

## Topic 10: Asymptotes

For each function, find the equations of both the vertical asymptote(s) and horizontal asymptotes (if they exist)

$$1. y = \frac{x}{x-3}$$

$$2. y = \frac{x+4}{x^2-1}$$

$$3. y = \frac{x+4}{x^2+1}$$

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

$$5. y = \frac{x^2-9}{x^3+3x^2-18x}$$

$$6. y = \frac{2x^2+6x}{x^3-3x^2-4x}$$

$$7. y = \frac{x^2-x-6}{x^3-x^2+x-6}$$

$$8. y = \frac{2x^3}{x^3-1}$$

$$9. y = \frac{\sqrt{x}}{2x^2-10}$$

### Topic 11: Complex fractions

Simplify the following

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

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

$$3. \frac{x - \frac{1}{x}}{x + \frac{1}{x}}$$

$$4. \frac{\frac{3}{x} - \frac{4}{y}}{\frac{4}{x} - \frac{3}{y}}$$

$$5. \frac{1 - \frac{2}{3x}}{x - \frac{4}{9x}}$$

$$6. \frac{\frac{x^2 - y^2}{xy}}{\frac{x + y}{y}}$$

$$7. \frac{\frac{x^{-3} - x}{x^{-2} - 1}}$$

$$8. \frac{\frac{x}{1-x} + \frac{1+x}{x}}{\frac{1-x}{x} + \frac{x}{1+x}}$$

$$9. \frac{\frac{4}{x-5} + \frac{2}{x+2}}{\frac{2x}{x^2 - 3x - 10} + 3}$$

## Topic 2: Domain

Find the domain of the following functions:

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

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

$$3. y = \frac{x^2-5x-6}{x^2-3x-18}$$

$$4. y = \frac{2^{2-x}}{x}$$

$$5. y = \sqrt{x-3} - \sqrt{x+3}$$

$$6. y = \frac{\sqrt{2x-9}}{2x+9}$$

$$7. y = \frac{x^2+8x+12}{\sqrt[4]{x+5}}$$

$$8. y = \sqrt{x^2-5x-14}$$

$$9. y = \frac{\sqrt[3]{x-6}}{\sqrt{x^2-x-30}}$$

$$10. y = \log(2x-12)$$

$$11. y = \sqrt{\tan x}$$

$$12. y = \frac{x}{\cos x}$$

Name \_\_\_\_\_

**Topic 1: Fractional & Negative Exponents**

Simplify using only positive exponents

1.  $-3x^{-3}$

2.  $-5\left(\frac{3}{2}\right)(4-9x)^{-\frac{1}{2}}(-9)$

3.  $2\left(\frac{2}{2-x}\right)\left[\frac{-2}{(2-x)^2}\right]$

4.  $(16x^2y)^{\frac{3}{4}}$

5.  $-\frac{x^{-\frac{1}{2}}}{2}\sin\sqrt{x}$

6.  $\frac{\sqrt{4x-16}}{\sqrt[4]{(x-4)^3}}$

7.  $-4\left(\frac{2x-1}{2x+1}\right)^{-3}\left[\frac{2(2x+1)-2(2x-1)}{(2x+1)^2}\right]$

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

9.  $\left(\frac{1}{x^{-2}} + \frac{4}{x^{-1}y^{-1}} + \frac{1}{y^{-2}}\right)^{-\frac{1}{2}}$

### Topic 3: Solving inequalities (absolute value)

Write the following absolute value expressions as piecewise expressions

1.  $y = |2x - 4|$

2.  $y = |6 + 2x| + 1$

3.  $y = |4x + 1| + 2x - 3$

Solve the following absolute value inequalities

4.  $|x - 3| > 12$

5.  $|x - 3| \leq 4$

6.  $|10x + 8| > 2$

7.  $|3x - 4| > -2$

8.  $|x - 6| > -8$

9.  $|x + 1| \leq |x - 3|$

### Topic 13: Solving Rational (fractional) equations

Solve each equation for  $x$

$$1. \frac{2}{3} - \frac{5}{6} = \frac{1}{x}$$

$$2. x + \frac{6}{x} = 5$$

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

$$4. \frac{x-5}{x+1} = \frac{3}{5}$$

$$5. \frac{60}{x} - \frac{60}{x-5} = \frac{2}{x}$$

$$6. \frac{2}{x+5} + \frac{1}{x-5} = \frac{16}{x^2-25}$$

$$7. \frac{x}{x-2} + \frac{2x}{4-x^2} = \frac{5}{x+2}$$

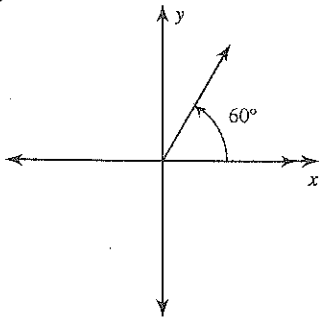
$$8. \frac{x}{2x-6} - \frac{3}{x^2-6x+9} = \frac{x-2}{3x-9}$$

$$9. \frac{2x+3}{x-1} = \frac{10}{x^2-1} + \frac{2x-3}{x+1}$$

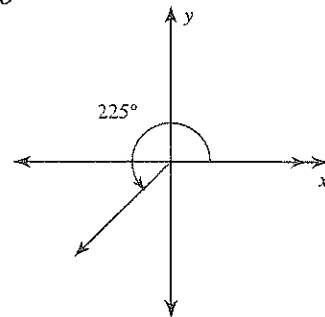
### Exact Trig Values of Special Angles

Find the exact value of each trigonometric function.

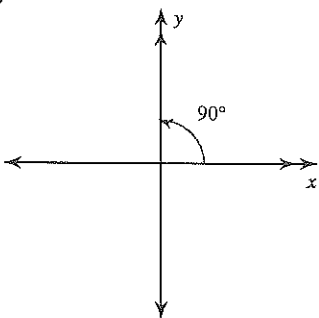
1)  $\tan \theta$



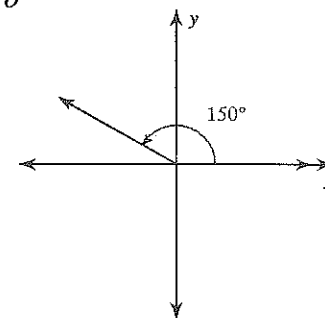
2)  $\sin \theta$



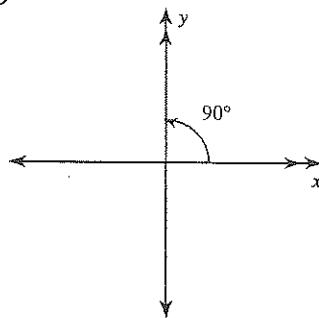
3)  $\sin \theta$



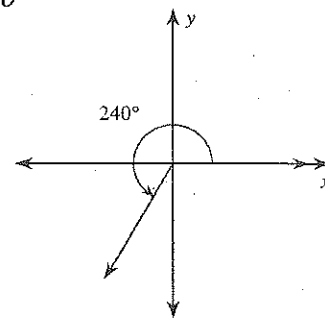
4)  $\cos \theta$



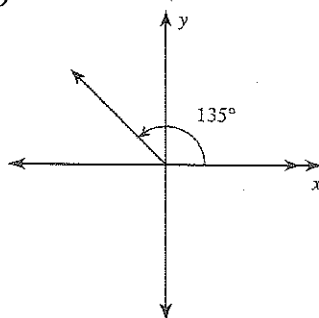
5)  $\cos \theta$



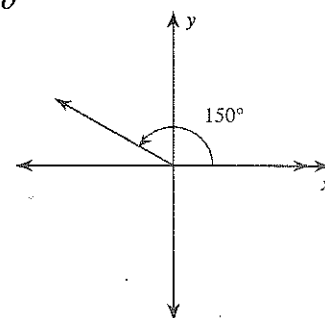
6)  $\tan \theta$



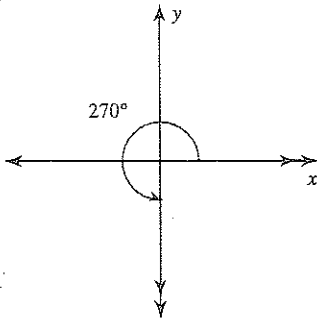
7)  $\cos \theta$



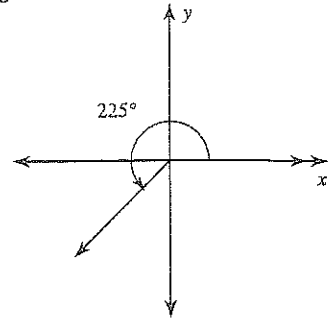
8)  $\tan \theta$



9)  $\cos \theta$



10)  $\tan \theta$



11)  $\cos 270^\circ$

12)  $\sin 0$

13)  $\cot \frac{7\pi}{4}$

14)  $\csc \frac{2\pi}{3}$

15)  $\csc 225^\circ$

16)  $\sin 300^\circ$

17)  $\csc 90^\circ$

18)  $\tan 240^\circ$

19)  $\sin \frac{\pi}{4}$

20)  $\tan 120^\circ$

21)  $\tan -\frac{13\pi}{6}$

22)  $\cos -630^\circ$

23)  $\cos 990^\circ$

24)  $\csc -\frac{31\pi}{6}$

25)  $\csc -\frac{5\pi}{6}$

26)  $\cos -\frac{17\pi}{3}$

27)  $\sin \frac{29\pi}{6}$

28)  $\sec 945^\circ$

29)  $\cos -\frac{11\pi}{2}$

30)  $\sin -2\pi$