Section I – Rules with Exponents

Simplify completely, eliminating all negative exponents from your final answer.

1. $x^2 \cdot x^8$ x^{10}

2. $(2b)^4$

3. $(n^3)^3 \cdot (n^{-3})^3$ $n^9 \cdot n^{-9} = n^0 = 1$

4. $(-3f^3g)^4$

5. $\frac{30y^4}{-5y^2}$

6. $\frac{81p^6q^5}{(3p^2q)^2}$

7. $g^{(5/3)} \cdot g^{(7/3)}$ $g^{12/3} = g^4$

8. $\sqrt{(x)^3}\sqrt{(x^2)} = x^{1/2} \cdot x^{2/3} = x^{3/6} \cdot x^{4/6} = x^{7/6}$

9. $\frac{a^{(-2)}}{6a^{(3)} \cdot a^{(-4)}}$ $\frac{a^4}{6a^2a^3}$ $\frac{1}{6a}$

10. $\frac{2c^{(1/8)}}{c^{(-1/16)} \cdot c^{(1/4)}}$ $\frac{2c^{1/8} \cdot c^{1/16}}{c^{1/4}} = \frac{2c^{3/16}}{c^{1/4}} = 2c^{-1/16} = \frac{2}{c^{1/16}}$

Section II – Combining Mathematical Operations

Simplify completely.

1. $\frac{b^2 - 100}{b^2} \div \frac{3b^2 - 31b + 10}{2b}$ $\frac{(b+10)(b-10)}{b^2} \cdot \frac{2b}{(3b-1)(b-10)} = \frac{2(b+10)}{b(3b-1)}$

2. $\frac{x-4}{x^2+6x+9} \div \frac{x^2-2x-8}{3+x}$

3. $\frac{4z}{z-4} + \frac{z+4}{z+1}$

4. $\frac{2x+1}{x-5} - \frac{4}{x^2-3x-10}$ $(x-5)(x+2)$ $\frac{(x+2)(2x+1)}{(x-5)(x+2)} - \frac{4}{(x-5)(x+2)}$ $\frac{2x^2+5x+2-4}{(x-5)(x+2)} = \frac{2x^2+5x-2}{x^2-3x-10}$

Section III – Finding zeros

Solve each equation.

1. $x^3 - 9x^2 + 14x = 0$

$x(x^2-9x+14)=0$

$x(x-7)(x-2)=0$

$x=0 \quad x=7 \quad x=2$

2. $4x^2 + 5x - 6 = 0$

FOIL

~~$(2x-1)(2x+6)=0$~~

~~$(2x-2)(2x+3)=0$~~

$(4x-3)(x+2)=0$

$x=3/4 \quad x=-2$

1. $x^3 - 4x^2 + 4x = 0$

$x=0 \quad x=2 \quad x=2$

2. $x^4 - 10x^2 + 9 = 0$

$(x^2-9)(x^2-1)=0$

$x^2=9 \quad x^2=1$

$x=\pm 3 \quad x=\pm 1$

Section IV – Equations for Lines

1. Write an equation in slope-intercept from for the line that passes through (2, 0.5) and has a slope of -¾.

xy $y=mx+b$

$\frac{1}{2}=\frac{-3}{4}(2)+b$

$b=2$

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

2. Write an equation in slope-intercept form for the line that passes through (0, -2) and is perpendicular to $y = x - 2$.

$m=1$

$m=-1$

xy $y=-x+-2$

$-2=0+b$

3. Write an equation in slope-intercept from for the line that has an x-intercept of -4 and a y-intercept of 4.

(0,4) $m=\frac{0-4}{-4-0}=1$

(-4,0)

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

$y-0=1(x-4)$

$y=x+4$

4. Write an equation in slope-intercept form for the line that passes through (6, -5) and is parallel to $3x - \frac{1}{5}y = 3$

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

$y=15x-15$

$m=15$

$y+5=15(x-6)$

$y=15x-90-5$

$y=15x-95$

Section V – End Behavior

List all vertical asymptotes, horizontal asymptotes, *x*-intercepts and *y*-intercepts.

1. $f(x) = \dfrac{2x^2 + 6x + 4}{x^2 - 2x - 8}$

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

2. $f(x) = \dfrac{x - 1}{x^2 - 4x + 3}$

VA: $x-4=0$, $x=4$

H.A. $n=m$, $y=2$

x int: $y=0$, $x+1=0$, $x=-1$

y int: $x=0$, $y=\frac{-1}{-4}=\frac{1}{2}$

3. $f(x) = \dfrac{x^2 + 8x + 12}{x + 2}$

$n<m$ HA: $y=0$

$n=m$ H.A.: $y=$ l.c.

$n>m$ H.A. No H.A.

Section VI – Values of Functions

Find the exact value of each function in its most simplified form.

1. $\sin\frac{\pi}{3}$

2. sec 0

3. $\cos\frac{5\pi}{3}$

4. cot $(\frac{-5\pi}{6})$

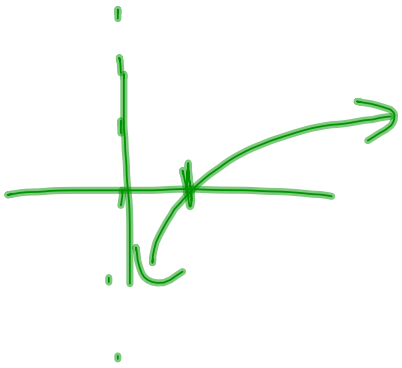
5. sin $(\frac{3\pi}{4})$

6. sec $(\frac{3\pi}{2})$

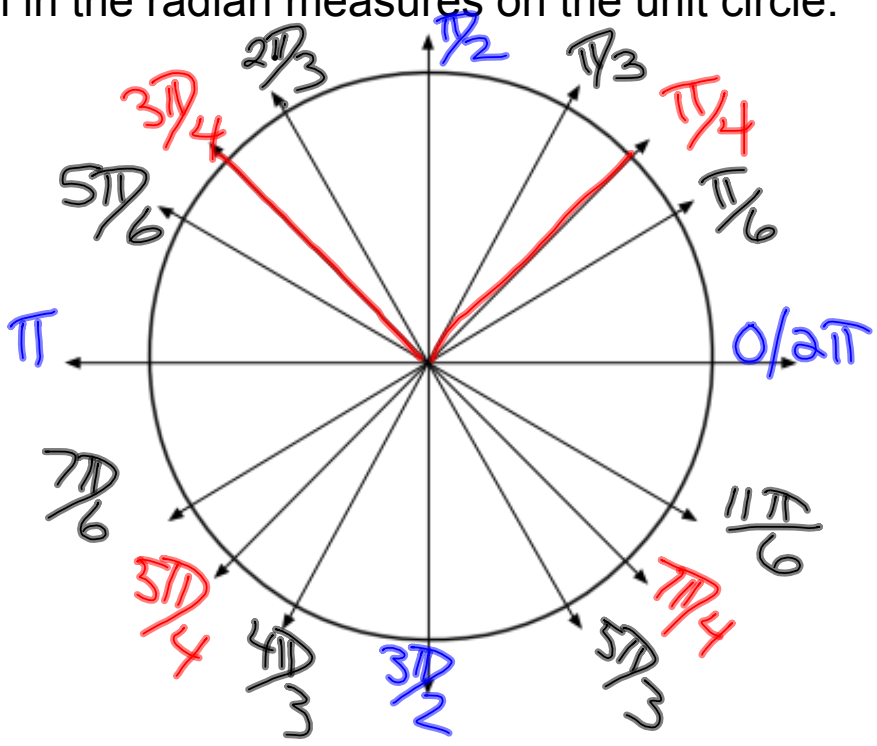
7. csc $(\frac{\pi}{3})$

8. ln (ln e) $= \ln 1 = 0$

9. Given $f(x)=x^2 - 3x + 4$, find $f(x+2) - f(2)$. Simplify

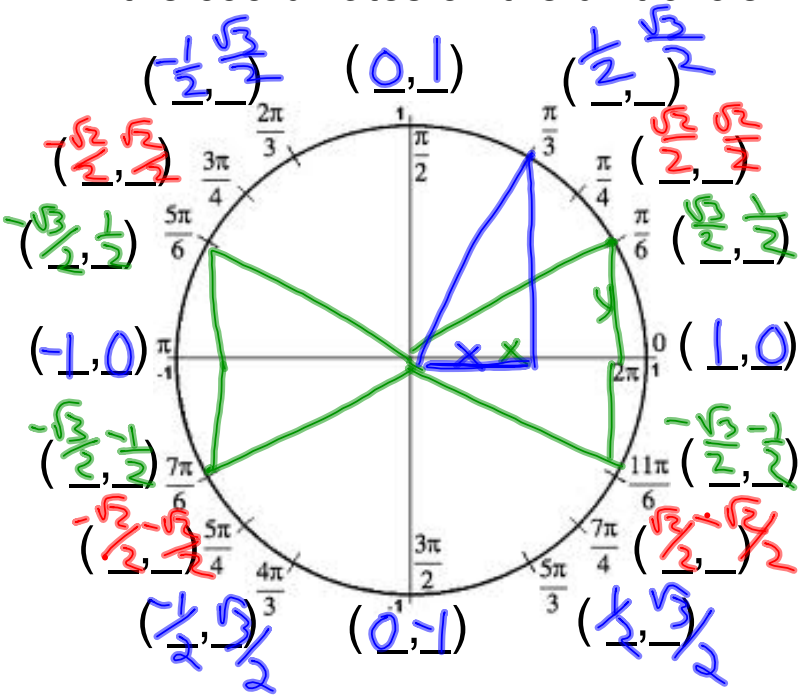


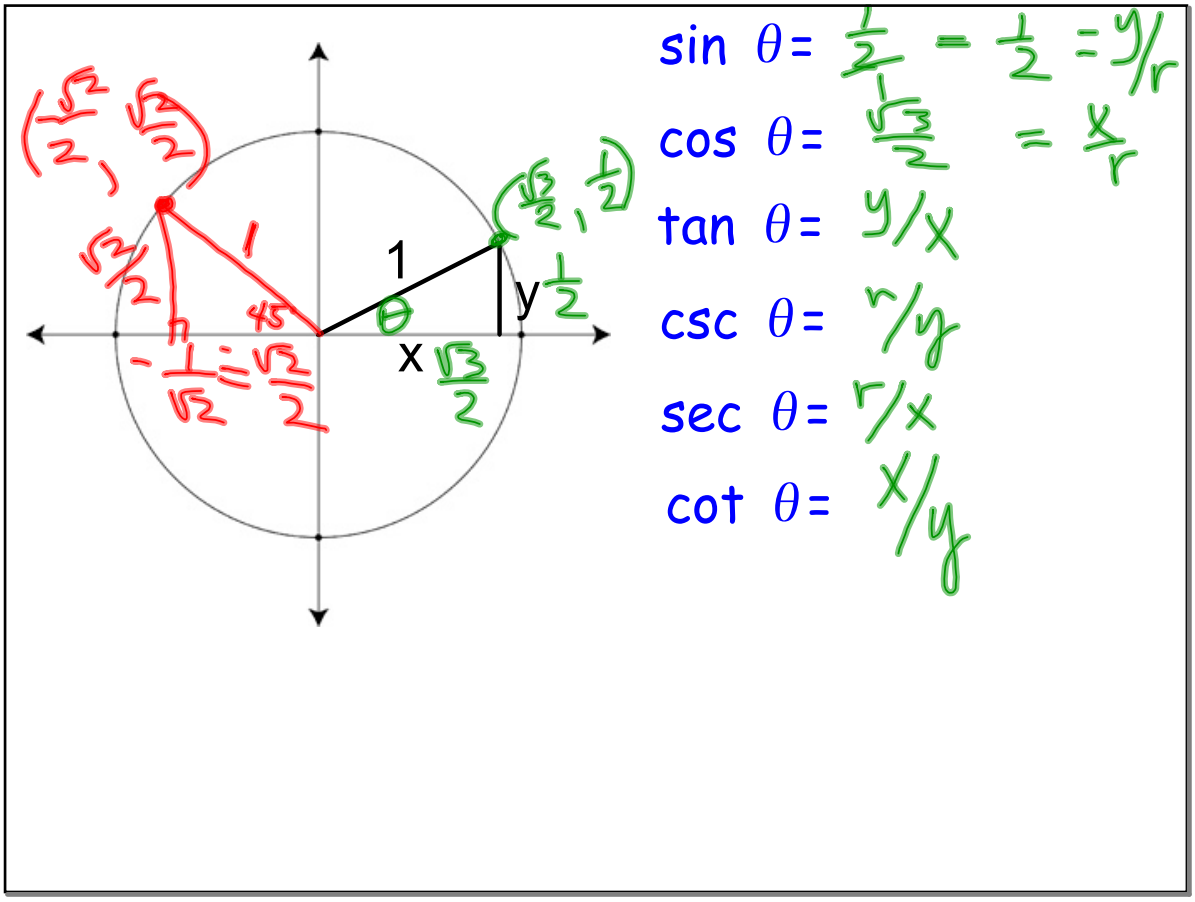
Fill in the radian measures on the unit circle.



$0, 1, -1, \frac{\sqrt{2}}{2}, \frac{\sqrt{3}}{2}, \frac{1}{2}$

Fill in the coordinates on the unit circle.





$\sin\theta = \frac{1}{2} = \frac{1}{2} = \frac{y}{r}$

$\cos\theta = \frac{\sqrt{3}}{2} = \frac{x}{r}$

$\tan\theta = \frac{y}{x}$

$\csc\theta = \frac{r}{y}$

$\sec\theta = \frac{r}{x}$

$\cot\theta = \frac{x}{y}$