

For incoming Honors Calculus students

Block _____

Work all problems on loose-leaf paper. Number accordingly, write each problem and box final answers. All work should be done in PENCIL ONLY! No Calculator! Show all steps.

Perform the indicated operation.

1) $g(n) = 4n + 5$
 $f(n) = -3n^2 + 2n$
Find $g(f(-3))$

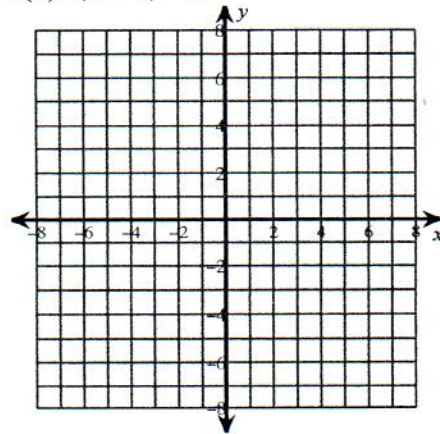
2) $h(x) = 4x + 5$
 $g(x) = -3x + 4$
Find $h(g(-9))$

Write the equation of the line.

3) Passes through $(-3, 2)$ and is parallel to $-(1/2)y = 3x + 6$

State the shifts and graph.

4) $f(x) = (x - 1)^2 + 3$



Factor each completely and solve.

5) $x^2 - 15x + 44$

6) $x^2 - 1$

7) $x^2 - 2x - 15$

8) $x^2 - 7x + 12$

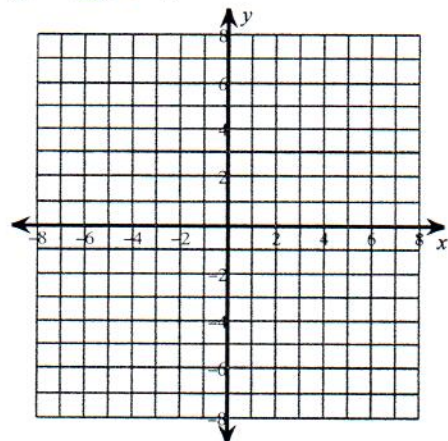
9) $n^2 - 26n + 169$

Solve each equation by completing the square.

10) $n^2 + 16n = -48$

Use completing the square to write the equation in vertex form, state the shifts, and graph.

11) $x^2 - 2x = -4$



Solve each equation using the square root property.

12) $3x^2 + 108 = 0$

Find the zeros of each function by using the quadratic formula.

13) $-3x^2 - 4x + 2 = 0$

Find the type and number of solutions by using the discriminant.

14) $4x^2 - 5x + 6 = 0$

15) $2x^2 - 4x = -9$

Simplify.

16) $-4 - 5 - (1 - 2i)$

17) $(-5 + 5i)(-4 + 8i)$

Add or subtract.

18) $(5 + 7x^2 - 2x) - (5x^2 - 8x - 6)$

Multiply

19) $(6x - 2)(-4 - 5x + 3x^2)$

Divide using synthetic division.

20)
$$\frac{6x^3 - 4x^2 + 15}{x + \frac{1}{4}}$$

Determine if the following binomial is a factor.

21) $(x - 6)$; $P(x) = -2x^3 + 2x - 5$

Rewrite each equation in exponential form.

22) $\log_{289} 17 = \frac{1}{2}$

23) $\log_2 y = x$

Rewrite each equation in logarithmic form.

24) $y^7 = x$

25) $8^2 = 64$

Express as a single logarithm. Simplify, if possible.

26) $\log_2 16 - \log_2 4$

Solve each equation.

27) $16^{-n} = 64$

Solve each equation. Round your answers to the nearest ten-thousandth. Use Calculator for this problem.

28) $-6 \cdot 13^{-1.4n} = -16$

Solve each equation.

29) $\log_6 2x - \log_6 2 = 1$

30) $\ln(x + 7) + \ln 5 = 3$

State when the variable is undefined.

31) $\frac{10}{3x - 21}$

32) $\frac{m + 7}{m^2 - 3m - 70}$

Simplify each expression.

33) $\frac{n^2 - 2n - 3}{n + 1} \cdot \frac{9}{n^2 - 5n + 6}$

34) $\frac{\frac{10x}{x^2 - 3x + 2}}{\frac{40}{x^2 - 4}}$

Identify the holes, vertical asymptotes, x-intercepts, horizontal asymptote, and domain of each.

35) $f(x) = \frac{x^2 + 4x + 3}{-3x^2 + 12}$

Solve each equation.

36) $\frac{1}{2} - \frac{p + 4}{2p^2} = \frac{p + 2}{2p}$

Identify the x and y intercepts of f(x). Without graphing g(x), identify its x and y intercepts.

37) $f(x) = x^2 + 5x - 6$ and $g(x) = -2f(3x)$

Perform the indicated operation.

38) $f(x) = 5x + 5$
 $g(x) = x^2 - 1$
Find $\left(\frac{f}{g}\right)(x)$

39) $h(t) = -2t + 5$
 $g(t) = t^3 + t^2$
Find $(h - g)(t)$

40) $g(x) = -x^3 - 4$
 $f(x) = 3x + 1$
Find $(g \cdot f)(x)$

41) $f(a) = 2a - 4$
 $g(a) = 3a + 2$
Find $f(g(a))$

Find the inverse of each function.

42) $g(x) = 2x - 4$

43) $f(n) = 2n + 1$

$$44) f(x) = \frac{3}{x}$$

Solve each equation for the given variable.

$$45) x - \frac{7}{8} = -\frac{3}{2}\left(-\frac{3}{2}x + \frac{2}{3}\right) - \frac{4}{3}x$$

$$46) \frac{2}{3}r - \frac{16}{3} = \frac{1}{2}\left(\frac{2}{3}r + 1\right) + \frac{8}{3}r$$

$$47) \frac{3}{2} - x = -2\left(\frac{2}{3}x - 2\right) - \frac{11}{3}$$

Simplify. Your answer should contain only positive exponents.

$$48) \frac{(-2m^3)^{-1}}{-pm^2q^{-2} \cdot -m^{-2}p^{-3}}$$

$$49) \left(\frac{-x^3y^0 \cdot 2x^{-4}y^4z^2 \cdot (-x^0y^3z^4)^{-4}}{-x^4y^4z^{-2}} \right)^2$$

$$50) \frac{h^3j^2k^2 \cdot 2h^0j^4k^2}{(jh^4k^3)^0}$$

$$51) \frac{(-m^3n^{-4}p^2)^{-1} \cdot -m^3n^2p^4}{mn^{-4}p^{-1}}$$

Factor each completely.

$$52) 5n^3 + 20n^2 - 7n - 28$$

$$53) 24n^3 - 15n^2 - 8n + 5$$

54) $4x^2 - 36xy + 56y^2$

55) $2u^2 - 20uv + 42v^2$

56) $x^3 - 81y^2x$

57) $3x^2 - 6xy - 144y^2$

58) $9n^2 - 16$

59) $16v^2 - 9$

60) $4r^2 + 20r + 25$

61) $n^2 + 2n + 1$

62) $2 + 250x^3$

63) $4m^3 - 256$

64) $-a^3 + 216$

65) $64x^3 + 125$

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

66) Slope = $-\frac{6}{5}$, y-intercept = 3

Write the slope-intercept form of the equation of the line described.

67) through: (4, 2), parallel to $y = \frac{1}{4}x - 4$

68) through: (-2, 0), perp. to $y = -\frac{1}{2}x - 2$

Find each product. Simplify like terms but leave fractions as improper fractions.

69) $\left(\frac{8}{3}x^2 - \frac{1}{2}x - \frac{3}{2}\right)\left(\frac{1}{2}x + \frac{4}{3}\right)$

70) $\left(\frac{1}{2}p^2 - \frac{8}{3}p + \frac{7}{3}\right)\left(\frac{8}{3}p - \frac{7}{2}\right)$

Simplify.

71) $3\sqrt{27} + 2\sqrt{3} + 3\sqrt{3} + 3\sqrt[4]{48}$

72) $-2\sqrt{8} - \sqrt{3} - 3\sqrt[7]{3} - 2\sqrt{18}$

73) $2\sqrt{45} + 3\sqrt[3]{54} + 3\sqrt{6} + 2\sqrt{20}$

74) $-\sqrt[5]{64} - 3\sqrt[5]{128} + 3\sqrt[5]{2} + 3\sqrt[5]{-2}$

Simplify and leave as exact solutions. No Calculator!

75) $\frac{\sqrt{8}}{3\sqrt{50}}$

76) $\frac{\sqrt{3}}{5\sqrt{12}}$

77) $\frac{\sqrt{15}}{\sqrt{5}}$

78) $\frac{4\sqrt{3}}{\sqrt{16}}$

Write each expression in radical form.

79) $(6x)^{\frac{5}{3}}$

80) $(10n)^{\frac{1}{3}}$

81) $(2x)^{\frac{7}{6}}$

82) $(7v)^{\frac{1}{2}}$

Simplify.

83) $\frac{5 + 4\sqrt{5}}{-5 + 2\sqrt{2}}$

84) $\frac{4 + 3\sqrt{3}}{-3 + \sqrt{2}}$

Identify the domain and range of each.

85) $y = 3\sqrt[3]{x} + 1$

86) $y = \sqrt{x}$

87) $y = \sqrt{x} - 4$

88) $y = \frac{1}{2}\sqrt[3]{x}$

Solve each equation.

89) $-27 = -k^{\frac{3}{2}}$

90) $\frac{1}{2} = (-4 - 2b)^{-\frac{1}{5}}$

Solve each equation for $0 \leq \theta < 2\pi$.

$$91) \frac{9 - 2\sqrt{3}}{3} = 3 + \cos \theta$$

$$92) -2\sqrt{2} = 4\cos \theta$$

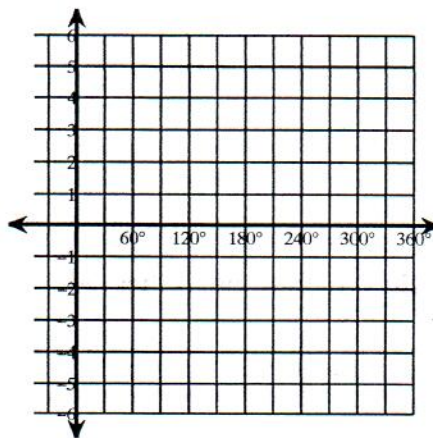
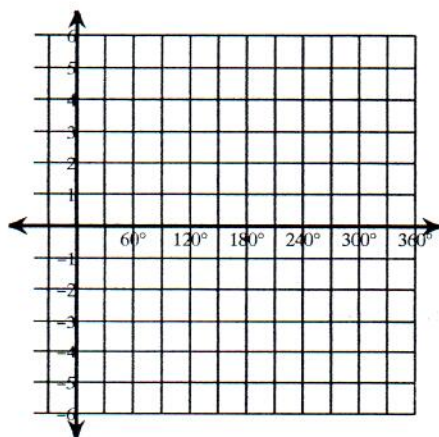
$$93) 4\sqrt{3} = 8\cos \theta$$

$$94) 0 = \frac{1}{3} \cdot \tan \theta$$

Using degrees, find the amplitude and period of each function. Then graph.

$$95) y = \frac{1}{2} \cdot \sin(3\theta - 135)$$

$$96) y = \cos(2\theta - 60)$$



Solve each equation.

$$97) \log_2 7 - \log_2 5x = \log_2 21$$

$$98) \log_7 4x - \log_7 6 = 2$$

$$99) \log_2 10 + \log_2 (x + 9) = 1$$

$$100) \log_7 6 - \log_7 (x - 2) = \log_7 59$$

Convert each degree measure into radians and each radian measure into degrees.

$$101) 1050^\circ$$

$$102) 220^\circ$$

$$103) -315^\circ$$

$$104) -210^\circ$$

Use the angle sum or difference identity to find the exact value of each.

105) $\cos -75^\circ$

106) $\sin -75^\circ$

107) $\sin 15^\circ$

108) $\sin 75^\circ$

Find the exact value of each trigonometric function.

109) $\cot -\frac{5\pi}{3}$

110) $\tan 2\pi$

111) $\sec 30^\circ$

112) $\tan -225^\circ$

113) $\cot -630^\circ$

114) $\cos 810^\circ$

115) $\sin 360^\circ$

116) $\cos \frac{11\pi}{6}$

117) $\sec -\frac{2\pi}{3}$

118) $\csc 300^\circ$

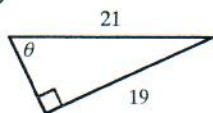
Find the value of the trig function indicated.

119) Find $\sin \theta$ if $\csc \theta = \frac{5}{3}$

120) Find $\tan \theta$ if $\cos \theta = \frac{4}{5}$

Find the value of the trig function indicated exact solutions.

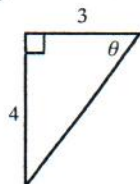
121) $\cos \theta$



122) $\sin \theta$



123) $\sin \theta$



124) $\sec \theta$

