

## Algebra II AB. 2<sup>nd</sup> Semester Exam Review

Put into  $f(x) = a(x-h)^2 + k$  form. Indicate Vertex, axis of symmetry, and direction of parabola.

$$x = -\frac{b}{2a}$$

$$\text{Vertex } (-3, 1)$$

$$x = -3$$



1.  $f(x) = 4(x+3)^2 + 1$

2.  $f(x) = -2(x-2)^2 - 2$

$$\text{Vertex } (2, -2)$$

$$x = 2$$



3.  $f(x) = x^2 + 6x - 3$

$$f(x) = (x+3)^2 - 12$$

$$\text{Vertex } (-3, -12)$$

$$x = -3$$



4.  $f(x) = 3x^2 - 18x + 11$

$$f(x) = 3(x-3)^2 - 16$$

$$\text{Vertex } (3, -16)$$

$$x = 3$$



Solve each equation by factoring

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

~~$$(x-6)(x+2) \quad x = 6$$~~

$$(x+3)(x-4) \quad x = 3$$

$$x = 4$$

6.  $x^2 - 12x + 36 = 0$

$$(x-6)(x-6) \quad x = 6$$

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

$$x(x-5) = 0$$

$$x = 0 \quad x = 5$$

Solve by using the quadratic equation.

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

$$x = \frac{-12 \pm \sqrt{12^2 - 4(1)(32)}}{2(1)}$$

$$x = \frac{-12 \pm 4}{2} \quad x = -4$$

$$x = -8$$

9.  $3x^2 + 5x - 2 = 0$

$$x = \frac{-5 \pm \sqrt{5^2 - 4(3)(-2)}}{2(3)}$$

$$x = \frac{-5 \pm 7}{6} \quad x = \frac{1}{3}$$

$$x = -2$$

List all the possible rational zeros for each function.

10.  $f(x) = x^3 + 6x + 2$   $\frac{p}{q}$   $\pm 1, \pm 2$

11.  $f(x) = 3x^3 + 5x^2 - 11x + 3$   $\pm 1, \pm 3, \pm \frac{1}{3}$

State the number of positive real zeros and negative real zeros.

12.  $f(x) = 5x^3 + 8x^2 - 4x + 3$

$$\text{Pos} = 2 \text{ or } 0$$

$$\text{Neg} = 1$$

13.  $f(x) = x^4 + x^3 + 2x^2 - 3x - 1$

$$\text{Pos} = 1$$

$$\text{Neg} = 3, 1$$

Find all the rational zeros for each function. Show possible roots, number of possible positive and negative roots.

15.  $f(x) = x^3 + 3x^2 - 6x - 8$   $\pm 1, \pm 2, \pm 3, \pm 4, \pm 8$

1 pos  
2 or 0 Neg

2, -1, -4

16.  $f(x) = x^3 + 7x^2 + 7x - 15$   $\pm 1, \pm 3, \pm 5, \pm 15$

1 Pos  
2 or 0 Neg

1, -3, -5

Simplify

17.  $\frac{3m+2}{m+n} + \frac{4}{2m+2n}$

$$\frac{3m+4}{m+n}$$

18.  $5 + \frac{x-3}{x+2}$

$$\frac{6x+7}{x+2}$$

19.  $\frac{2}{x-3} - \frac{1}{x-1}$

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

19.  $\frac{4a}{3bc} + \frac{15b}{5ac}$   $\frac{7m-5}{(m+1)(m-2)}$

20.  $\frac{4}{m+1} + \frac{3}{m-2}$   $\frac{4a^2+9b^2}{3abc}$

**Solve**

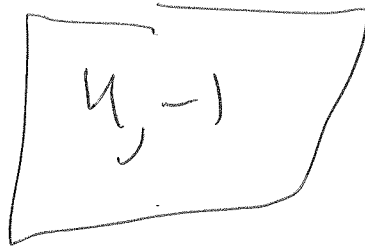
21.  $\frac{2y}{3} - \frac{y+3}{6} = 2$  5

22.  $\frac{4t-3}{5} - \frac{4-2t}{3} = 1$  2

23.  $\frac{y}{y+1} = \frac{2}{3}$  2

24.  $\frac{x+1}{3} + \frac{x-1}{3} = \frac{4}{3}$  2

$$25. \frac{1}{t-1} + \frac{1}{t+2} = \frac{1}{2}$$



Solve each equation.

$$26. 3^{4x} = 3^{(3-x)}$$

$$4x = 3 - x$$

$$5x = 3 \quad \boxed{x = \frac{3}{5}}$$

$$28. 9^{2p} = 27^{(p-1)}$$

$$3^{2(2p)} = 3^{3(p-1)}$$

$$4p = 3p - 3$$

$$p = -3 \quad \boxed{p = -3}$$

$$30. \log_3(3x+4) = \log_3(x-10)$$

$$3x+4 = x-10$$

$$2x = -14 \quad \boxed{x = -7}$$

$$32. 9^b = 45$$

$$\log 9^b = \log 45$$

$$b \log 9 = \log 45$$

$$b = \frac{\log 45}{\log 9}$$

$$\boxed{b = 1.7325}$$

$$34. 6^{x+2} = 17.2$$

$$\log 6^{x+2} = \log 17.2$$

$$(x+2) \log 6 = \log 17.2$$

$$x+2 = \frac{\log 17.2}{\log 6}$$

$$x = \frac{\log 17.2}{\log 6} - 2$$

$$\boxed{x = -1.4122}$$

$$27. \frac{1}{32} = 2^{(1-m)}$$

$$2^{-5} = 2^{(1-m)}$$

$$-5 = 1 - m$$

$$-m = 6 \quad \boxed{m = 6}$$

$$29. (1/9)^m = 81^{(m+4)}$$

$$9^{-m} = 9^{2(m+4)}$$

$$-m = 2m + 8$$

$$-3m = 8 \quad \boxed{m = -\frac{8}{3}}$$

$$31. \log_5(10x) = \log_5(2x+20)$$

$$10x = 2x + 20$$

$$8x = 20$$

$$\boxed{x = \frac{20}{8} = \frac{5}{2}}$$

$$33. 5^p = 34$$

$$\log 5^p = \log 34$$

$$p \log 5 = \log 34$$

$$p = \frac{\log 34}{\log 5} = \boxed{2.191}$$

$$35. \log_5 16 = x$$

$$5^x = 16$$

$$\log 5^x = \log 16$$

$$x \log 5 = \log 16$$

$$x = \frac{\log 16}{\log 5}$$

$$\boxed{x = 1.7227}$$