3\sqrt{3}}{5}$

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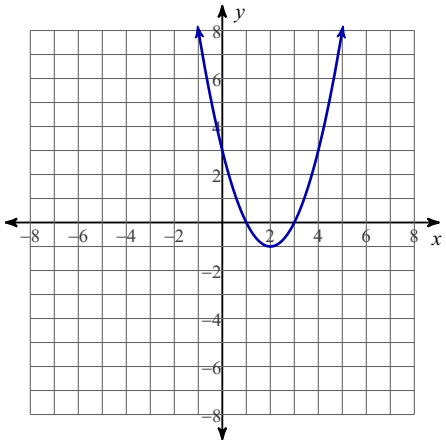

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