Answer Key
Testname: M1103 PRACTICE FINAL EXAM F19

1) B
2) C
3) A
4) D
5) C
6) B
7) A
8) A
9) B
10) A
11) D
12) C
13) A
14) C
15) D
16) A
17) D
18) A
19) D
20) B
21) D
22) C
23) D
24) C
25) B
26) D
27) C
28) C
29) A
30) C
31) C
32) D
33) D
34) B
35) A
36) B
37) B
38) B
39) B
40) B

MATH 1108- College Mathematics Review - Final Exam, Revised October 2019

Disclaimer: By no means does this review include all possible problems of which the final exam is a subset. Please be sure to review all chapters and sections from the course. The final exam is cumulative.

1. A rectangular shaped fenced-in pasture is to have a perimeter of 900 yards. IF the width must be 90 yards because of a building code, solve the equation $2l + 2(90) = 900$ to determine the length of the fenced-in pasture.

   $2l+180=900 \rightarrow 2l=720$ $\boxed{l=360}$

2. Simplify $\sqrt{75}$ without a calculator

   $\sqrt{25}\sqrt{3} \rightarrow \boxed{5\sqrt{3}}$

3. Solve the linear equation and simplify your answer. Express your solution as an integer, a simplified fraction or a decimal rounded to two decimal places.

   $$3(3y + 2) = 3y + 18$$

   $9y+6=3y+18$
   $6y=12$
   $\boxed{y=2}$

4. Set up the equation for the following word problem and solve the equation. Let x be the unknown number

   67 time a number minus 58 is equal to 36 less than the number.

   $67x-58=x-36$
   $66x=22$
   $\boxed{x=\frac{1}{3}}$

5. Consider the following equation: $6x + 4y = -2$
   Determine if the given ordered pairs, $(-3, 4)$ and (-5,0), satisfy the equation.

   $6(-3)+4(4)=-2$
   $-18+16=-2 \rightarrow -2=-2$ ✓

   $6(-5)+4(0)=-2$
   $-30=-2$ ✗

6. Find the y-intercept and x-intercept of the following linear equation: $-6x + 4y = -15$

   x-int: $y=0$
   $-6x+4(0)=-15$
   $-6x=-15 \rightarrow x=\frac{-15}{-6}$ $x=\frac{5}{2}$

   y-int: $x=0$
   $-6(0)+4y=-15 \rightarrow \frac{4y}{4}=\frac{-15}{4}$ $y=\frac{-15}{4}$

7. Find the slope determined by the following pair of points: $(4, -1), (-5, 8)$

   $m=\frac{\Delta y}{\Delta x} \rightarrow \frac{y_1-y_2}{x_1-x_2} \rightarrow \frac{8-(-1)}{-5-(4)}=\frac{9}{-9} \rightarrow m=-1$

   x-int: $(\frac{5}{2}, 0)$
   y-int: $(0, \frac{-15}{4})$

8. Find the equation (in slope-intercept form) of the line with the given slop that passes through the point with the given coordinates: slope: $\frac{-3}{4}$,ordered pair:$(-4, 5)$ $y=mx+b$ $m=-3/4$

   $5=\frac{-3}{4}(-4)+b \rightarrow 5=3+b \rightarrow b=2$

   $\boxed{y=\frac{-3}{4}x+2}$

9. State the domain of the following function: $y = -7x - 6$

   $\mathbb{R}$ OR all real numbers OR $(-\infty, \infty)$

10. Simplify the expression using the properties of exponents. Expand any numerical portion of your answer and only include positive exponents. $(\frac{3x^2y^{-1}}{y^2})^2$

    $\frac{3^2x^4y^{-2}}{y^2} \rightarrow \boxed{\frac{9x^4}{y^4}}$

11. Perform the indicated operation by removing the parentheses and combining like terms: $(5x - 8) - (8x^2 + 9x)$

    $5x-8-8x^2-9x \rightarrow \boxed{-8x^2-4x-8}$

12. Multiply the polynomials using the distributive property and combine like terms: $(x - 3)(x^2 + 3x + 9)$

    $x^3+3x^2+9x-3x^2-9x-27$

    $\boxed{x^3-27}$

13. Multiply the binomials using the FOIL method. Combine like terms. $(x^2+1)(8x^2+7)$

$8x^4+7x^2+8x^2+7 \rightarrow \boxed{8x^4+15x^2+7}$

14. One number is 3 more than another. The difference between their squares is 51.

$\begin{cases} x = y+3 \\ x^2-y^2=51 \end{cases}$ $\quad x=y+3$ $\quad -3 \quad -3$ $\quad y=x-3 \rightarrow x^2-(x-3)^2=51$

15. Divide the polynomial in the numerator by the monomial in the denominator. Simplify your answer. $\frac{3x^4+9x^3+4}{x^3}$

$\boxed{3x+9+\frac{4}{x^3}}$

16. Factor the given polynomial by finding the greatest common monomial factor and rewrite the expression: $2xy^2+10xy+11x^3y$

$xy(2y+10+11x^2)$

17. Completely factor the expression by grouping, if possible. $12ar-10uy+3ru-40ay$

$\boxed{(4a+u)(3r-10y)}$ $\quad 12ar+3ru-10uy-40ay$

$3r(4a+u)-10y(u+4a) \rightarrow \boxed{(4a+u)(3r-10y)}$

18. Factor the given trinomial. If the trinomial cannot be factored, indicate "Not Factorable". $2x^4-22x^3+60x^2$

$2x^2(x^2-11x+30)$

$\boxed{2x^2(x-5)(x-6)}$

19. Completely factor the trinomial, if possible: $8y^2-34y-9$

$\boxed{(2x-9)(4x+1)}$ $\quad AC=-72$

4 2 9 1 (×2, ×2, ×36) $\quad -36 \quad 2 = -34$

20. Solve the quadratic equation by factoring: $49x^2=25$

$49x^2=25 \rightarrow 49x^2-25=0$

$(7x-5)(7x+5)$ $\quad \boxed{x=\frac{5}{7}, \frac{-5}{7}}$

21. Evaluate the radical expression. Express your answer as an integer, simplified fraction,or a decimal rounded to two decimal places. If the Expression does not represent a real number, indicate "Not a Real Number". $\sqrt{-25}$

Not a Real Number

22. Simplify the following Expression. Assume that all variables are positive. $\sqrt[3]{81x^{15}y^5} \rightarrow \boxed{3x^5y\sqrt[3]{3y^2}}$

23. Simplify the following expression. If the expression is not a real number, indicate "Not a Real Number". $(\frac{27}{64})^{\frac{2}{3}} \rightarrow \boxed{\frac{9}{16}}$

24. Statistics show that the fractional part of a battery, B, that is still good after t hours of use is given by $B=6^{-0.01t}$ What fractional part of the battery is still operating after 100 hours of use.

$B=6^{-0.01(100)} \rightarrow 6^{-1}=\boxed{\frac{1}{6}}$

25. Solve the following logarithmic equation in terms of the variable x: $log_{16}(x)=\frac{-1}{4}$

$\rightarrow 16^{\frac{-1}{4}} \rightarrow 2^{-1} \rightarrow \boxed{\frac{1}{2}}$

26. Express the following equation in exponential form: $ln(53.3)=k$

$e^k=53.3$

27. Solve the following quadratic equation by using the definition of a square root and write the solutions in simplified radical form: $(9y-27)^2=27$

$\boxed{y=\frac{\sqrt{3}}{3}+3}$

$\sqrt{(9y-27)^2}=\sqrt{27}$

$9y-27=\sqrt{27} \rightarrow 9y-27=\sqrt{9}\sqrt{3}$

$9y-27=3\sqrt{3} \rightarrow 9y-27=3\sqrt{3}$

$+27 \quad +27$

$\frac{9y}{9}=\frac{3\sqrt{3}+27}{9}$

$y=\frac{\sqrt{3}}{3}+3$

28. Solve the following equation using the quadratic formula: $-5y^2-6y=-2$

$\frac{-b\pm\sqrt{b^2-4ac}}{2a} \rightarrow \frac{6\pm\sqrt{6^2-4(-5)(2)}}{2(-5)} \rightarrow \frac{6\pm\sqrt{36+40}}{-10} \rightarrow \frac{6\pm\sqrt{76}}{-10} \rightarrow \frac{6\pm 2\sqrt{19}}{-10}$

$\boxed{\frac{-3\pm\sqrt{19}}{5}}$

29. A rectangular auditorium seats 2494 people. The number of seats exceeds the number of rows by 15. Find the number of seats per row.

$x+15$

$x \quad \boxed{2494}$

$x(x+15)=2494$

$x^2+15x=2494$

$x^2+15x-2494=0$

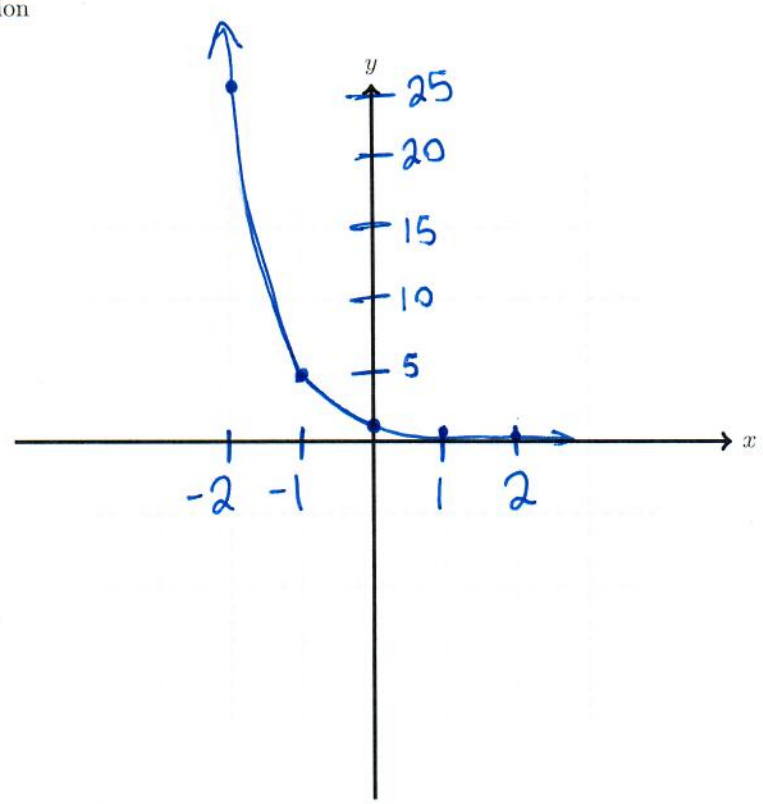
$(x+58)(2x-43)$ $\quad x=43+15 \rightarrow \boxed{58 \text{ seats}}$

30. Consider the following function: $y = \frac{1}{5}^x$

a. Make a list of x and y values

b. Graph the function

x	y
-2	25
-1	5
0	1
1	1/5
2	1/25



31. Find the probability that in a standard deck of 52 playing cards you choose a card and it is either a black card or a queen. Leave your answer as a simplified fraction or as a decimal rounded to the nearest thousandth.

$P(B) + P(Q) - P(B \cap Q)$ $\frac{26}{52} + \frac{4}{52} - \frac{2}{52} = \frac{28}{52} \rightarrow$ **7/13**

32. A survey of 140 freshmen business students at a local university produced the results listed below. How many students took only religion? **16**

33 took history

39 took science

38 took religion

17 took history but not science

12 took science and religion

13 took history and religion

3 took all three

History = 33

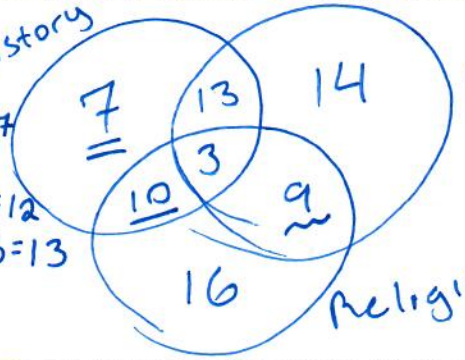
$7 + 10 + 3 = 20$

13

H-S → $H - S = \_ + 10 = 17$

S∩R → $S \cap R = \_ + 3 = 12$

H∩R → $H \cap R = \_ + 3 = 13$



Science = 39

$13 + 3 + 9 = 25$

14

Religion = 38

$10 + 3 + 9 = 22$

38 − 22 = 16

33. Michael had a test average of 82.6 last semester. His first four test grades were 89, 79, 76, and 91.

Use the formula $\bar{x} = \frac{x_1 + x_2 + \ldots + x_n}{n}$ to find his score on the fifth test.

$82.6 = \frac{89 + 79 + 76 + 91 + x}{5}$

$5 \times 82.6 = 335 + x \rightarrow 413 = 335 + x$

$-335 \quad -335$

$78 = x$

$x = 78$

34. Find the amount of money that will be accumulated in a savings account if \$3750 is invested at 8.0% for 16 years and the interest is compounded continuously. Round your answer to two decimal places.

\$13487.40

$A = Pe^{rt}$ $A = 3750e^{(.08)(16)}$ $A = 3750e^{1.28}$ $A = 3750(3.597)$

35. The intensity of a cat's soft purring is measured to be $2.19x10^{-11}$. Given that $I_o = 10^{-12} watts/meter^2$, what is the decibel level of this noise? Use the formula $D = 10log(\frac{I}{I_o})$ and round to the nearest hundredth.

13.40 decibels

$D = 10 \log\left(\frac{2.19 \times 10^{-11}}{10^{-12}}\right)$

$D = 10 \log(21.9) \rightarrow D = 10(1.340)$

$D = 13.40$

Key

MATH 1110- College Algebra Review - Final Exam, Revised December 2018

Math Zone

Disclaimer: By no means does this review include all possible problems of which the final exam is a subset. Please be sure to review all chapters and sections from the course. The final exam is cumulative.

1. Factor the following: $x^2 - 10x + 24$

$(x-4)(x-6)$

2. Use special factoring: $y^2 - 324$

$(x+18)(x-18)$

3. Consider the pair of points (-2,-8) and (1,2).

What is the distance between them? distance: $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2} = \sqrt{(1-(-2))^2+(2-(-8))^2}$

$= \sqrt{(3)^2+(10)^2} = \sqrt{9+100} = \boxed{\sqrt{109}}$

What is the midpoint

midpoint: $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$\frac{-2+1}{2}, \frac{-8+2}{2}$

$\boxed{(-1/2, -3)}$

4. Consider the equation: $2y - x = -4$ find the x- and y- intercepts.

$2(0) - x = -4$ $\quad 2y - 0 = -4$

$0 - x = -4$ $\quad 2y = -4$

$-x = -4$ $\quad \boxed{y = -2}$

$\boxed{x = 4}$

x-intercept: (4,0)

y-intercept: (0,-2)

5. Find the equation of the line in **slope-intercept form** that passes through the point (10,10) and has a slope of 6.

$y - y_1 = m(x - x_1)$

$y - 10 = 6(x - 10)$

$y - 10 = 6x - 60$

$\boxed{y = 6x - 50}$

6. Find the equation of the line in **standard form** that passes through the following points: (2,-10) and (6,-5).

$m = \frac{y_2-y_1}{x_2-x_1} = \frac{-5-(-10)}{6-2} = \frac{5}{4}$

$y - y_1 = m(x - x_1)$

$y - (-10) = \frac{5}{4}(x - 2)$

$y + 10 = \frac{5}{4}x - \frac{5}{2}$

$\left(y + 10 = \frac{5}{4}x - \frac{5}{2}\right)4$

$4y + 40 = 5x - 10$

$\boxed{-5x + 4y = -50 \text{ or } 5x - 4y = 50}$

7. Find the equation of the line that passes through the point (-10,-11) and is **parallel** to the given line. $(5y-3) = -2(5-x)$

$5y - 3 = -10 + 2x$

$5y = 2x - 7$

$y = \frac{2}{5}x - \frac{7}{5}$

$y - y_1 = m(x - x_1)$

$y - (-11) = \frac{2}{5}(x - (-10))$ or $\boxed{y + 11 = \frac{2}{5}(x + 10)}$

$y + 11 = \frac{2}{5}x + 4$

$\boxed{y = \frac{2}{5}x - 7}$

8. Find the standard form of the equation for the circle with the following properties. Center (-7,-4) and radius of 3.

$(x-h)^2 + (y-k)^2 = r^2$

$(x-(-7))^2 + (y-(-4))^2 = (3)^2$

$\boxed{(x+7)^2 + (y+4)^2 = 9}$

Key

9. Given $f(x) = 5x^2 - 7x + 5$, determine the difference quotient by using $\frac{(x+h)-f(x)}{h}$

$\frac{5(x+h)^2 - 7(x+h) + 5 - (5x^2 - 7x + 5)}{h} = \frac{5x^2 + 10xh + 5h^2 - 7x - 7h + 5 - 5x^2 + 7x - 5}{h}$

$= \frac{10xh + 5h^2 - 7h}{h} = \boxed{10x + 5h - 7}$

10. Sketch the graph of the equation (first re-write in center-radius form) $x^2 + y^2 + 8x - 2y = -1$

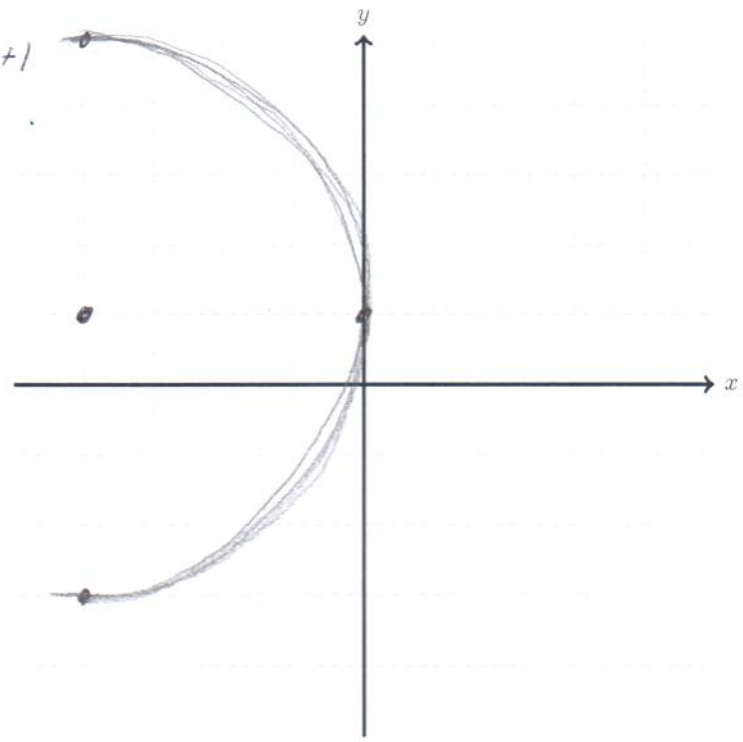
$x^2 + 8x + y^2 - 2y = -1$

$x^2 + 8x + 16 + y^2 - 2y + 1 = -1 + 16 + 1$

$(x+4)^2 + (y-1)^2 = 16$

Center: $(-4, 1)$

radius: 4

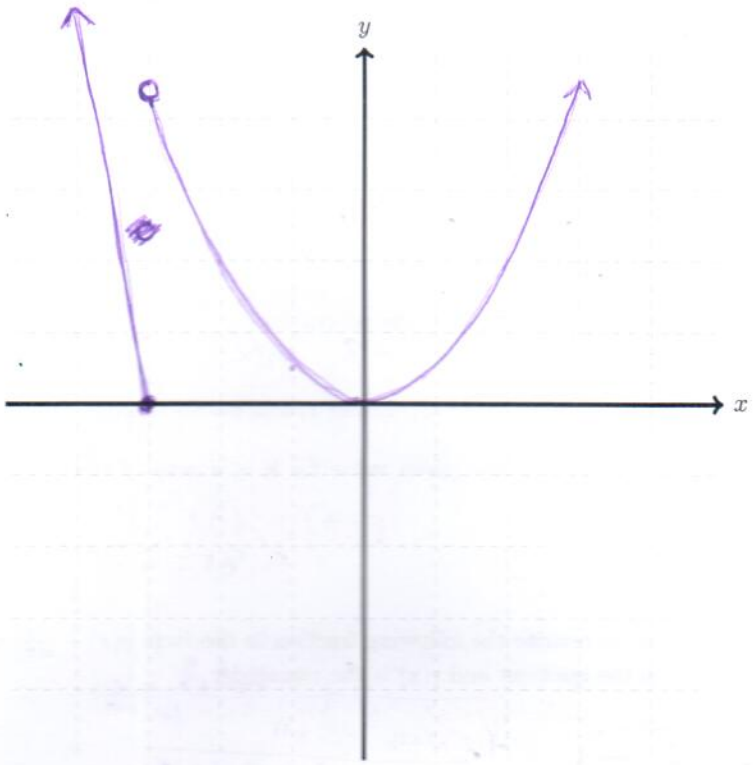


11. Graph the piece-wise defined function below.

$$r(x) = \begin{cases} -6x - 18 & x \leq -3 \\ \frac{1}{2}x^2 & x > -3 \end{cases}$$

See next Page.

Key



12. **a** varies directly as the square of **b** and inversely as the square of **c**. If $a = 158$ when $b = 9$ and $c = 3$, find **a** when $b = 5$ and $c = 6$

(I) $a = \frac{kb^2}{c^2}$ (II) $158 = \frac{k \cdot 9^2}{3^2} \ldots k = \frac{158}{9}$ (III) $a = \frac{kb^2}{c^2}$ $a = \frac{\left(\frac{158}{9}\right)(5^2)}{6^2}$

$a = \frac{158 \cdot 25}{9 \cdot 36}$

$a = \frac{1975}{162}$

13. Determine the more basic function that has been shifted, reflected, stretched or compressed. $v(x) = (6 - x)^2 + 3$

What is the shape of the more basic function?

U-shaped/parabola

$(6-x)(6-x)$

$36 - 12x + x^2$

What transformations has the more basic function undergone?

, moved up 3 units and to the right 6 units

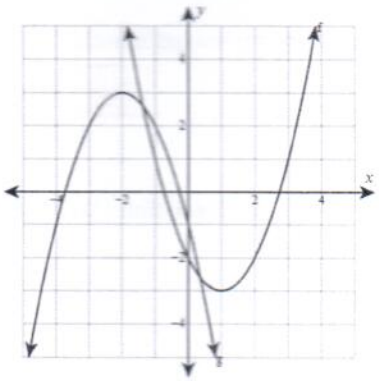
What is the domain and range -in interval notation- of the function?

range: $\mathbb{R}$ domain: $[3, \infty)$

14. Considering the functions: $f(x) = x^2 + 2$ and $g(x) = x^3 + x^2$ determine (f(g(2)).

$f(g(2)) = \left((2)^3 + (2)^2\right)^2 + 2 = (8 + 4)^2 + 2 = 144 + 2 = 146$

15. Given the graph, find $(f + g)(-1), (f - g)(-1), (f/g)(-1) and (f * g)(-1)$



2

3, -1, ~~1~~, 2

Key

16. Find the inverse of the function: $f(x) = \frac{-4}{2x+3}$

$x = \frac{-4}{2y+3}$ $2y+3 = \frac{-4}{x}$ $2y = -\frac{4}{x} - 3$ $y = -\frac{2}{x} - \frac{3}{2}$

17. Solve the following polynomial equation: $x^3 - 62x^2 + 61x = 0$

$x(x^2 - 62x + 61) = 0$ $x = 0, 61, 1$

$x(x-61)(x-1) = 0$

18. Construct a polynomial function with the following properties:

$(x+3)(x+2)(x-1) - 8 = (x-1)(x^2+5x+6) - 8 = x^3+5x^2+6x-x^2-5x-6-8$

$= x^3+4x^2+x-14$

Third degree, Zeros of -3, -2, and 1, and passes through the point (2,12)

19. Use synthetic division to determine if the given value for k is a zero of this polynomial. If not, determine p(k). $p(x) = 3x^3 - 3x^2 - 11x - 16; k = 3$

3 | 3 -3 -11 -16
9 18 21
3 6 7 | X

$p(3) = 3(3)^3 - 3(3)^2 - 11(3) - 16$

$= 81 - 27 - 33 - 16 = 5$

20. Use polynomial long division to rewrite the following fraction in the form $q(x) + \frac{r(x)}{d(x)}$ where d(x) is the denominator of the original fraction, q(x) is the quotient and r(x) is the remainder.

$\frac{15x^5+3x^4-33x^3-3x^2+18x}{3x^3-3x}$

$5x^2+x-6+\frac{0}{3x^3-3x}$

$3x^3-3x \overline{)15x^5+3x^4-33x^3-3x^2+18x+0}$ $5x^2+x-6$

$-(15x^5 \quad -15x^3)$

$3x^4-18x^3-3x^2+18x$

$-(3x^4 \quad -3x^2)$

$-18x^3+18x$

$-(-18x^3+18x)$

0

21. Consider the following polynomial. Use polynomial division and the quadratic formula, if necessary, to identify the actual zeros.

$g(x) = x^4 - 7x^3 + 8x^2 + 28x - 48$

Potential: $\pm\{1,2,3,4,6,8,12,16,24,48\}$

2 | 1 -7 8 28 -48
2 -10 -4 48
1 -5 -2 24 | 0

$x^3 - 5x^2 - 2x + 24$

Potential: $\pm\{1,2,3,4,6,8,12,24\}$

3 | 1 -5 -2 24
3 -6 -24
1 -2 -8 | 0

$x^2 - 2x - 8$

$(x-4)(x+2)$

Zeros: $x = 2$ $x = 4$ $x = 3$ $x = -2$

22. Consider the following rational function. Find equations for the vertical, horizontal and oblique asymptotes, if any, for the function.

$f(x) = \frac{10x^2+24x+8}{-2x+8}$

vertical: $x = 4$ $-2x+8=0$ $-2x=-8$

horizontal: $\frac{x^2}{x}$ no horizontal asymtote

oblique: $-2x+8 \overline{)10x^2+24x+8}$ $-5x-32$

$-10x^2+40x$

$64x+8$

$-64x+256$

264

$y = -5x - 32$

23. Solve the following elementary exponential equation.

$(\frac{1}{3})^{3x+1} = (\frac{1}{9})^4$

$(\frac{1}{3})^{3x+1} = ((\frac{1}{3})^2)^4$

$(\frac{1}{3})^{3x+1} = (\frac{1}{3})^8$

$3x+1 = 8$

$3x = 7$

$x = \frac{7}{3}$

24. Martha invests \$6100 in a new savings account which earns 3.1% annual interest, compounded monthly. What will be the value of her investment after 7 years? Round to the nearest cent.

$A(t) = P(1+\frac{r}{n})^{nt}$

$A(7) = 6100(1+\frac{0.031}{12})^{(12)(7)}$ $A(7) = 7576.18$

25. Solve the following logarithmic equation, using a calculator if necessary to evaluate the logarithm. Write your answer as a fraction or round your answer to two decimal places. $ln(7x+10) = 4$

$e^{\ln(7x+10)} = e^4$

$7x+10 = e^4$

$7x = e^4 - 10$

$x = \frac{e^4-10}{7}$

$x = 6.37$

26. Use the properties of logarithms to expand the following expression as much as possible. Simplify any numerical expressions that can be evaluated without a calculator. $ln(\frac{12x^9}{y^7})$

$\ln(\frac{12x^9}{y^7})$

$= \ln(12x^9) - \ln(y^7)$

$= \ln(12) + 9\ln(x) - 7\ln(y)$

Key

27. Solve the following logarithmic equation. Express your answer as either an exact expression or a decimal approximation rounded to four decimal places. $log_4(x+3) + log_4(x-3) = log_4(4x+36)$

$\log_4((x+3)\cdot(x-3)) = \log_4(4x+36)$

$x^2 - 9 = 4x + 36$

$x^2 - 4x - 45 = 0 \rightarrow$ quadratic formula

$\frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-(-4) \pm \sqrt{(-4)^2-4(1)(-45)}}{2(1)} = \frac{4 \pm \sqrt{16+180}}{2}$

$= \frac{4 \pm \sqrt{196}}{2} = \frac{4 \pm 13}{2} = \boxed{\frac{-11}{2}, \frac{17}{2} = x}$

28. Use the method of substitution to solve the following system of equations. If the system is dependent, express the solution set in terms of one of the variables. Leave all fractional answers in fraction form.

$$\begin{cases} -2x - 5y = 4 \\ 8x + 20y = -18 \end{cases}$$

$-2x - 5y = 4$

$+5y \quad +5y$

$-2x = 4 + 5y$

$x = -2 - \frac{5}{2}y$

$8(-2 - \frac{5}{2}y) + 20y = -18$

$-16 - 20y + 20y = -18$

$-16 \neq -18$ Inconsistent

29. Use properties of logs to write the expression as a single term without logs. $7^{8log_7(x)}$

$7^{8\log_7(x)} = 7^{\log_7(x^8)} = \boxed{x^8}$

30. Find a formula for the inverse of the following function, if possible. $V(x) = 3x^{1/5} + 2$

$x = 3y^{1/5} + 2$

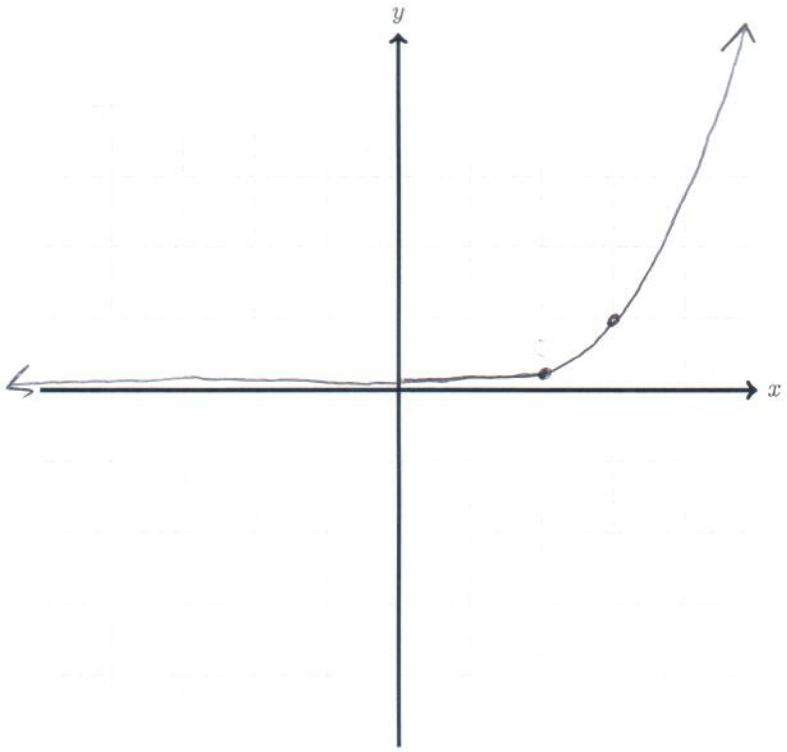
$x - 2 = 3y^{1/5}$

$\left(\frac{x-2}{3}\right)^5 = \left(y^{1/5}\right)^5$

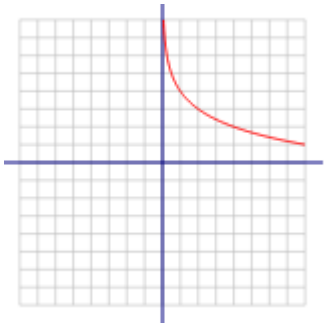
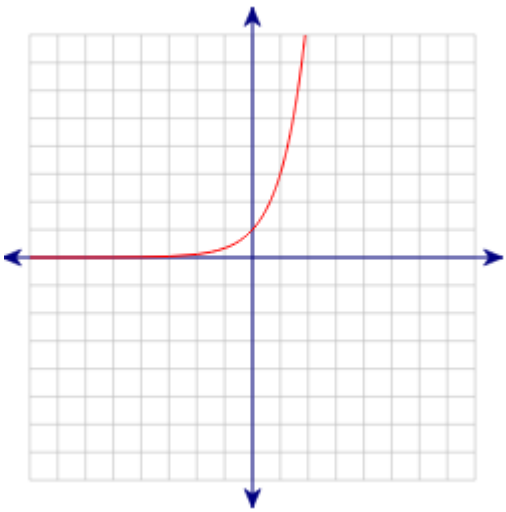
$\boxed{\left(\frac{x-2}{3}\right)^5 = y}$

31. Sketch a graph of the following exponential function: $p(x) = (\frac{1}{5})^{3-x}$

x	y
3	1
2	1/5



Answer key:

1. $x = 9$
2. 
3. $\frac{5x^3+10x^2-25x-30}{12}$
4. No solution
5. $x = 225$
6. No, 36
7. 11
8. $\frac{\pi}{4}, \frac{7\pi}{4}$
9. $\cot^2 t$
10. $\frac{\sqrt{6}+\sqrt{2}}{4}$
11. $-x^2 - x + 12$
12. $70°, 2.26, 2.45$
13. -2
14. $\sec \beta$
15. $\frac{2}{11}$ rad
16. G does not have an inverse function.
17. $(-2, 1), (-2, -1), (-1, 0), (-5, 2)$ $Domain : (-\infty, -1], Range : (-\infty, \infty)$
18. 42.0585 feet
19. One
20. 
21. x^8

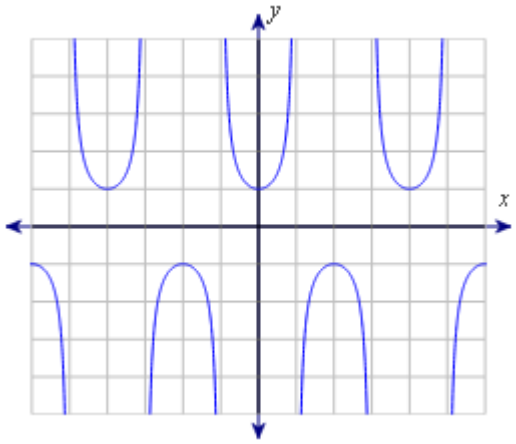
22. $28°$

23. $\frac{23}{25}$

24. Amplitude = 3, Period = 2π, Phase Shift = no phase shift

25. $\frac{5\pi}{6}, \frac{11\pi}{6}$

26. $31.04°$ or 0.54 or $58.96°$ or 1.03

27. 

Reflect graph across x-axis: No
Shift graph vertically: None
Shift graph horizontally (phase shift): Right, 3π
Stretch/compress graph vertically (amplitude): Yes, 2
Stretch/compress graph horizontally (period): No

28. Potential: $\pm\{\frac{1}{2}, 1, \frac{3}{2}, 2, 3, 6\}$
Real: $\{\frac{1}{2}, \sqrt{6}, -\sqrt{6}\}$

29. 64

30. $\frac{\pi}{6}$

31. A has an inverse function

32. $(f \circ g)(x) = \frac{1}{x+4}$
$(g \circ f)(x) = \frac{1+4x}{x}$