# Summer Math Packet 3

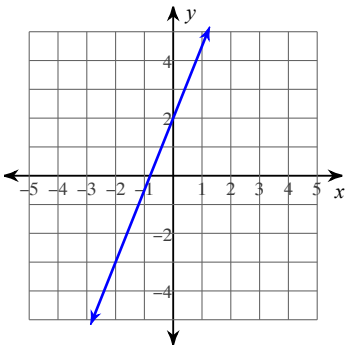
For students taking Honors Precalculus, Precalculus, Honors Calculus, Calculus, or Calculus 2 during the 2023-2024 school year.

# Math Packet #3

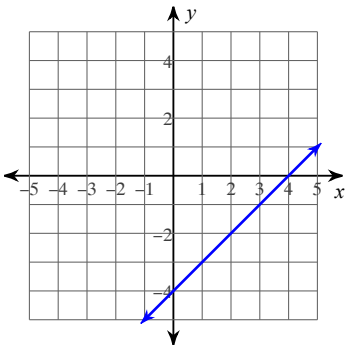
Name_____

**Write the slope-intercept form of the equation of each line.**

1)




2)




**Write the slope-intercept form of the equation of each line given the slope and y-intercept.**

3) Slope = 6, y-intercept = 3

4) Slope = $-\frac{1}{4}$, y-intercept = 2

**Write the slope-intercept form of the equation of the line through the given point with the given slope.**

5) through: $(3, 0)$, slope = undefined

6) through: $(-3, 0)$, slope $= \frac{1}{3}$

**Write the slope-intercept form of the equation of each line.**

7) $0 = 3y - 3x + 15$

8) $-2 + x = -y$

**Write the slope-intercept form of the equation of the line through the given points.**

9) through: $(0, -1)$ and $(-2, 3)$

10) through: $(-3, 1)$ and $(4, 4)$

**Solve each system by substitution.**

11) $3x + 2y = 13$
$y = 4x + 12$

12) $x - 2y = 4$
$3x - 6y = -3$

13) $-2x + 3y = -6$
$x - 2y = 5$

14) $-4x + 5y = -11$
$5x - 4y = -2$

**Solve each system by elimination.**

15) $7x - y = -20$
$7x - 3y = -18$

16) $5x - 10y = -25$
$-4x + y = -15$

17) $3x + 10y = -27$
$5x - 3y = 14$

18) $\frac{6}{7}y = -3x + \frac{33}{7}$
$5x + 3y = 22$

**Evaluate each function. Write in expanded form. (Function notation)**

19) $p(x) = x^2 - x$; Find $p(2x)$

20) $h(t) = t^2 + 4$; Find $h(t + 2)$

21) $h(x) = x^3 - 2x$; Find $h(-4a)$

22) $h(x) = 4x - 2$; Find $h(x - 2)$

23) $k(n) = n^2 + 3$; Find $k(-2)$

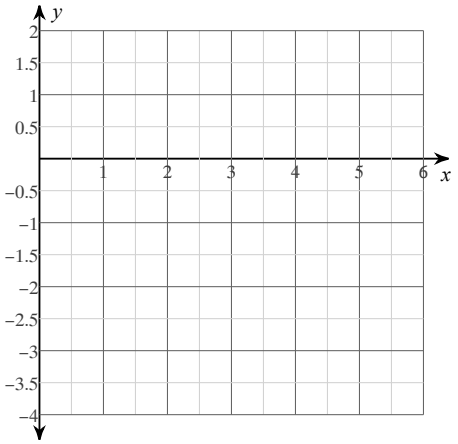
24) $g(n) = n^2 + 5n$; Find $g(-6)$

25) $g(n) = 3n^2 - 3n$; Find $g(7)$

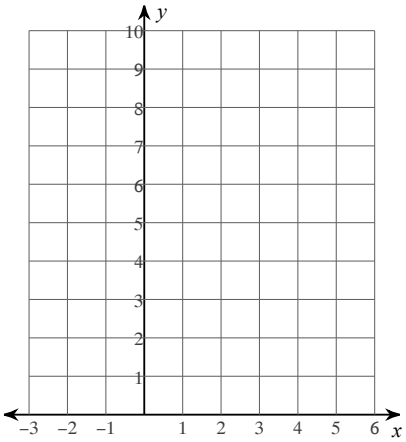
26) $g(n) = n^3 + 3n$; Find $g(1)$

**Sketch the graph of each function.**

27) $y = x^2 - 6x + 6$




28) $y = 2(x - 4)^2 + 1$




**Factor each completely.**

29) $2x^3 - 14x^2 + 24x$

30) $4x^3 - 24x^2 - 108x$

31) $7x^3 - 64x^2 - 60x$

32) $7n^3 + 4n^2$

33) $16m^2 - 128m$

34) $45b^3 - 30b^2 - 40b$

**Simplify.**

35) $\sqrt{72x^4y^4}$

36) $\sqrt[4]{80x^2y^3}$

37) $\sqrt{96mn^3p^2}$

38) $\sqrt[3]{216m^7pq^6}$

**Simplify. Your answer should contain only positive exponents.**

39) $\left(\dfrac{2b^4}{b^{-4}b^{-3}}\right)^0$

40) $\dfrac{2v^4}{\left(2v^3 \cdot 2v^2\right)^{-1}}$

41) $\dfrac{\left(2xy^3 \cdot xy^{-3}\right)^0}{2yx^4}$

42) $\left(\dfrac{2ba^{-2}}{2a^4b^4}\right)^{-4}$

43) $x^3y^3z^0 \cdot 3yx^2z^3$

44) $2p^3q^3r^0 \cdot p^0q^2r^{-3}$

**Solve each equation.**

45) $81^{2b-2} = 3^5$

46) $64^{-n-1} = 16^{n+3}$

**Simplify each difference (Write in expanded form).**

47) $(6n^4 + 3n^3 - 3n) - (3n - 2n^3 + 4n^4)$

**Find each product.**

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

**Solve each equation by factoring.**

49) $k^2 + k - 2 = 0$

50) $b^2 - 7b + 12 = 0$

51) $4r^2 - 16r - 48 = 0$

52) $5n^2 - 20n + 20 = 0$

**Solve each equation by taking square roots.**

53) $a^2 = 16$

54) $-10n^2 = -640$

55) $2x^2 + 7 = 105$

**Simplify.**

56) $\sqrt[3]{18x^3} \cdot \sqrt[3]{20x^3}$

57) $\sqrt{20x^3} \cdot -3\sqrt{5x^3}$

**Solve each equation with the quadratic formula. You may get irrational or complex numbers as answers.**

58) $x^2 - 5x + 3 = 0$

59) $11m^2 + 6m - 1 = 0$

**Write each expression in radical form.**

60) $n^{\frac{3}{4}}$

61) $(10n)^{\frac{7}{6}}$

62) Find the LCM (Least Common Multiple) of 24 and 36.

63) Find the GCF (Greatest Common Factor) of $7x^2y^4$ and $8xy^3$.

**Solve each equation. Remember to check for extraneous solutions.**

64) $\sqrt{8 - x} = \sqrt{11 - 2x}$

65) $\sqrt{8 - x} = \sqrt{2x + 2}$

66) $7\sqrt{a} = 7$

67) $x - 1 = \sqrt{7x - 7}$

68) Are you planning on taking Honors Precalculus? If "YES," you must complete the following extra problems after this question. If "NO," then you are not required to complete the questions after this point.

**Perform the indicated operation.**

69) $g(t) = 4t$
$h(t) = t + 4$
Find $g(h(-10))$

70) $g(n) = n + 5$
$f(n) = n^2 + 3$
Find $g(-5) \cdot f(-5)$

71) $g(x) = 2x^2 - 5$
$h(x) = 4x - 4$
Find $g(3 + x) \cdot h(3 + x)$

72) $g(x) = 4x - 3$
$h(x) = -3x^2 + 3$
Find $g(a^2) \div h(a^2)$

**Factor by grouping.**

73) $f(x) = x^3 - 2x^2 - 2x + 4$

74) $f(x) = x^3 + 2x^2 + 4x + 8$

**Factor each completely.**

75) $1 + 27u^3$

76) $8x^3 + y^3$

**Divide using synthetic division.**

77) $(8v^3 + 26v^2 - 17v + 18) \div (v + 4)$

78) $(8n^3 + 66n^2 + 77n + 52) \div (n + 7)$

**Condense each expression to a single logarithm.**

79) $3\ln 2 + 4\ln 7$

80) $\log_2 x + \log_2 y + 6\log_2 z$

**Expand each logarithm.**

81) $\log_9 \dfrac{x^2}{y^6}$

82) $\log_7 \left(11^5 \cdot 3\right)^2$

**Simplify. Keep your answer in radical form.**

83) $-3\sqrt{8} - 3\sqrt{18}$

84) $3\sqrt{54} - \sqrt{24}$

85) $\sqrt{5}\left(3\sqrt{3} + 4\right)$

86) $\left(4 + 2\sqrt{2}\right)\left(1 + \sqrt{2}\right)$

# Answers to Math Packet #3

1) $y = \frac{5}{2}x + 2$

2) $y = x - 4$

3) $y = 6x + 3$

4) $y = -\frac{1}{4}x + 2$

5) $x = 3$

6) $y = \frac{1}{3}x + 1$

7) $y = x - 5$

8) $y = -x + 2$

9) $y = -2x - 1$

10) $y = \frac{3}{7}x + \frac{16}{7}$

11) $(-1, 8)$

12) No solution

13) $(-3, -4)$

14) $(-6, -7)$

15) $(-3, -1)$

16) $(5, 5)$

17) $(1, -3)$

18) $(-1, 9)$

19) $4x^2 - 2x$

20) $t^2 + 4t + 8$

21) $-64a^3 + 8a$

22) $4x - 10$

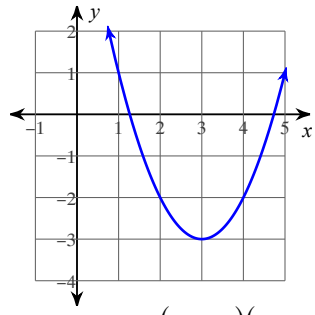
23) 7

24) 6

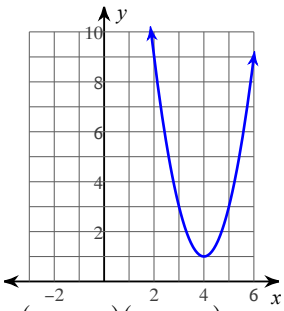
25) 126

26) 4

27)




28)




29) $2x(x - 4)(x - 3)$

30) $4x(x + 3)(x - 9)$

31) $x(7x + 6)(x - 10)$

32) $n^2(7n + 4)$

33) $16m(m - 8)$

34) $5b(3b + 2)(3b - 4)$

35) $6x^2y^2\sqrt{2}$

36) $2\sqrt[4]{5x^2y^3}$

37) $4np\sqrt{6mn}$

38) $6m^2q^2\sqrt[3]{mp}$

39) 1

40) $8v^9$

41) $\frac{1}{2yx^4}$

42) $a^{24}b^{12}$

43) $3x^5y^4z^3$

44) $\frac{2q^5p^3}{r^3}$

45) $\left\{\frac{13}{8}\right\}$

46) $\left\{-\frac{9}{5}\right\}$

47) $2n^4 + 5n^3 - 6n$

48) $3x^3 - 6x^2 - 7x - 6$

49) $\{1, -2\}$

50) $\{3, 4\}$

51) $\{6, -2\}$

52) $\{2\}$

53) $\{4, -4\}$

54) $\{8, -8\}$

55) $\{7, -7\}$

56) $2x^2\sqrt[3]{45}$

57) $-30x^3$

58) $\left\{\frac{5 + \sqrt{13}}{2}, \frac{5 - \sqrt{13}}{2}\right\}$

59) $\left\{\frac{-3 + 2\sqrt{5}}{11}, \frac{-3 - 2\sqrt{5}}{11}\right\}$

60) $\left(\sqrt[4]{n}\right)^3$

61) $\left(\sqrt[6]{10n}\right)^7$

62) 72

63) $xy^3$

64) $\{3\}$

65) $\{2\}$

66) $\{1\}$

67) $\{1, 8\}$

68)

69) $-24$

70) 0

71) $8x^3 + 64x^2 + 148x + 104$

72) $\frac{4a^2 - 3}{-3a^4 + 3}$

73) $f(x) = (x - 2)(x^2 - 2)$

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

75) $(1 + 3u)(1 - 3u + 9u^2)$

76) $(2x + y)(4x^2 - 2xy + y^2)$

77) $8v^2 - 6v + 7 - \frac{10}{v + 4}$

78) $8n^2 + 10n + 7 + \frac{3}{n + 7}$

79) $\ln\left(7^4 \cdot 2^3\right)$

80) $\log_2\left(yxz^6\right)$

81) $2\log_9 x - 6\log_9 y$

82) $10\log_7 11 + 2\log_7 3$

83) $-15\sqrt{2}$

84) $7\sqrt{6}$

85) $3\sqrt{15} + 4\sqrt{5}$

86) $8 + 6\sqrt{2}$