Summer Math Packet to Prepare for Precalculus and Honors Precalculus

(Scroll to the end to check your answers.)

Evaluate each function.

1) $f(n) = 3 \cdot 5^n$; Find $f(0)$

2) $h(n) = 3n^2 + 5$; Find $h(-8)$

3) $g(a) = a^2 + 3a$; Find $g(3 - a)$

4) $g(x) = -4x + 5$; Find $g\left(\frac{x}{4}\right)$

Perform the indicated operation.

5) $h(t) = -3t + 1$
$g(t) = 3t - 4$
Find $h(t) + g(t)$

6) $g(x) = x^2 - 4$
$h(x) = 3x - 3$
Find $(2g - 5h)(x)$

7) $g(a) = 2a + 4$
$h(a) = a^3 + 2a^2$
Find $g(9) \div h(9)$

8) $f(t) = 4t + 2$
$g(t) = 3t$
Find $(f \cdot g)(-4)$

9) $g(a) = -3a^2 - 4$
$h(a) = a + 3$
Find $\left(\frac{g}{h}\right)(-3a)$

10) $f(n) = 2n$
$g(n) = 2n - 5$
Find $(f - g)\left(\frac{n}{3}\right)$

11) $g(t) = t + 3$
$h(t) = 4t - 3$
Find $(g \circ h)(t)$

12) $f(n) = 3n$
$g(n) = n + 1$
Find $(f \circ g)(n)$

Simplify each expression.

13) $(7x + 6x^2 + 1) - (1 + 8x + 8x^2)$

14) $(6x^2 + 6 + 8x^4) + (x^2 - 4 + 2x^4)$

Find each product.

15) $(7r - 1)(r - 6)$

16) $(4n - 8)(5n + 8)$

17) $(2p^2 - 5p - 3)(4p + 7)$

18) $(4a^2 + 6a - 6)(6a - 8)$

19) $(5 - 4x)(5 + 4x)$

20) $(x - 4)^2$

Factor each completely.

21) $a^2 - 12a + 36$

22) $4x^2 + 8x - 320$

23) $30p^2 + 96p + 18$

24) $3a^2 + 7a - 6$

25) $4m^2 - 9$

26) $9n^2 - 4$

27) $9a^2 + 30a + 25$

28) $25n^2 - 10n + 1$

29) $16n^3 + 56n^2 - 14n - 49$

30) $6v^3 - 7v^2 + 12v - 14$

31) $64x^3 - 125$

32) $-x^3 - 125$

Solve each equation by factoring.

33) $r^2 + 4r - 21 = 0$

34) $r^2 - 4 = 0$

35) $5n^2 - 20n + 7 = 7$

36) $4x^2 + 16x = -8x - 36$

37) $15x^2 - 120x + 454 = 7x^2 + 6$

38) $7n^2 - 18n + 48 = -4n + 6n^2$

39) $-48 + 4n = -2n^2$

40) $4x^2 - 16x = 0$

Divide.

41) $(x^3 - 3x^2 - 15x - 28) \div (x - 6)$

42) $(n^3 + 4n^2 - 53n - 78) \div (n + 9)$

Write each expression in exponential form.

43) $\sqrt{v}$

44) $\left(\sqrt[3]{5v}\right)^4$

45) $\sqrt[4]{5x^2}$

46) $\left(\sqrt[3]{3r}\right)^4$

47) $\left(\sqrt{r}\right)^5$

48) $\sqrt{6b}$

Write each expression in radical form.

49) $(3p)^{\frac{1}{3}}$

50) $(2x)^{\frac{3}{2}}$

51) $(7r)^{\frac{2}{3}}$

52) $(7x)^{\frac{5}{3}}$

53) $(10x)^{\frac{1}{6}}$

54) $a^{\frac{1}{3}}$

Simplify.

55) $\sqrt{72k^4}$

56) $\sqrt{96n^4}$

57) $\sqrt{80}$

58) $\sqrt{45}$

59) $-3\sqrt{12} - 3\sqrt{8} - 2\sqrt{3}$

60) $-2\sqrt{45} - 2\sqrt{2} - 2\sqrt{45}$

61) $\sqrt{15} \cdot \sqrt{6}$

62) $\sqrt{6}\left(\sqrt{2} + 3\right)$

63) $\sqrt{5}\left(5\sqrt{10} + \sqrt{6}\right)$

64) $\left(1 - \sqrt{2}\right)\left(-4 - 2\sqrt{2}\right)$

65) $\dfrac{\sqrt{16}}{\sqrt{9}}$

66) $\dfrac{\sqrt{5}}{3\sqrt{20}}$

67) $\dfrac{\sqrt{3}}{\sqrt{5}-\sqrt{3}}$

68) $\dfrac{\sqrt{5}-3\sqrt{3}}{3+\sqrt{5}}$

Simplify. Your answer should contain only positive exponents.

69) $\left(a^4b^2\right)^3$

70) $\left(3xy^{-3}\right)^3$

71) $\dfrac{4yx^{-2}}{4x^2}$

72) $\dfrac{4v^{-4}}{3u^{-3}v^{-4}}$

73) $\left(\dfrac{\left(2u^3v^4\right)^2}{2vu^4\cdot 2v}\right)^3$

74) $\dfrac{m^{-2}n^4\cdot nm^2}{\left(2nm^4\right)^{-1}}$

75) $2n^{-3}\cdot 3m^2n^{-2}$

76) $2yx^{-1}\cdot 4x^2$

Solve each equation. Remember to check for extraneous solutions.

77) $\dfrac{3}{4}+\dfrac{1}{4n}=\dfrac{2}{n}$

78) $6=\dfrac{3b-9}{2b}+\dfrac{3}{2b}$

79) $\dfrac{4k+8}{k^2}+\dfrac{3}{k^2}=\dfrac{3k-15}{2k^2}$

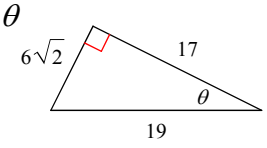
80) $\dfrac{3}{5x^2}-\dfrac{1}{5x}=\dfrac{1}{5x^2}$

81) $\dfrac{3a+15}{4a}=\dfrac{5}{4}+\dfrac{1}{4}$

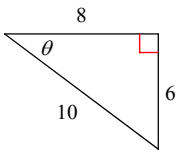
82) $\dfrac{k+6}{4k}=\dfrac{3}{4}+\dfrac{k+1}{k}$

Find the value of the trig function indicated. Make sure your answers are rationalized.

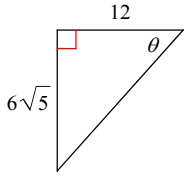
83) cos θ



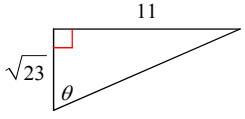
84) tan θ



85) cos θ



86) sec θ



ANSWER KEY:

Summer Math Packet to Prepare for Precalculus and Honors Precalculus

Evaluate each function.

1) $f(n) = 3 \cdot 5^n$; Find $f(0)$

3

2) $h(n) = 3n^2 + 5$; Find $h(-8)$

197

3) $g(a) = a^2 + 3a$; Find $g(3 - a)$

$18 - 9a + a^2$

4) $g(x) = -4x + 5$; Find $g\left(\frac{x}{4}\right)$

$-x + 5$

Perform the indicated operation.

5) $h(t) = -3t + 1$
$g(t) = 3t - 4$
Find $h(t) + g(t)$

-3

6) $g(x) = x^2 - 4$
$h(x) = 3x - 3$
Find $(2g - 5h)(x)$

$2x^2 - 15x + 7$

7) $g(a) = 2a + 4$
$h(a) = a^3 + 2a^2$
Find $g(9) \div h(9)$

$\frac{2}{81}$

8) $f(t) = 4t + 2$
$g(t) = 3t$
Find $(f \cdot g)(-4)$

168

9) $g(a) = -3a^2 - 4$
$h(a) = a + 3$
Find $\left(\frac{g}{h}\right)(-3a)$

$\frac{-27a^2 - 4}{-3a + 3}$

10) $f(n) = 2n$
$g(n) = 2n - 5$
Find $(f - g)\left(\frac{n}{3}\right)$

5

11) $g(t) = t + 3$
$h(t) = 4t - 3$
Find $(g \circ h)(t)$

$4t$

12) $f(n) = 3n$
$g(n) = n + 1$
Find $(f \circ g)(n)$

$3n + 3$

Simplify each expression.

13) $(7x + 6x^2 + 1) - (1 + 8x + 8x^2)$

$-2x^2 - x$

14) $(6x^2 + 6 + 8x^4) + (x^2 - 4 + 2x^4)$

$10x^4 + 7x^2 + 2$

Find each product.

15) $(7r - 1)(r - 6)$

$7r^2 - 43r + 6$

16) $(4n - 8)(5n + 8)$

$20n^2 - 8n - 64$

17) $(2p^2 - 5p - 3)(4p + 7)$

$8p^3 - 6p^2 - 47p - 21$

18) $(4a^2 + 6a - 6)(6a - 8)$

$24a^3 + 4a^2 - 84a + 48$

19) $(5 - 4x)(5 + 4x)$

$25 - 16x^2$

20) $(x - 4)^2$

$x^2 - 8x + 16$

Factor each completely.

21) $a^2 - 12a + 36$

$(a-6)^2$

22) $4x^2 + 8x - 320$

$4(x-8)(x+10)$

23) $30p^2 + 96p + 18$

$6(5p+1)(p+3)$

24) $3a^2 + 7a - 6$

$(3a-2)(a+3)$

25) $4m^2 - 9$

$(2m+3)(2m-3)$

26) $9n^2 - 4$

$(3n+2)(3n-2)$

27) $9a^2 + 30a + 25$

$(3a+5)^2$

28) $25n^2 - 10n + 1$

$(5n-1)^2$

29) $16n^3 + 56n^2 - 14n - 49$

$(8n^2-7)(2n+7)$

30) $6v^3 - 7v^2 + 12v - 14$

$(v^2+2)(6v-7)$

31) $64x^3 - 125$

$(4x-5)(16x^2+20x+25)$

32) $-x^3 - 125$

$(-x-5)(x^2-5x+25)$

Solve each equation by factoring.

33) $r^2 + 4r - 21 = 0$

$\{-7, 3\}$

34) $r^2 - 4 = 0$

$\{-2, 2\}$

35) $5n^2 - 20n + 7 = 7$

$\{4, 0\}$

36) $4x^2 + 16x = -8x - 36$

$\{-3\}$

37) $15x^2 - 120x + 454 = 7x^2 + 6$

$\{8, 7\}$

38) $7n^2 - 18n + 48 = -4n + 6n^2$

$\{8, 6\}$

39) $-48 + 4n = -2n^2$

$\{-6, 4\}$

40) $4x^2 - 16x = 0$

$\{4, 0\}$

Divide.

41) $(x^3 - 3x^2 - 15x - 28) \div (x - 6)$

$x^2 + 3x + 3 - \frac{10}{x-6}$

42) $(n^3 + 4n^2 - 53n - 78) \div (n + 9)$

$n^2 - 5n - 8 - \frac{6}{n+9}$

Write each expression in exponential form.

43) $\sqrt{v}$

$v^{\frac{1}{2}}$

44) $\left(\sqrt[3]{5v}\right)^4$

$(5v)^{\frac{4}{3}}$

45) $\sqrt[4]{5x^2}$

$(5x^2)^{\frac{1}{4}}$

46) $\left(\sqrt[3]{3r}\right)^4$

$(3r)^{\frac{4}{3}}$

47) $\left(\sqrt{r}\right)^5$

$r^{\frac{5}{2}}$

48) $\sqrt{6b}$

$(6b)^{\frac{1}{2}}$

Write each expression in radical form.

49) $(3p)^{\frac{1}{3}}$

$\sqrt[3]{3p}$

50) $(2x)^{\frac{3}{2}}$

$\left(\sqrt{2x}\right)^3$

51) $(7r)^{\frac{2}{3}}$

$\left(\sqrt[3]{7r}\right)^2$

52) $(7x)^{\frac{5}{3}}$

$\left(\sqrt[3]{7x}\right)^5$

53) $(10x)^{\frac{1}{6}}$

$\sqrt[6]{10x}$

54) $a^{\frac{1}{3}}$

$\sqrt[3]{a}$

Simplify.

55) $\sqrt{72k^4}$

$6k^2\sqrt{2}$

56) $\sqrt{96n^4}$

$4n^2\sqrt{6}$

57) $\sqrt{80}$

$4\sqrt{5}$

58) $\sqrt{45}$

$3\sqrt{5}$

59) $-3\sqrt{12} - 3\sqrt{8} - 2\sqrt{3}$

$-8\sqrt{3} - 6\sqrt{2}$

60) $-2\sqrt{45} - 2\sqrt{2} - 2\sqrt{45}$

$-12\sqrt{5} - 2\sqrt{2}$

61) $\sqrt{15} \cdot \sqrt{6}$

$3\sqrt{10}$

62) $\sqrt{6}\left(\sqrt{2} + 3\right)$

$2\sqrt{3} + 3\sqrt{6}$

63) $\sqrt{5}\left(5\sqrt{10} + \sqrt{6}\right)$

$25\sqrt{2} + \sqrt{30}$

64) $\left(1 - \sqrt{2}\right)\left(-4 - 2\sqrt{2}\right)$

$2\sqrt{2}$

65) $\dfrac{\sqrt{16}}{\sqrt{9}}$ $\dfrac{4}{3}$

66) $\dfrac{\sqrt{5}}{3\sqrt{20}}$ $\dfrac{1}{6}$

67) $\dfrac{\sqrt{3}}{\sqrt{5}-\sqrt{3}}$ $\dfrac{\sqrt{15}+3}{2}$

68) $\dfrac{\sqrt{5}-3\sqrt{3}}{3+\sqrt{5}}$ $\dfrac{3\sqrt{5}-5-9\sqrt{3}+3\sqrt{15}}{4}$

Simplify. Your answer should contain only positive exponents.

69) $(a^4b^2)^3$
$a^{12}b^6$

70) $(3xy^{-3})^3$ $\dfrac{27x^3}{y^9}$

71) $\dfrac{4yx^{-2}}{4x^2}$ $\dfrac{y}{x^4}$

72) $\dfrac{4v^{-4}}{3u^{-3}v^{-4}}$ $\dfrac{4u^3}{3}$

73) $\left(\dfrac{(2u^3v^4)^2}{2vu^4\cdot 2v}\right)^3$
u^6v^{18}

74) $\dfrac{m^{-2}n^4\cdot nm^2}{(2nm^4)^{-1}}$
$2n^6m^4$

75) $2n^{-3}\cdot 3m^2n^{-2}$ $\dfrac{6m^2}{n^5}$

76) $2yx^{-1}\cdot 4x^2$
$8yx$

Solve each equation. Remember to check for extraneous solutions.

77) $\dfrac{3}{4}+\dfrac{1}{4n}=\dfrac{2}{n}$ $\left\{\dfrac{7}{3}\right\}$

78) $6=\dfrac{3b-9}{2b}+\dfrac{3}{2b}$ $\left\{-\dfrac{2}{3}\right\}$

79) $\dfrac{4k+8}{k^2}+\dfrac{3}{k^2}=\dfrac{3k-15}{2k^2}$ $\left\{-\dfrac{37}{5}\right\}$

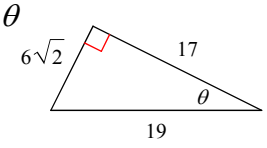
80) $\dfrac{3}{5x^2}-\dfrac{1}{5x}=\dfrac{1}{5x^2}$
$\{2\}$

81) $\dfrac{3a+15}{4a}=\dfrac{5}{4}+\dfrac{1}{4}$
$\{5\}$

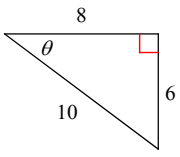
82) $\dfrac{k+6}{4k}=\dfrac{3}{4}+\dfrac{k+1}{k}$ $\left\{\dfrac{1}{3}\right\}$

Find the value of the trig function indicated. Make sure your answers are rationalized.

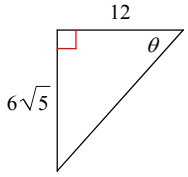
83) $\cos\theta$ $\dfrac{17}{19}$



84) $\tan\theta$ $\dfrac{3}{4}$



85) $\cos\theta$ $\dfrac{2}{3}$



86) $\sec\theta$ $\dfrac{12\sqrt{23}}{23}$