

## Math A 30 Review

I have identified questions below that are usually poorly done on the Final Exam. If you hope to do well on the test, you should be prepared to do questions like the following:

- Determine the equation of the line that passes through (4,1) and is:
  - parallel to the line defined by  $9x - 7y = 126$
  - perpendicular to the line defined by  $9x - 7y = 126$ .
- Rewrite the quadratic function  $y = 3x^2 - 6x - 5$  in the form  $y = a(x - p)^2 + q$  and then determine:
  - the coordinates of the vertex.
  - the equation of the axis of symmetry.
  - the concavity of the function.
  - the y- intercept.
  - the x intercept(s) or zeroes of the function.
  - the maximum (minimum) value of the function.
  - the domain and range of the function.
  - a sketch of the graph.
- If two numbers have a sum of 60, what is their greatest possible product? What are the numbers that yield the maximum?
- A ball is (h) meters above ground (t) seconds after it is hit where  $h = -5t^2 + 30t + 1$ . When does the ball reach its maximum height? What is the maximum height reached by the ball?
- One number is 10 larger than another. What is the smallest possible value for the sum of their squares? What are the numbers that yield the minimum?
- Factor each of the following polynomials completely:
  - $y^2 - 10y + 25 - 36v^2$
  - $4m^2 - a^2 + 20ab - 100b^2$
  - $8x^3 + 27x^3y^9$
- Use the factor theorem to factor completely:  $-7x - 6 + x^3$
- Reduce the following rational expressions **noting any restrictions** on the variable:
  - $\frac{x^3 - y^3}{y^2 - x^2}$
  - $\frac{3x^4 - 30x^3}{50x - 5x^2}$
- Simplify:  $\frac{a^2 - 16}{16a - 4a^2} \cdot \frac{2a^3 + 6a^2}{a^2 + 7a + 12}$

10. Simplify:  $\frac{5x^3 - 40}{40 - 10x^2} \div \frac{x^3 + 2x^2 + 4x}{x^2 + 3x + 2}$

11. Simplify:  $\frac{6x^2 + 5x - 6}{12x - 3x^2} \cdot \frac{12x^2 - x - 6}{6x^2 + 13x + 6} \div \frac{12x^2 - 17x + 6}{2x^2 - 8x}$

12. Simplify:  $\frac{5a}{6b^2c} + \frac{2a}{9bc^2}$

13. Simplify:  $\frac{6a}{a^2 - a - 2} - \frac{7a - 1}{a^2 - 2a - 3}$

14. Simplify each of the following:

a.  $\frac{-28x^{2/3}y^{-3/5}}{21x^{-1/3}y^{12/5}}$

b.  $\left(2^{-1/2}x^{3/4}y^{-8/3}\right)^{-12/5}$

c.  $\frac{2\sqrt{6} - 3\sqrt{5}}{3\sqrt{6} - 2\sqrt{5}}$

15. Solve each equation:

a)  $\frac{x}{x-4} + \frac{x-2}{x-5} = 4$

b)  $3|5 - 2x| - 2 = 19$

16. Solve each radical equation. Reject any extraneous roots:

a)  $3\sqrt{2x+4} + 20 = 8$

b)  $\sqrt{x+2} - \sqrt{3x-5} = -1$

17. Find three consecutive positive even integers whose squares have a sum of 2360.

18. A(2,-3) and B(-4,5) are the endpoints of the diameter of a circle. Find the coordinates of the center of the circle and find the radius of the circle.

19. How many real roots does  $m^4 - 3m^2 - 4 = 0$  have? What are they?

20. What are the x intercepts for  $2x^2 - 2x - 5 = 0$  ?
21. A quadratic defined by  $y = x^2 - 16$  is an example of: Pick one.
- one to many relation
  - many to one relation
  - one to one relation'

22. If  $g(x) = x^2 - 1$        $f(x) = \frac{1}{x-1}$

- Determine:
- $f(3)$
  - $f(x + h)$
  - $g(f(x))$
  - $\frac{f(x+h) - f(x)}{h}$

23. What is inverse variation? Give an example. What is its defining equation?

24. If x varies inversely with y and  $x = 5$  when  $y = 22$ , find x if  $y = 52$ .

25. Graph the line  $2x - y = 4$

26. Solve the system.

$$\frac{2}{3}x + \frac{5}{2}y = 28$$

$$\frac{3}{4}x - \frac{1}{8}y = 8$$

27. A commissionaire removed 76 coins, consisting of loonies and quarters from a parking meter. If the value of the coins was \$37.75, how many coins of each were removed?

28. The distance between the points A(-2,3) and B(4,-1) is:

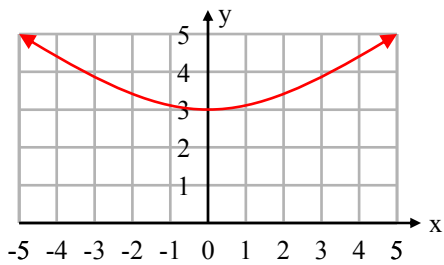
29. The midpoint of line segment AB is: A(4,-5) and B(-7,3)

30. The height (in inches) of 12 basketball players is shown below:

70	73	68	76	70	73
73	80	64	77	65	79

For this data set, determine the mean, median, mode, range and the 3 quartiles.

31. Identify the range and domain of the relation below:



**Answers**

1. a)  $9x - 7y = 29$

b)  $7x + 9y = 37$

2.

a)  $V(1, -8)$

b)  $x = 1$

c) up

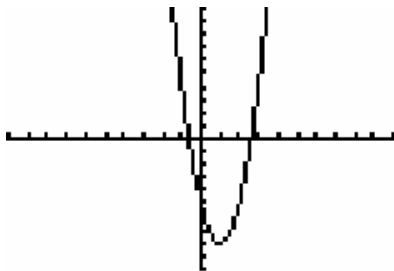
d)  $y = -5$

e)  $x = \frac{3 \pm 2\sqrt{6}}{3}$

f) min:  $y = -8$

g.  $\{x: x \in \mathbb{R}\}; \{y: y \geq -8, y \in \mathbb{R}\}$

h.



3. Product = 900; 30 and 30

4. 46 m after 3 seconds

5. 50 when  $x = -5,5$

6. a)  $(y - 5 - 6v)(y - 5 + 6v)$  b)  $(2m - a + 10b)(2m + a - 10b)$  c)  $(2x + 3xy^3)(4x^2 - 6x^2y^3 + 9x^2y^6)$

7.  $(x + 1)(x - 3)(x + 2)$

8. a.  $\frac{-(x^2 + xy + y^2)}{x + y}$  Rest:  $x^2 \neq y^2$

b.  $\frac{-3}{5}x^2$  Rest:  $x \neq 0, 10$ .

9.  $\frac{-a}{2}$

10.  $\frac{-(x+1)}{2x}$

11.  $\frac{-2}{3}$

12.  $\frac{15ac + 4ab}{18b^2c^2}$  ;  $b \neq 0, c \neq 0$

13.  $\frac{-(a + 2)}{(a - 3)(a - 2)}$

14. a.  $\frac{-4x}{3y^3}$  b.  $2^{6/5} x^{-9/5} y^{32/5}$  c.  $\frac{6 - 5\sqrt{30}}{34}$

15. a)  $x = 9/2, 8$       b)  $x = -1, 6$

16. a) No solutions      b)  $x = 7$

17. The integers are 26, 28, 30

18.  $C(-1, 1); r = 5$

19. Two  $m = \pm 2$

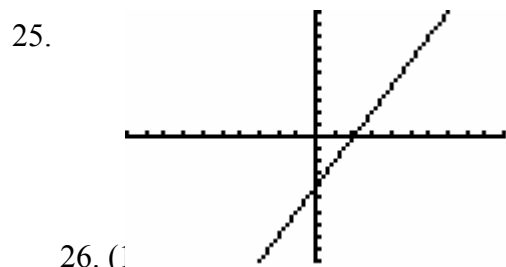
20.  $\frac{1 \pm \sqrt{11}}{2}$

21. many to one

22. a.  $\frac{1}{2}$       b.  $\frac{1}{x + h - 1}$       c.  $\frac{-x^2 + 2x}{(x - 1)^2}$       d.  $\frac{-1}{(x - 1)(x + h - 1)}$

23.  $xy = k$

24.  $\frac{55}{26}$



27. 25 loonies and 51 quarters

28.  $2\sqrt{13}$

29.  $M(-3/2, -1)$

30. Mean = 72.3 Median = 73 Mode = 73 Range = 16,  $Q_1 = 69$   $Q_2 = 73$   $Q_3 = 76.5$

31. D:  $\{x: x \in \mathbb{R}\}$  R:  $\{y: y \geq 3, y \in \mathbb{R}\}$