Algebra 2 CC   Name_____ ID: 1
SPG Review   Date_____ Period____

Solve each equation.

1) $\log_{20}(-5x+7) = \log_{20}(10-2x)$

2) $\log_3(3x-1) = \log_3(2x+7)$

3) $-2\log_9 -10n = -4$

4) $3 + \log_3(n+8) = 1$

5) $\ln(x-3) + \ln 2 = 5$

6) $\log_7 9 + \log_7(x^2-2) = 3$

7) $10^{3b-2} = 10000$

8) $3^{3x} = 243$

Solve each equation. Round your answers to the nearest ten-thousandth.

9) $-3.4 \cdot 3^{m+3} = -74$

10) $-5 \cdot 10^{n-4} = -28.6$

Identify the domain and range of each. Then sketch the graph.

11) $y = \log_5(x+1) - 3$

12) $y = \log_4(x-1)$

Use a calculator to approximate each to the nearest thousandth.

13) $\log_2 3.6$

14) $\log_5 6.9$

Sketch the graph of each function.

15) $y = 4 \cdot 2^x$

16) $y = 4 \cdot \left(\frac{1}{2}\right)^x$

Solve each equation. Round your answers to the nearest ten-thousandth.

17) $12^{x-1} - 7 = 9$

18) $-4 \cdot 18^{p+8} = -47.3$

Simplify.

19) $\dfrac{2}{4+4i}$

20) $\dfrac{5+3i}{4-i}$

Simplify each expression.

21) $\dfrac{p-4}{6} \div \dfrac{5p+50}{5}$

22) $\dfrac{4x^2}{4} \div \dfrac{10x^2}{4x+40}$

Solve each equation. Remember to check for extraneous solutions.

23) $\dfrac{2}{5x^2} = \dfrac{1}{5x} + \dfrac{1}{x^2}$

24) $\dfrac{1}{5x^2} = \dfrac{1}{x} + \dfrac{1}{x^2}$

Graph each function.

25) $f(x) = \dfrac{-x^2+5x-6}{x^2-3x+2}$

26) $f(x) = \dfrac{x^3-3x^2-4x}{-4x^2+4x+24}$

Simplify each expression.

27) $\dfrac{2}{k-10} \cdot \dfrac{k+5}{4k+20}$

28) $\dfrac{n+8}{n-9} \cdot \dfrac{n^2-n-72}{5}$

State the number of complex zeros, the possible number of real and imaginary zeros, the possible number of positive and negative zeros, and the possible rational zeros for each function. Then find all rational zeros.

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

30) $f(x) = 5x^3 + x^2 - 5x - 1$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

31) $4x^{\frac{1}{3}} y^{\frac{3}{2}} \cdot y^{-\frac{3}{2}}$

32) $4yx^{-\frac{4}{3}} \cdot 4y^{-2}$

Simplify each and state the excluded values.

33) $\dfrac{40a-24}{16a+72}$

34) $\dfrac{x^2-2x-8}{x^2-6x-16}$

Simplify.

35) $\dfrac{2\sqrt{15}}{5\sqrt{48}}$

36) $\dfrac{3\sqrt{10}}{5\sqrt{2}}$

Solve each equation. Remember to check for extraneous solutions.

37) $15 = \sqrt{10n - 1} + 8$

38) $2 = \sqrt{n - 8}$

Simplify.

39) $3\sqrt{8} - 3\sqrt{45} - 2\sqrt{5}$

40) $-\sqrt{12} + 2\sqrt{24} - \sqrt{3}$

Sketch the graph of each function.

41) $y = 5\sqrt{x - 4} - 5$

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

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

43) $\dfrac{49\pi}{36}$

44) $560°$

Use a double-angle or half-angle identity to find the exact value of each expression.

45) $\cos\theta = \dfrac{4}{5}$ and $0° < \theta < 90°$

Find $\sin 2\theta$

46) $\cos\theta = \dfrac{1}{18}$ and $270° < \theta < 360°$

Find $\tan\dfrac{\theta}{2}$

Find the exact value of each trigonometric function.

47) $\tan\theta$

450°

48) $\cos\theta$

390°
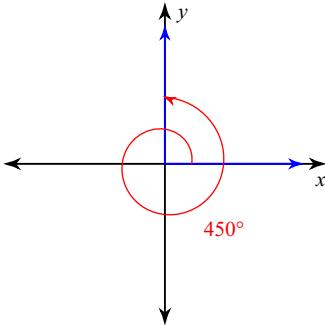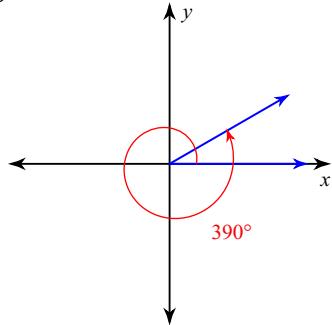
**Find a positive and a negative coterminal angle for each given angle.**

49) 70°

50) −436°

Graph each function using degrees.

51) $y = 4\sin(2\theta + 90)$

52) $y = 2\cos\left(\dfrac{\theta}{4} + 330\right)$

53) $y = 4\tan\left(\dfrac{\theta}{2} + 45\right)$

Algebra 2 CC
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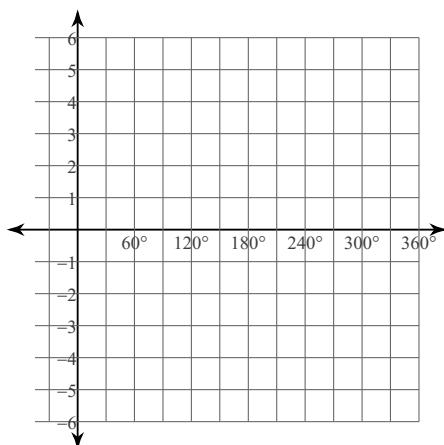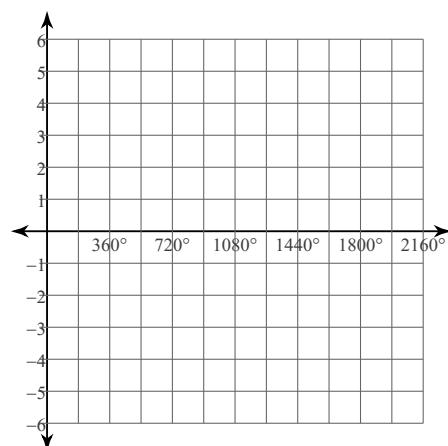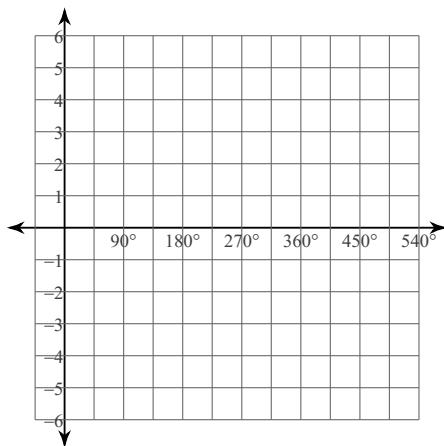
SPG Review
Date_____ Period____

Solve each equation.

1) $\log_{20}(-5x+7)=\log_{20}(10-2x)$

$\{-1\}$

2) $\log_{3}(3x-1)=\log_{3}(2x+7)$

$\{8\}$

3) $-2\log_{9}-10n=-4$

$\left\{-\dfrac{81}{10}\right\}$

4) $3+\log_{3}(n+8)=1$

$\left\{-\dfrac{71}{9}\right\}$

5) $\ln(x-3)+\ln 2=5$

$\left\{\dfrac{e^5+6}{2}\right\}$

6) $\log_{7}9+\log_{7}(x^2-2)=3$

$\left\{\dfrac{19}{3},-\dfrac{19}{3}\right\}$

7) $10^{3b-2}=10000$

$\{2\}$

8) $3^{3x}=243$

$\left\{\dfrac{5}{3}\right\}$

Solve each equation. Round your answers to the nearest ten-thousandth.

9) $-3.4\cdot 3^{m+3}=-74$

-0.1962

10) $-5\cdot 10^{n-4}=-28.6$

4.7574

Identify the domain and range of each. Then sketch the graph.

11) $y=\log_{5}(x+1)-3$

Domain: $x>-1$
Range: All reals
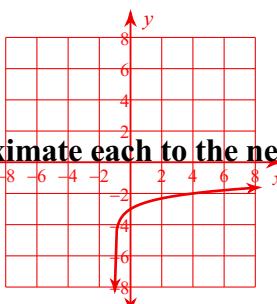
12) $y=\log_{4}(x-1)$

Domain: $x>1$
Range: All reals
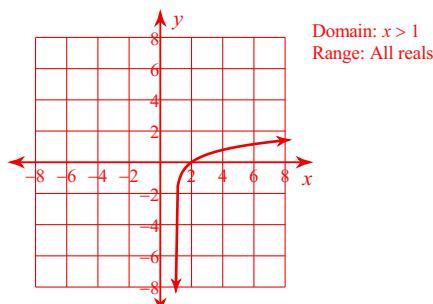
Use a calculator to approximate each to the nearest thousandth.

13) $\log_{2}3.6$

1.848

14) $\log_{5}6.9$

1.2

Sketch the graph of each function.

15) $y=4\cdot 2^{x}$
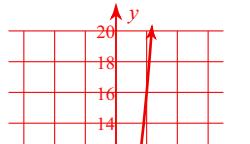
16) $y=4\cdot\left(\dfrac{1}{2}\right)^{x}$
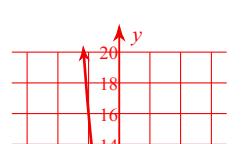
Solve each equation. Round your answers to the nearest ten-thousandth.

17) $12^{x-1}-7=9$

2.1158
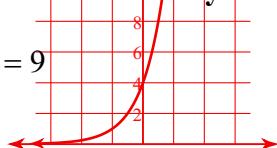
18) $-4\cdot 18^{p+8}=-47.3$

-7.1454
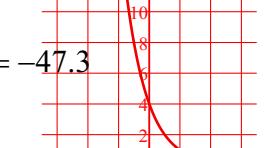
Simplify.

19) $\dfrac{2}{4+4i}$

$\dfrac{1-i}{4}$

20) $\dfrac{5+3i}{4-i}$

$1+i$

Simplify each expression.

21) $\dfrac{p-4}{6} \div \dfrac{5p+50}{5}$

$\dfrac{p-4}{6(p+10)}$

22) $\dfrac{4x^2}{4} \div \dfrac{10x^2}{4x+40}$

$\dfrac{2(x+10)}{5}$

Solve each equation. Remember to check for extraneous solutions.

23) $\dfrac{2}{5x^2} = \dfrac{1}{5x} + \dfrac{1}{x^2}$

$\{-3\}$

24) $\dfrac{1}{5x^2} = \dfrac{1}{x} + \dfrac{1}{x^2}$

$\left\{-\dfrac{4}{5}\right\}$

Graph each function.

25) $f(x) = \dfrac{-x^2+5x-6}{x^2-3x+2}$
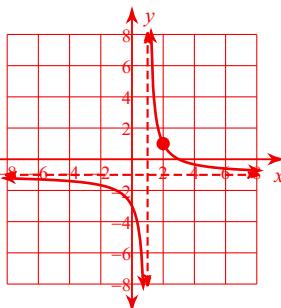
26) $f(x) = \dfrac{x^3-3x^2-4x}{-4x^2+4x+24}$
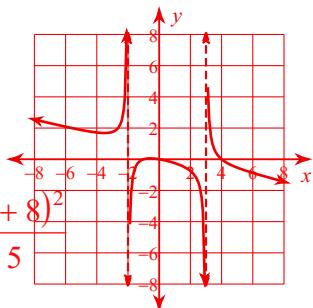
Simplify each expression.

27) $\dfrac{2}{k-10} \cdot \dfrac{k+5}{4k+20}$

$\dfrac{1}{2(k-10)}$
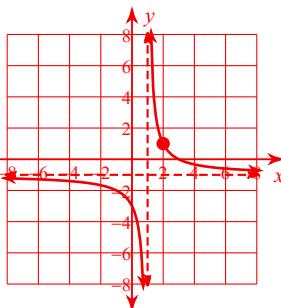
28) $\dfrac{n+8}{n-9} \cdot \dfrac{n^2-n-72}{5}$ $\dfrac{(n+8)^2}{5}$

State the number of complex zeros, the possible number of real and imaginary zeros, the possible number of positive and negative zeros, and the possible rational zeros for each function. Then find all rational zeros.

29) $f(x) = x^3 - 3x + 2$ # of complex zeros: 3
Possible # of real zeros: 3 or 1
Possible # of imaginary zeros: 2 or 0
Possible # positive real zeros: 2 or 0
Possible # negative real zeros: 1
Possible rational zeros: $\pm 1, \pm 2$
Rational zeros: $\{-2, 1 \text{ mult. } 2\}$

30) $f(x) = 5x^3 + x^2 - 5x - 1$ # of complex zeros: 3
Possible # of real zeros: 3 or
Possible # of imaginary zeros:
Possible # positive real zero
Possible # negative real zero

Possible rational zeros: $\pm 1, \pm$

Rational zeros: $\left\{1, -\dfrac{1}{5}, -1\right\}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

31) $4x^{\frac{1}{3}} y^{\frac{3}{2}} \cdot y^{-\frac{3}{2}}$

$4x^{\frac{1}{3}}$

32) $4yx^{-\frac{4}{3}} \cdot 4y^{-2}$ $\dfrac{16x^{\frac{2}{3}}}{x^2 y}$

Simplify each and state the excluded values.

33) $\dfrac{40a-24}{16a+72}$

$\dfrac{5a-3}{2a+9}$; $\left\{-\dfrac{9}{2}\right\}$

34) $\dfrac{x^2-2x-8}{x^2-6x-16}$

$\dfrac{x-4}{x-8}$; $\{8, -2\}$

Simplify.

35) $\dfrac{2\sqrt{15}}{5\sqrt{48}}$

$\dfrac{\sqrt{5}}{10}$

36) $\dfrac{3\sqrt{10}}{5\sqrt{2}}$

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

Solve each equation. Remember to check for extraneous solutions.

37) $15 = \sqrt{10n-1} + 8$

$\{5\}$

38) $2 = \sqrt{n-8}$

$\{12\}$

Simplify.

39) $3\sqrt{8} - 3\sqrt{45} - 2\sqrt{5}$

$6\sqrt{2} - 11\sqrt{5}$

40) $-\sqrt{12} + 2\sqrt{24} - \sqrt{3}$

$-3\sqrt{3} + 4\sqrt{6}$

Sketch the graph of each function.
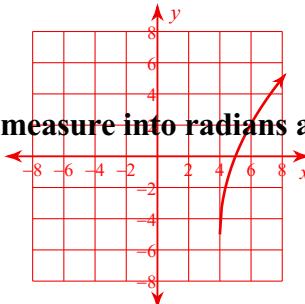
41) $y = 5\sqrt{x-4} - 5$

42) $y = \sqrt{x-4}$
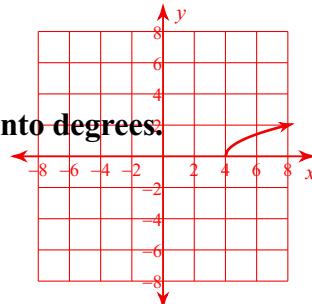
Convert each degree measure into radians and each radian measure into degrees.

43) $\dfrac{49\pi}{36}$

$245°$

44) $560°$

$\dfrac{28\pi}{9}$

Use a double-angle or half-angle identity to find the exact value of each expression.

45) $\cos\theta = \dfrac{4}{5}$ and $0° < \theta < 90°$

Find $\sin 2\theta$

$\dfrac{24}{25}$

46) $\cos\theta = \dfrac{1}{18}$ and $270° < \theta < 360°$

Find $\tan\dfrac{\theta}{2}$

$-\dfrac{\sqrt{323}}{19}$

Find the exact value of each trigonometric function.

47) $\tan\theta$

450°

Undefined

48) $\cos\theta$

390°
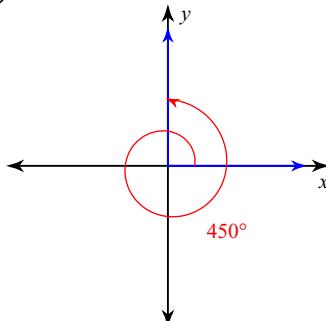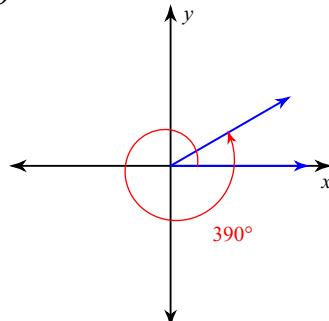
$\dfrac{\sqrt{3}}{2}$

Find a positive and a negative coterminal angle for each given angle.

49) 70°

   430° and −290°

50) −436°

   284° and −76°

Graph each function using degrees.

51) $y = 4\sin(2\theta + 90)$

52) $y = 2\cos\left(\dfrac{\theta}{4} + 330\right)$

53) $y = 4\tan\left(\dfrac{\theta}{2} + 45\right)$