

Pascal's Triangle.

Pascal's triangle is a useful tool for expanding binomials, so if I ask you to do $(x+2)^4$ you can either do a bunch of FOILing (a) or use the triangle. (b)

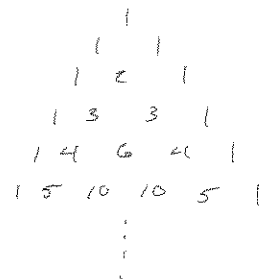
a) $(x+2)^4 = (x+2)(x+2)(x+2)(x+2)$
 $= (x^2+4x+4)(x^2+4x+4)$

✓ I don't feel like doing this rn.

b) $(x+2)^4 \rightarrow 14641$
 $= x^4 + 8x^3 + 24x^2 + 32x + 16$

To start off, here is the triangle...

I don't expect you to memorize all the numbers, so here is how to construct it...

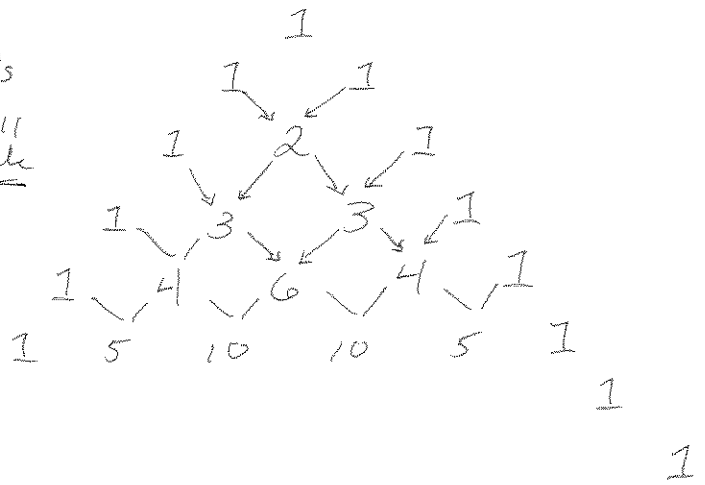


Start with a 1

then, in the next row put 2 1's

Each row from now on, we'll be adding 2 1's to the outside

to fill in the #'s in the middle, we combine the #'s from the row above. So, our 2 1's in the 2nd row combine to make a 2 in the 3rd row.



To fill in the 4th row, combine the 1 & 2 for a 3, and the 2 & 1 for another 3.

The next row comes from combining 1 & 3, 3 & 3, and 3 & 1

and so on...

try a couple on your own

Now, how to use pascal's triangle...

Each row represents a power of a binomial. If I expand $(a+b)^2 = (a+b)(a+b) = \frac{1}{1}a^2 + \frac{2}{2}ab + \frac{1}{1}b^2$

expand $(a+b)^3 = (a^2+2ab+b^2)(a+b) = \frac{1}{1}a^3 + \frac{3}{3}a^2b + \frac{3}{3}ab^2 + \frac{1}{1}b^3$

$$\begin{array}{l}
 (a+b)^0 \longrightarrow 1 \\
 (a+b)^1 \longrightarrow 1 \quad 1 \\
 (a+b)^2 \longrightarrow 1 \quad 2 \quad 1 \\
 (a+b)^3 \longrightarrow 1 \quad 3 \quad 3 \quad 1 \\
 (a+b)^4 \longrightarrow 1 \quad 4 \quad 6 \quad 4 \quad 1 \\
 \vdots \qquad \qquad \qquad \vdots
 \end{array}$$

So if I ask you to expand $(a+b)^5$, the numbers are 1,5,10,10,5,1
 start on the left side with a^5 , and go down a power each term

then start on the right with b^5 , and go down a power as you move left

$$1a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + 1b^5$$

Notice the powers in each term add to 5 (b/c its $(a+b)^5$).

So, if I take the example from before, $(x+2)^4$, lets expand it.

$$(x+2)^4 \rightarrow 1, 4, 6, 4, 1$$

$$1x^4 + 4x^3 \cdot 2 + 6x^2 \cdot 2^2 + 4x \cdot 2^3 + 1 \cdot 2^4$$

↓ Simplify

$$x^4 + 8x^3 + 24x^2 + 32x + 16$$

You can check by hand
 If you want...

Try a couple...

$$(x+1)^4$$

$$(x+4)^3$$

$$(x+2)^5$$

$$(x+5)^3$$

$$(x-2)^4$$

$$(x-3)^3$$

(think of it as $(x+(-2))^4$)

Summer Pre-Calculus Review

Problem Set 1

Solve the following by factoring.

1. $x^2 - 8x + 7 = 0$

2. $x^2 + 9x + 18 = 0$

3. $x^2 - 3x - 28 = 0$

4. $x^2 + 5x + 4 = 0$

5. $x^2 + 14x + 48 = 0$

6. $5x^2 - 245 = 0$

7. $2x^3 - 26x^2 + 72x = 0$

8. $2x^2 - 17x - 9 = 0$

9. $5x^2 + 46x - 40 = 0$

10. $5x^2 + 3x - 14 = 0$

Solve the following equations for x

11. $3x - 5 = 19$

12. $\frac{2}{3}x - 7 = -15$

13. $5xh - 4b = 11$

If $f(x) = 3x^2 - 5x - 1$ and $g(x) = \sqrt{5x + 9}$ evaluate the following.

14. $f(3)$

15. $f(-2)$

16. $g(-1)$

17. $g(15)$

18. $f(g(8))$

19. $g(f(3))$

20. If $f(x) = x^2 - 5x$, evaluate $f(x + h)$.

For the following, find the equations of the lines described.

21. $m = \frac{5}{4}, (-4, -3)$

22. $m = \frac{-3}{5}, (-5, -2)$

23. *through* $(-2, 2)$ & $(8, -18)$

24. *through* $(1, -4)$ & $(-4, -1)$

Simplify the following. For example, $\frac{x^4 - 5x^2 + 6}{x} = x^3 - 5x + 6x^{-1}$

25. $\frac{5x^3 - 2x^2 + 6x}{x}$

26. $\frac{x^5 - 5x^3 + 4}{\sqrt{x}}$

27. $\frac{x^2 - 4x + \sqrt{x}}{\sqrt[3]{x}}$

Simplify the following using laws of exponents.

28. $\frac{a^{11}b^{14}}{(a^3b^{-2})^4}$

29. $a^4 \cdot \sqrt{a^6b^9}$

30. $\sqrt{(4x^2y^7)^6}$

Evaluate the following trig functions.

31. $\sin\left(\frac{\pi}{4}\right)$

32. $\cos\left(\frac{3\pi}{2}\right)$

33. $\tan\left(\frac{5\pi}{3}\right)$

34. $\sin\left(\frac{3\pi}{4}\right)$

35. $\cos\left(\frac{\pi}{3}\right)$

36. $\tan\left(\frac{3\pi}{2}\right)$

37. $\cos\left(\frac{7\pi}{6}\right)$

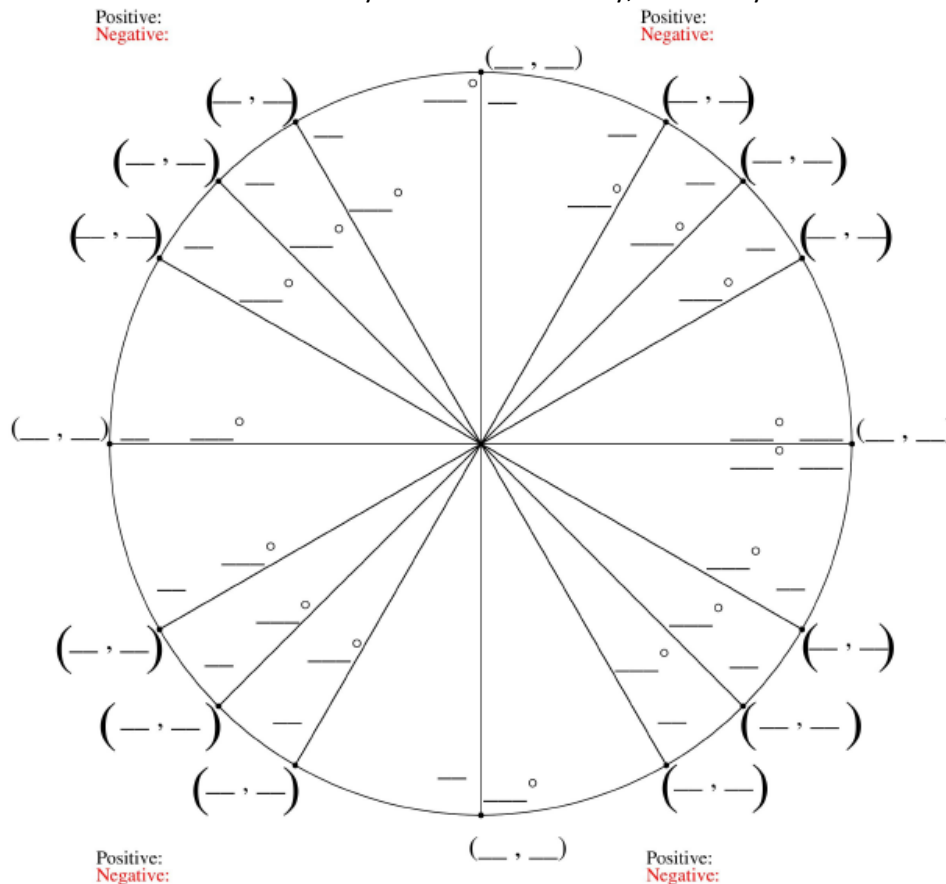
38. $\sin\left(\frac{4\pi}{3}\right)$

Solve the following.

39. $\sin(x) = \frac{\sqrt{3}}{2}$

40. $\tan(x) = -\sqrt{3}$

Fill in the unit circle as best as you can from memory, then use your notes to finish it off.



Summer Pre-Calculus Review

Problem Set 2

Solve the following by factoring.

1. $x^2 - 6x - 16 = 0$

3. $x^2 + 8x = 0$

5. $x^2 - 7x - 8 = 0$

7. $4x^2 + 12x = 0$

9. $5x^2 + 49x - 10 = 0$

2. $x^2 - 4x - 32 = 0$

4. $x^2 - x - 20 = 0$

6. $2x^3 - 18x^2 + 36x = 0$

8. $5x^2 - 9x = 0$

10. $7x^2 + 65x - 50 = 0$

Solve the following.

11. $\frac{5}{3}x - 11 = -26$

12. $\ln((x + 5)^2) = 16$

13. $2^{x+4} = 8^{x-4}$

Expand the following.

14. $(x + 5)^2$

15. $(x + 2)^3$

16. $(x + h)^2$

17. If $f(x) = x^2 + 3x$, evaluate $f(4 + h) - f(4)$.

For the following, find the equations of the lines described.

18. $m = \frac{4}{3}, (-6, 7)$

19. Through $(-6, 6)$ & $(15, -8)$

20. *through* $(4, 7)$ & $(10, 22)$

21. *perp to* $y = \frac{-3}{5}x + 2$, *through* $(12, 7)$

Simplify the following using log laws.

22. $\ln\left(\frac{e^5 x^4}{y^6}\right)$

23. $\log\left(\frac{100x}{y^4 z^8}\right)$

24. Write $1000 + 4 \log x - 6 \log y - b \log z$ as a single log.

For the following, simplify the rational functions.

25. $\frac{x^2-5x+11}{x}$

26. $\frac{3x^3-4x+5}{\sqrt{x}}$

27. $\frac{5x^2-6x-\frac{1}{x}}{\sqrt[3]{x}}$

Simplify the following using laws of exponents.

28. $\sqrt[3]{x^9y^4}$

29. $(x^4y^7)^2(a^9x^{-3})^{\frac{2}{3}}$

30. $\frac{x^4y^7}{\sqrt{x^{16}y^{-4}}}$

Evaluate the following.

31. $\sin\left(\frac{\pi}{2}\right)$

32. $\cos\left(\frac{\pi}{2}\right)$

33. $\tan\left(\frac{\pi}{2}\right)$

34. $\cos\left(\frac{5\pi}{3}\right)$

35. $\cos\left(\frac{5\pi}{6}\right)$

36. $\sin\left(\frac{7\pi}{6}\right)$

37. $\tan\left(\frac{-\pi}{3}\right)$

38. $\sin\left(\frac{5\pi}{6}\right)$

39. $\tan\left(\frac{7\pi}{6}\right)$

Solve the following without a calculator.

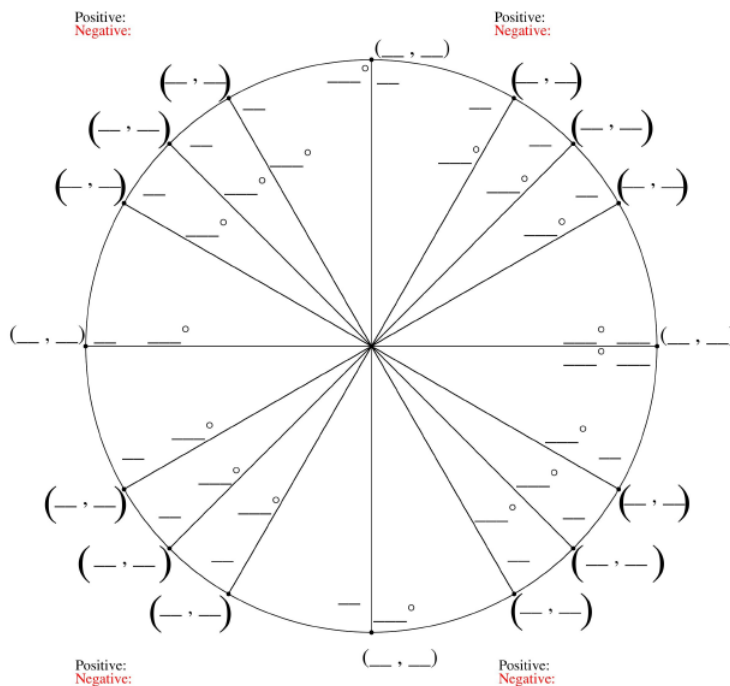
40. $2 \sin(x) + 3 = 2$

41. $\cos(x) = \frac{\sqrt{3}}{2}$

42. $-4 \sin(x) = 2\sqrt{2}$

43. $\tan(x) = \frac{\sqrt{3}}{3}$

Fill out the unit circle as best you can from memory, then use your old notes to finish it.



Summer Pre-Calculus Review

Problem Set 3

Solve each equation by factoring.

1. $x^2 + 2x = 0$

2. $4x^2 - 96x = 0$

3. $x^2 - 16 = 0$

4. $x^2 + x - 56 = 0$

5. $x^2 + 7x = 0$

6. $x^2 - 14x + 48 = 0$

7. $4x^2 + 4x - 288$

8. $4x^2 + 8n = 0$

9. $5x^2 + 19x + 18 = 0$

10. $7x^2 + 76x + 60 = 0$

Expand the following:

11. $(x + 4)^2$

12. $(x + 1)^4$

13. $(x + h)^3$

14. If $f(x) = 3x^2 - 5x$, evaluate $f(x + h)$

Solve the following equations. (no calc)

15. $\frac{\frac{2}{3}x-11}{7} = 3$

16. $\ln((x - 5)^3) = 27$

17. $2^{3x+4} = 8^{2x-5}$

Simplify the following using properties of exponents.

18. $(x^3y^4)^3 \cdot (4x^{-5}y^3)^{-2}$

19. $\frac{(a^4b^{-3})^4}{a^{-4}b^5}$

20. $\sqrt{\frac{a^7b^4}{(a^{-3}b^3)^{-2}}}$

Use log laws to expand the following.

21. $\log(5x^3y^6)$

22. $\ln\left(\frac{x^3y^6}{z^5}\right)$

23. $\ln\sqrt{\frac{x^6y^4}{z^3e^8}}$

Use log laws to write the following as a single log

24. $\log x + 5 \log y - 6 \log z$

25. $8 + \ln x + 4 \ln y - 5 \ln(ab)$

Write the equations of the lines with the information below.

26. $(4, 5)$ & $(9, 7)$

27. $(-9, 4)$ & $(6, -16)$

28. Parallel to $y = \frac{2}{5}x$ through $(10, 2)$

For the following, identify at what values you find

a) x – intercepts b) y – intercepts c) holes d) vertical asymptotes and e) horizontal asymptotes

29. $\frac{(x^2-2x-24)(x^2+2x-15)}{(x-3)(x^2+6x+8)}$

30. $\frac{(2x^2-3x-20)(x+3)}{(x^2-9x+20)(x+4)}$

Simplify the following

31. $\frac{3x^2-5x+4}{x}$

32. $\frac{5x^2-9x+11}{\sqrt{x}}$

33. $\frac{2x^2-x^{\frac{2}{3}}-\frac{1}{x}}{\sqrt{x}}$

Solve the following

34. $2 \sin(x) - 4 = -3$

35. $4 \sin(2x) + 5 = 2\sqrt{2} + 5$

36. $\tan(2x) = \sqrt{3}$

Evaluate the following:

37. $\sin\left(\frac{\pi}{3}\right)$

38. $\sin\left(\frac{\pi}{4}\right)$

39. $\sin\left(\frac{\pi}{6}\right)$

40. $\cos\left(\frac{2\pi}{3}\right)$

41. $\cos\left(\frac{3\pi}{4}\right)$

42. $\cos\left(\frac{5\pi}{6}\right)$

43. $\sin\left(\frac{5\pi}{4}\right)$

44. $\cos\left(\frac{-2\pi}{3}\right)$

45. $\sin\left(\frac{7\pi}{6}\right)$

46. $\cos\left(\frac{11\pi}{6}\right)$

47. $\sin\left(\frac{-\pi}{4}\right)$

48. $\cos\left(\frac{5\pi}{3}\right)$

49. $\sin(0)$

50. $\sin\left(\frac{\pi}{2}\right)$

51. $\sin(\pi)$

52. $\sin\left(\frac{3\pi}{2}\right)$

53. $\cos(0)$

54. $\cos\left(\frac{\pi}{2}\right)$

55. $\cos(\pi)$

56. $\cos\left(\frac{3\pi}{2}\right)$

Summer Pre-Calculus Review

Problem Set 4

1. $x^2 - 5x - 36 = 0$

3. $x^2 - 6x - 7 = 0$

5. $x^2 - 10x = 0$

7. $x^3 - 16x = 0$

9. $3x^2 - 7x + 4 = 0$

2. $x^2 + 10x + 16 = 0$

4. $x^2 - 11x + 24 = 0$

6. $15x^2 - 25x = 0$

8. $2x^2 - 5x - 12 = 0$

10. $4x^2 + 12x + 5 = 0$

Solve the following. Try **not** to factor.

11. $4x^2 - 20 = 0$

12. $(x - 5)^2 + 11 = 20$

13. $\sqrt{5x - 1} + 3 = 8$

14. $5(x + 2)^2 - 6 = 14$

15. $(x + 4)^3 + 1 = 28$

16. $\frac{x}{4} + \frac{x+1}{3} = 5$

17. $\log_2(x^2 + 2x) = 3$

18. $\log_7(x + 1) + \log_7(x - 5) = 1$

Expand the following. Use Pascal's Triangle if you'd like to try, or do the algebra out.

19. $(x - 4)^2$

20. $(x + 3)^4$

21. $(x + h)^5$

22. If $f(x) = 2x^2 + 5x - 4$, evaluate $f(x + h)$ and $f(1 + h) - f(1)$

For the following, find the equations of the lines described.

23. $m = \frac{5}{2}$, $(8, 12)$

24. Through $(-2, 5)$ and $(6, 17)$

25. Through $(-5, 7)$ and $(3, 2)$

26. Perp to $y = \frac{3}{4}x - 2$, through $(6, 5)$

Simplify the following using log laws.

27. $\log\left(\frac{x^4y^5}{100z^4}\right)$

28. $\ln\left(\frac{e^5x^9}{100y^{-2}}\right)$

29. Write $11\log_2 x + 5 + 4\log_2 y - 5\log_2 z$ as a single log

Simplify the following fractions

30. $\frac{5x^2-6x-7}{x^3}$

31. $\frac{x^3-\frac{1}{x}+\frac{5}{x^2}}{x}$

32. $\frac{x^2-5x+2}{\sqrt[3]{x}}$

For the following, identify at what values you find

a) *x* – intercepts b) *y* – intercepts c) holes d) vertical asymptotes and e) horizontal asymptotes

33. $\frac{(x^2+4x+3)(x^2-10x+24)}{(x^2+7x+12)(2x^2+5x+3)}$

34. $\frac{x^3+3x^2-4x-12}{(x^2-4x+4)(x^2-2x-15)}$

Solve the following.

35. $4 \sin(x) - 5 = -3$

36. $2 \cos(3x) = \sqrt{2}$

37. $4 \sin^2(x) + 5 = 7$

Evaluate the following:

38. $\sin(0)$

39. $\cos(0)$

40. $\tan(0)$

41. $\sin\left(\frac{\pi}{6}\right)$

42. $\cos\left(\frac{\pi}{6}\right)$

43. $\tan\left(\frac{\pi}{6}\right)$

44. $\sin\left(\frac{\pi}{4}\right)$

45. $\cos\left(\frac{\pi}{4}\right)$

46. $\tan\left(\frac{\pi}{4}\right)$

47. $\sin\left(\frac{\pi}{3}\right)$

48. $\cos\left(\frac{\pi}{3}\right)$

49. $\tan\left(\frac{\pi}{3}\right)$

50. $\sin\left(\frac{\pi}{2}\right)$

51. $\cos\left(\frac{\pi}{2}\right)$

52. $\tan\left(\frac{\pi}{2}\right)$

53. $\sin(\pi)$

54. $\cos(\pi)$

55. $\tan(\pi)$

56. $\sin\left(\frac{3\pi}{2}\right)$

57. $\cos\left(\frac{3\pi}{2}\right)$

58. $\tan\left(\frac{3\pi}{2}\right)$

59. $\sin(2\pi)$

60. $\cos(2\pi)$

61. $\tan(2\pi)$

Summer Pre-Calculus Review

Problem Set 5

Solve the following by factoring

1. $x^2 + 12x + 32 = 0$

2. $x^2 - 4x - 21 = 0$

3. $x^2 + 3x - 18 = 0$

4. $x^2 - 13x + 40 = 0$

5. $8x^2 - 20x = 0$

6. $2x^4 - 18x^2 = 0$

7. $x^3 - 4x^2 - 9x + 36 = 0$

8. $2x^2 + 15x + 7 = 0$

9. $3x^2 - 11x - 20 = 0$

10. $6x^2 + 5x - 4 = 0$

Solve the following. Try not to factor on the first 4, only use a calculator on #21

11. $3x^2 - 21 = 0$

12. $(2x - 3)^2 - 5 = 11$

13. $5(x - 5)^2 - 18 = 7$

14. $(x + 8)^3 - 7 = 20$

15. $\sqrt{3x + 11} - 5 = 2$

16. $\frac{5x}{2} + \frac{x+7}{3} = 8$

17. $\frac{x+2}{3} + \frac{12}{x} = x + 1$

18. $\frac{8}{x-4} + \frac{14}{x+1} = 6$

19. $\frac{x}{2\sqrt{x^2+16}} - \frac{1}{5} = 0$

20. $3^{x+5} = 9^{2x-11}$

21. $2^{3x+7} = 5^{(x-1)}$

22. $\log_2(x^2 + 4x - 1) - \log_2(x - 3) = 4$

Solve the following inequalities.

23. $x^2 - 14x - 32 \geq 0$

24. $(x + 7)(x - 1)(x - 5) < 0$

25. $\frac{x^2-2x-35}{x-2} \leq 0$

Expand the following. Try to use Pascal's Triangle...

26. $(x - 5)^3$

27. $(x + 2)^5$

28. $(x + h)^6$

29. If $f(x) = 3x^2 + 7x - 5$, evaluate $f(x + h) - f(x)$ and $f(1 + h) - f(1)$

Find the equations of the following lines.

30. $(-5, -11)$ & $(10, 1)$

31. $(-4, 7)$ and $(5, -3)$

32. parallel to $y = -\frac{5}{2}x + 15$, through $(10, 3)$

34. Perp to $y = 3x - 1$, through $(9, 5)$

Simplify the following fractions.

$$35. \frac{(2x^2 - 5x + \frac{2}{x})}{x^2}$$

$$36. \frac{3x^4 - \frac{5}{x} + 9}{\sqrt{x}}$$

$$37. \frac{2x^2 - \sqrt{x} + \frac{5}{x^2}}{\sqrt[3]{x}}$$

For the following, identify at what values you find

a) x – intercepts b) y – intercepts c) holes d) vertical asymptotes and e) horizontal asymptotes

$$38. \frac{(x^2 - 16)(x + 5)}{(x^2 + 7x + 12)(x^2 + 2x - 15)}$$

$$39. \frac{(x - 2)(x^2 - 4x - 21)}{(2x + 6)(x^2 - 4x + 4)}$$

Solve the following, without a calculator.

$$40. 6 \cos(x) = -3\sqrt{2}$$

$$41. 4 \sin(3x) - 5 = -3$$

$$42. 7 \tan^2 x - 12 = 9$$

Evaluate the following.

$$43. \sin\left(\frac{2\pi}{3}\right)$$

$$44. \cos\left(\frac{2\pi}{3}\right)$$

$$45. \tan\left(\frac{2\pi}{3}\right)$$

$$46. \sin\left(\frac{3\pi}{4}\right)$$

$$47. \cos\left(\frac{3\pi}{4}\right)$$

$$48. \tan\left(\frac{3\pi}{4}\right)$$

$$49. \sin\left(\frac{5\pi}{6}\right)$$

$$50. \cos\left(\frac{5\pi}{6}\right)$$

$$51. \tan\left(\frac{5\pi}{6}\right)$$

$$52. \sin\left(\frac{3\pi}{2}\right)$$

$$53. \cos(2\pi)$$

$$54. \tan\left(\frac{5\pi}{2}\right)$$

$$55. \sin^{-1}\left(\frac{1}{2}\right)$$

$$56. \cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$$

$$57. \tan^{-1}\left(\frac{\sqrt{3}}{3}\right)$$

$$58. \sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$$

Summer Pre-Calculus Review

Problem Set #6

Factor the following:

1. $x^2 + 13x + 42$

2. $x^2 - 9x - 36$

3. $x^2 + 3x - 40$

4. $x^2 - 16x + 48$

5. $12x^3 - 18x^2$

6. $5x^2 - 24$

7. $x^3 + 8x^2 - 9x - 72$

8. $2x^2 + 9x - 35$

9. $3x^2 - 6x - 45$

10. $6x^2 - 19x + 10$

Solve the following, try not to use factoring for the first 3. Calculator allowed on #18

11. $6x^2 - 19 = 5$

12. $(x + 3)^2 + 14 = 20$

13. $5(2x - 7)^2 - 1 = 4$

14. $(x - 1)^4 - 6 = 10$

15. $3\sqrt{5x + 6} - 7 = 5$

16. $\log_3(x^2 - 5x + 15) = 2$

17. $2^{4x-1} = 8^{x+1}$

18. $3^{5x-7} = 7^{2x+1}$

19. $\frac{2x}{7} + \frac{x+5}{3} = 6$

20. $y + \frac{24}{y} = 14$

21. $\frac{5}{x-3} + \frac{10}{x+1} = 7$

22. $\frac{x}{4\sqrt{x^2+25}} - \frac{1}{6} = 0$

Solve the following inequalities.

23. $x^2 + 5x - 84 \geq 0$

24. $(x^2 + 8x)(x - 2)(x - 5) \leq 0$

25. $\frac{x^2 - 13x + 40}{x + 3} \geq 0$

26. $e^x x^2 - 25e^x < 0$

Expand the following using Pascal's Triangle

27. $(x + 5)^4$

28. $(x + h)^5$

29. If $f(x) = x^3 - 2x^2$ evaluate $f(1 + h) - f(1)$ and $f(x + h) - f(x)$

Find the following lines.

30. $(-9, -4)$ & $(6, 16)$

31. $(-12, 24)$ & $(4, 4)$

32. $(-5, 3)$ & $(7, 11)$

33. Perp to $y = \frac{5}{6}x$, through $(10, -7)$

34. Simplify $(x^2 + 2)^3 + 3(2x)(x - 1)(x^2 + 2)^2$ so that it's the product of 2 polynomials.

Simplify the following fractions.

35. $\frac{5x^3 - 6x^2 + \frac{2}{x}}{3x}$

36. $\frac{4x^3 - \frac{6}{x} + 15}{\sqrt{x}}$

37. $\frac{2x^2 - \sqrt{x^5} - \sqrt{x}}{\sqrt[3]{x}}$

For the following, identify at what values you find

a) x – intercepts b) y – intercepts c) holes d) vertical asymptotes and e) horizontal asymptotes

38. $\frac{x^3 + x^2 - 9x - 9}{(x^2 + 6x + 5)(x^2 - 3x - 18)}$

39. $\frac{(2x^2 + 18x + 28)(x^2 - 8x + 15)}{(3x^2 + 15x - 72)(x^2 + x - 42)}$

Solve the following, without a calculator.

40. $5 \cos(x) + 3 = 13$

41. $6 \tan(3x) = 2\sqrt{3}$

42. $8 \sin^2(x) - 1 = 5$

Evaluate the following.

43. $\sin\left(\frac{7\pi}{6}\right)$

44. $\cos\left(\frac{7\pi}{6}\right)$

45. $\tan\left(\frac{7\pi}{6}\right)$

46. $\sin\left(\frac{5\pi}{4}\right)$

47. $\cos\left(\frac{5\pi}{4}\right)$

48. $\tan\left(\frac{5\pi}{4}\right)$

49. $\sin\left(\frac{4\pi}{3}\right)$

50. $\cos\left(\frac{4\pi}{3}\right)$

51. $\tan\left(\frac{4\pi}{3}\right)$

52. $\sin\left(\frac{\pi}{2}\right)$

53. $\cos(\pi)$

54. $\tan\left(\frac{3\pi}{2}\right)$

55. $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$

56. $\cos^{-1}\left(\frac{1}{2}\right)$

57. $\tan^{-1}(1)$

58. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

Pre-Calculus Summer Review

Worksheet 7

Factor the following.

1. $x^2 - 9x - 52$

3. $4x^3 - 20x^2$

5. $2x^2 - 11x - 40$

7. $5x^2 + 22x + 8$

2. $x^2 - 15x + 54$

4. $12x^4 - 27x^2$

6. $2x^3 + 3x^2 - 32x - 48$

8. $4x^2 + 8x - 21$

Solve the following.

9. $5x^2 - 17 = 48$

11. $2\sqrt{3x-5} + 4 = 8$

13. $9^{2x-4} = 27^{x-1}$

15. $\log_2(6x+2) - \log_2(x-3) = 4$

17. $\frac{8}{x} + \frac{x+7}{3} = 7$

19. $\frac{3x}{6\sqrt{x^2+16}} - \frac{1}{8} = 0$

21. $8 \cos(4x) + \sqrt{12} = 2\sqrt{27}$

10. $3(x+5)^2 - 7 = 2$

12. $\sqrt{3x+4} - \sqrt{x-3} = 3$

14. $5^{4x+5} = 12^{2x-1}$

16. $\log_4(x^2 - 5x + 28) = 3$

18. $\frac{12}{x-2} - \frac{15}{x+1} = 3$

20. $10 \sin x - 7 = -2$

22. $6 \tan^2 x + 11 = 13$

Solve the following inequalities.

23. $x^2 - 4x - 32 \leq 0$

25. $\frac{x^2-11x+18}{x+2} \geq 0$

24. $(x^3 + 4x^2)(x+1)(x-3) > 0$

26. $\ln(x) \cdot x^3 - 8 \ln(x) < 0$

27. If $f(x) = 5x^2 - 3x + 2$, find $f(x+h) - f(x)$

28. If $g(x) = 2x^3 + 4x^2$, find $g(x+h) - g(x)$

29. Find a line that goes through the points $(4, 2)$ and $(-3, 5)$

30. Find a line that is perpendicular to $y = \frac{5}{2}x - 6$ and goes through $(10, 7)$

31. Simplify $3(x^3 - 5)^4 + 4(3x^2)(3x + 1)(x^3 - 5)^3$

32. Simplify $\frac{x^4 - 6\sqrt{x} + \frac{5}{x^2}}{\sqrt[3]{x^2}}$

For the following, identify at what values you find

a) *x* – intercepts b) *y* – intercepts c) holes d) vertical asymptotes and e) horizontal asymptotes

33. $\frac{(x^2 - 7x - 30)(2x^2 + 12x - 32)}{(x^2 - 16x + 60)(x^2 + 6x + 9)}$

Evaluate the following.

34. $\sin\left(\frac{\pi}{3}\right)$

35. $\tan\left(\frac{3\pi}{4}\right)$

36. $\cos\left(\frac{5\pi}{6}\right)$

37. $\tan\left(\frac{4\pi}{3}\right)$

38. $\cos\left(\frac{5\pi}{3}\right)$

39. $\sin\left(\frac{2\pi}{3}\right)$

40. $\sin\left(\frac{7\pi}{4}\right)$

41. $\cos\left(\frac{5\pi}{6}\right)$

42. $\sin\left(\frac{4\pi}{3}\right)$

Pre-Calculus Summer Review

Worksheet 8

Factor the following.

1. $x^2 - 6x - 7$

3. $14x^2 - 21x$

5. $9x^2 + 6x + 1$

7. $5x^2 - 18x - 8$

2. $x^2 + 11x + 24$

4. $-6x^2 + 15x^4$

6. $2x^3 + x^2 - 18x - 9$

8. $6x^2 - 11x - 10$

Solve the following.

9. $3x^2 - 11 = 16$

11. $4\sqrt{3x+4} - 11 = 17$

13. $2^{5x-1} = 16^{x+3}$

15. $\ln(x-2) + \ln(x) = 1$

17. $\frac{8}{x} + \frac{x+7}{3} = 7$

19. $\frac{3x}{6\sqrt{x^2+16}} - \frac{1}{8} = 0$

21. $8 \cos(4x) + \sqrt{12} = 2\sqrt{27}$

10. $5(x+2)^2 - 9 = 21$

12. $\sqrt{2x+4} - \sqrt{x-2} = 2$

14. $2^{5x+1} = 12^{2x-1}$

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18. $\frac{12}{x-2} - \frac{15}{x+1} = 3$

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40. $\sin\left(\frac{7\pi}{4}\right)$

41. $\cos\left(\frac{5\pi}{6}\right)$

42. $\sin\left(\frac{4\pi}{3}\right)$

Evaluate the following:

43. $4 - \frac{1}{2}$

44. $\frac{2}{3} - \frac{1}{2}$

45. $\frac{28}{5} \cdot \frac{15}{4}$

46. $\frac{1}{x} + \frac{2}{3} + \frac{x}{6}$