**MAT 1033** **REVIEW FOR FINAL**

1. Solve $2x - 1 < 12$ .

2. If $f(x) = 3x^2 - 5x + 6$, find:
   a. $f(0)$

   b. $f(-a)$

3. Stephen has 10 coins in his pocket. They have a total value of $1.90. If the coins are all either quarters or nickels, how many of each does Stephen have?

4. a. Find the slope of the graph of $5x - 6y = -9$.

   b. Find the y-intercept for this graph.

5. If $f(x) = 3x + 1$ find $f(-2)$

6. Write the equation of the line passing through $(2, -3)$ and perpendicular to the line $x + 2y = 6$.

7. Solve the system:
$$x - 3y = 7$$
$$2x + 5y = 9$$

8. Factor: $25x^2y - y^3$

9. Factor: $8x^3 - 125y^3$

10. Find the vertex of
    a. $y = 2x^2 + 3x + 7$.

    b. $y = 3(x + 1)^2 - 5$

11. Solve $x^2 - 6x + 7 = 0$.

12. Find the x-intercepts of $y = 3x^2 - 9x + 5$ using the quadratic formula.

13. Simplify and write the result in $a + bi$ form.

    a. $(2 - 7i) + (5 + 4i)$

    b. $(3 - 3i)(3 + 3i)$

    c. $(2+3i)/(1+5i)$

14. Simplify and express without negative exponents.
$$\frac{4x^{-3}y^2}{9x^2y} \cdot \frac{15xy^3}{2x^{-4}y^2}$$

1. _____

2. a. _____

   b. _____

3. _____

4. a. _____

   b. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. a. _____

    b. _____

11. _____

12. _____

13. a. _____

    b. _____

    c. _____

14. _____

15. Simplify.

a. $\sqrt{x^4y^{10}}$

b. $\sqrt[3]{x^3y^6}$

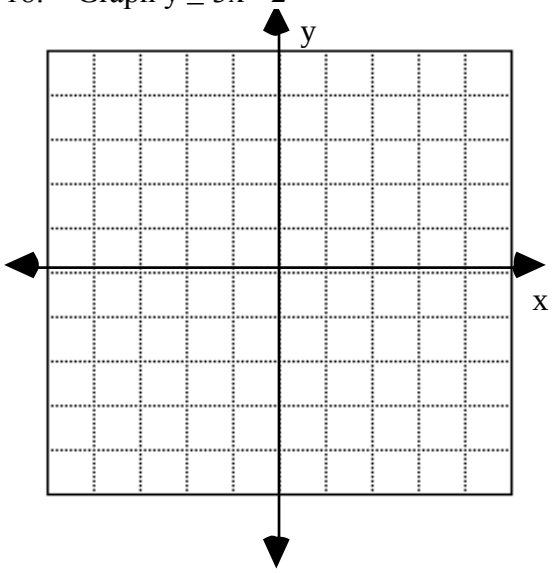
c. $(8x^3y^4)^{2/3}$

d. $\left(\frac{9}{x^4}\right)^{1/2}$

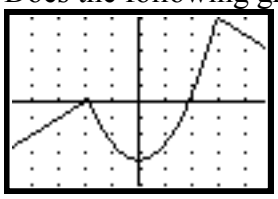
16. Add and simplify: $\frac{-8}{x+5}+\frac{5}{x+2}$

17. Solve: $\frac{4}{2x-1}=\frac{3}{x-7}$

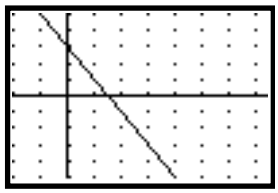
18. Graph $y \leq 3x - 2$




19. Does the following graph represent a function? Why?



20. Write the equation for each of the following graphs. Each mark on the graph represents one unit.



15.
a. _____
b. _____
c. _____
d. _____

16. _____

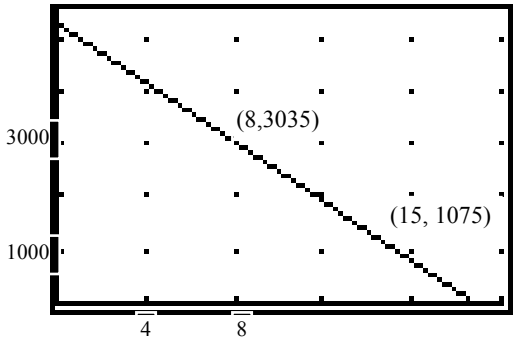
17. _____

18. see graph

19. _____

College Algebra Review for Final

1) The figure below shows the amount of money, M, left in Jim's bank account w weeks after he loses all sources of income.




A) Calculate the slope. Explain what the slope measures in the context of this problem.
B) Find the vertical intercept. Explain what this point represents in the context of this problem.
C) Write a linear equation that describes Jim's money, M, in terms of weeks, w.
D) Estimate the amount of money Jim has left after 4 weeks. Mark this point on the graph.

2) The world's oil reserves were 1660 billion barrels in 1976; total annual consumption is 20 billion barrels. Several values are shown in the table below.

| time (after 1976) | barrels (in billions) |
|---|---|
| 0 | 1660 |
| 2 | 1620 |
| 4 | 1580 |

A) Write an equation that expresses the remaining oil reserves, R, in terms of time, t(in years since 1976).
B) Find the intercepts.
C) What is the significance of the intercepts to the world's oil supply?
D) Graph the equation.

3) Solve $3x^2 + 7x - 1 = 0$ using the quadratic formula.

4) Write an equation for a parabola that has x-intercepts at (-2, 0) and (-5, 0).

5) Solve $2x^2 + 13x - 24 = 0$ using any method. Show your work or explain your method.

6) James Bond stands on top of a 200-foot building and throws a book upward with a velocity of 32 feet per second. The height of the book above the ground t seconds later is given by the formula $h = -16t^2 + 32t + 200$, where h is in feet.
A) When is the book above 200 feet?
B) How long does it take the book to hit the ground? Find this algebraically.
C) What is the maximum height that the book reaches?
D) Graph the equation for h in terms of t. Mark the points corresponding to your answers to parts A, B and C on your graph.

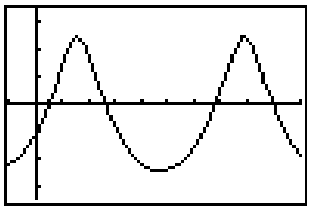
7) The revenue of The Chocolate Shoppe is given by $R = -0.04x^2 + 34x$ dollars from the sale of chocolates. How many pounds of chocolates must the company sell in order to maximize its revenue? What is the maximum revenue?

8) Given $y = x^2 + 3x - 10$:
A) Find the x-intercepts algebraically.
B) Find the y - intercept.
C) Find the vertex algebraically.

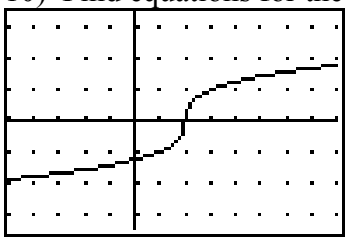
D) Sketch the graph.

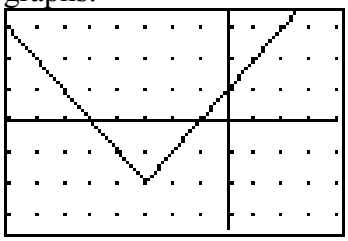
9) Are the following functions? **Explain why or why not**.

| x | t |
|---|---|
| 2 | -1 |
| 3 | 0 |
| 5 | 4 |
| 11 | 7 |
| 3 | 5 |



10) Find equations for the following graphs.



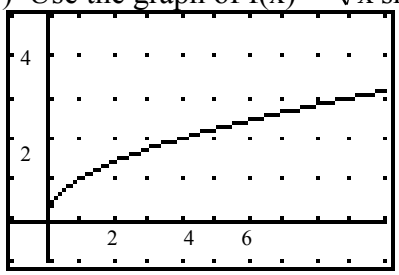


11) Given the table below, evaluate f(5).

| x | f(x) |
|---|---|
| -1 | 5 |
| 2 | 7 |
| 5 | 11 |
| 9 | 23 |

12) Given $g(x) = 2x^3 - 5x^2 + 1$, find g(-2).

13) Use the graph of $f(x) = \sqrt{x}$ shown, to estimate the following.

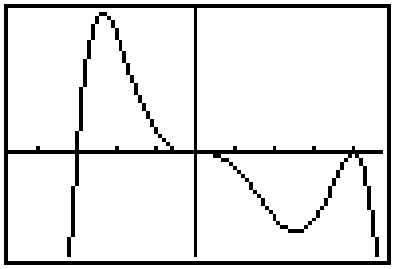



A) f(7) =
B) For what x value will f(x) = 1.5?
C) The domain of the graph is _____.
D) The range of the graph is _____.

14) Sketch a graph of $P(x) = (x+5)(x-2)^2$

15) Given $f(x) = (x-7)^3(x+2)^2$
A) What is the degree of the polynomial?
B) What is the end behavior?
C) Where are the x-intercepts?
D) What is the behavior of the graph at each of the x-intercepts?

16) Given the graph as shown, find an equation.



17) The cost in thousands of dollars for immunizing p% of the residents of Mathematicsland against a dangerous new disease is given by the function $C(p) = \frac{65p}{100 - p}$.

A) What is the cost of immunizing 40% of the residents? Show your work or explain how you got your answer.

B) What percentage can be immunized if the city is able to spend $87, 000?

C) Graph the function C. (Use Xmin = 0, Xmax = 100, Ymin = 0) Mark the answers to parts A and B as points on your graph.

18) A) Write $\log_4 y = p$ in exponential form.

B) Write $h^5 = t$ in logarithmic form.

C) Solve for x: $r^x = 7$

D) Solve for x: $\log_x 25 = 2$

E) Solve for x: $\log(x + 14) = 2$

F) Solve: $4e^{7x+1}=12$

19) The population of a town was 45,000 in 1970 and has been growing by 6% each year.

A) Find a function that models this situation, where t is years since 1970 and P is population of the town.

B) What is the population in 1998?

C) When will (did) the population reach 80,000 people?

D) Sketch a graph and label the coordinates for parts B and C.

20. Given $y = \frac{1}{x+2} - 5$ and $y = \frac{2}{x^2} - 1$, find:

A) the horizontal asymptote of each equation.

B) the vertical asymptote(s) of each equation.

C) the y-intercept of each equation.

D) Sketch a graph of each equation.

21. Find the inverse:

A)

| x | 1 | 10 | 100 | 1000 |
|---|---|---|---|---|
| f(x) | 10 | 15 | 20 | 25 |

B) $f(x) = \sqrt[3]{4x+1}$

22. Describe how to transform one of the ten basic shapes to obtain $f(x) = -5\sqrt{x+3} + 6$. Sketch the graph and label at least two points on the graph.