

# Math 134 Review

Name: \_\_\_\_\_

May 8, 2015

1. Write as a single exponent.

$$(a) 3(3^x)(3^y) = 3^{x+y+1}$$

$$(b) (2^{2x}(2^{-3}))^{-1} = 2^{3-2x}$$

$$2. \text{Simplify: } \sqrt{54p^{10}q^8} = 3\sqrt{6}p^5q^4$$

$$3. \text{Simplify: } (2p - 1)^2 - 2(p + 1) = 4p^2 - 6p - 1$$

$$4. \text{Simplify: } \frac{5^7 - 5 \cdot 4}{5} = 5^6 - 4$$

$$5. \text{Simplify: } \frac{x^2 - 9}{2x} \cdot \frac{12}{2x - 6} = \frac{3x + 9}{x}$$

$$6. \text{Write as a single fraction: } \frac{3}{a} - \frac{4}{b} = \frac{3b - 4a}{ab}$$

$$7. \text{If } a = xy/z \text{ then } a^{-2} = \frac{z^2}{x^2y^2}$$

8. Solve for  $x$ .

$$(a) 3x^2 - x = 30 \\ x = \frac{1 \pm \sqrt{361}}{6}$$

$$(b) 2x^2 - 4x + 3 = 2 \\ x = 1 \pm \frac{\sqrt{2}}{2}$$

9. For the following equations find any roots, intercepts, and the vertex of the graph.

(a)  $3x^2 - 4x + 2 = f(x)$

No roots, vertex at  $(\frac{2}{3}, \frac{2}{3})$ , y-intercept at  $(0, 2)$

(b)  $g(x) = (4x - 3)x$

Roots:  $x = \{0, \frac{3}{4}\}$ , Vertex:  $(\frac{3}{8}, -\frac{9}{16})$ , y-intercept:  $(0, 0)$

10. Solve for  $x$ :  $\frac{3x-1}{x+4} = 2$

$x = 9$

11.  $f(x) = \frac{2-x}{x+4}$ .  $f(-3) = ?$

$f(-3) = 5$

12.  $f(x) = -3x$ .  $f(x - 1) = ?$

$f(x - 1) = 3 - 3x$

13.  $f(x) = \frac{x}{x+1}$ . For which  $x$  is  $f(x) = \frac{1}{3}$ ?

$x = \frac{1}{2}$

14. Find the  $y$  coordinate of the point of intersection of the graphs  $x - 2y = -10$  and  $x + y = 4$ .

$y = \frac{14}{3}$

15. Find the slope of the line  $6x - 4y - 8 = 0$ .

$m = \frac{3}{2}$

16. Simplify:  $9^{3/2}27^{1/3} = ?$

81

17.  $f(x) = 3^x + x^2$ .  $f(-1) = ?$

$f(-1) = \frac{4}{3}$

18. Let  $f(x) = 3x - 4$ . Find  $f^{-1}(x)$  and evaluate  $f^{-1}(4)$ .

$f^{-1}(x) = \frac{x}{3} + \frac{4}{3}$ ,  $f^{-1}(4) = \frac{8}{3}$

19. Find  $\log_3 9^{\frac{1}{2}}$

1

20. Solve  $2^{x-3} = 3^{2x-1}$

$x = \frac{3 \ln 2 - \ln 3}{\ln 2 - 2 \ln 3}$

21. Solve  $3^{2x} - 3^x - 6$

$x = 1$

22. Solve  $\frac{(x-2)(x+1)^2}{x(x+3)} < 0$

$(-\infty, -3) \cup (0, 2)$

23. Perform polynomial division, give the quotient and remainder.

$$\frac{x^4 - 3x^3 + 6x^2 - 13x + 5}{2x^2 - 3}$$

$q(x) = \frac{1}{4}(2x^2 - 6x + 15), r(x) = \frac{1}{4}(-70x + 65)$

24. Write in interval notation and indicate on the number line.

(a)  $\{x : |x + 3| \leq 4\}$

$[-7, 1]$

(b)  $\{x : |x - 4| > 3\}$

$(-\infty, -1) \cup (7, \infty)$

(c)  $\{x : |x - 5| < 4\}$

$(1, 9)$

25. Write in set notation using absolute value signs.

(a)  $x > -1$  or  $x < -5$

$\{x : |x + 3| > 2\}$

(b)  $0 \leq x \leq 6$

$\{x : |x - 3| \leq 3\}$

26. Find the line that runs through the points  $(0, 3)$  and  $(-5, 2)$ .

$y = \frac{1}{5}x + 3$

27. Find the equation for the line that is perpendicular to  $y = -3x + 3$  and passes through the point  $(0, 6)$

$y = \frac{1}{3}x + 6$

28. Find the equation for the line that is parallel to  $y = 4x - 3$  and passes through the point  $(1, 3)$

$y = 4x - 1$

29. Graph the following equation  $p(x) = (x - 2)^2(3 - x)(x + 1)$

30. Graph the following function. List all roots and asymptotes and the behavior at them.

$$r(x) = \frac{(x - 3)(x + 2)}{(x + 1)(x - 2)}$$

Roots:  $x = 3, x = -2$ , crosses, Asymptotes:  $x = -1, x = 2$ , degree 1