

Additional Problems

⑧ Solve $3^{2x+6} = 4^{x+7}$
Round to 2 decimal places.

Apply ln:

$$\ln 3^{2x+6} = \ln 4^{x+7}$$

$$(2x+6) \ln 3 = (x+7) \ln 4$$

$$2x \ln 3 + 6 \ln 3 = x \ln 4 + 7 \ln 4$$

$$2x \ln 3 - x \ln 4 = 7 \ln 4 - 6 \ln 3$$

$$x(2 \ln 3 - \ln 4) = 7 \ln 4 - 6 \ln 3$$

$$x = \frac{(7 \ln 4 - 6 \ln 3)}{(2 \ln 3 - \ln 4)}$$

$$\approx 3.84$$

⑨ a) Write down the n^{th} term:

$$\frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}, \dots$$

$$a_1 = \frac{3}{4} \quad a_2 = \frac{4}{5}$$

$$a_n = \frac{n+2}{n+3}$$

b) Evaluate $\sum_{k=1}^{82} (3k+4)$

$$= \sum_{k=1}^{82} 3k + \sum_{k=1}^{82} 4$$

$$= 3 \left(\sum_{k=1}^{82} k \right) + \left(\sum_{k=1}^{82} 4 \right)$$

formula sheet logic

$$= 3 \cdot \frac{82(83)}{2} + 82(4)$$

$$= 10,537$$

⑮ from Practice Questions
Graph $f(\theta) = 3 \sin(\pi\theta - 2) + 1$

Standard Form $f(\theta) = 3\sin\left[\pi\left(\theta - \frac{2}{\pi}\right)\right] + 1$

$f(x) = 3\sin\left[\pi\left(x - \frac{2}{\pi}\right)\right] + 1$

x	$y = \sin x$
0	0
$\pi/2$	1
π	0
$3\pi/2$	-1
2π	0

New x -values: Divide by π , then add $\frac{2}{\pi}$ (counter-intuitive)

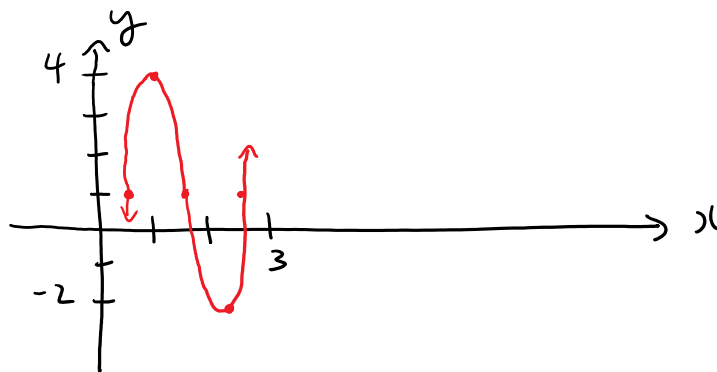
x	y
$0 + \frac{2}{\pi}$	1
$\frac{1}{2} + \frac{2}{\pi}$	4
$1 + \frac{2}{\pi}$	1
$\frac{3}{2} + \frac{2}{\pi}$	-2
$2 + \frac{2}{\pi}$	1

Prev. y -values
0
1
0
-1
0

New y -values:
 Mult. previous y -values by 3 and add 1

Calculator : $\frac{2}{\pi} \approx 0.6$

x	y
0.6	1
1.1	4
1.6	1
2.1	-2
2.6	1



(17) b) Solve $4\sin^2\theta = 3$ on $0 \leq \theta < 2\pi$

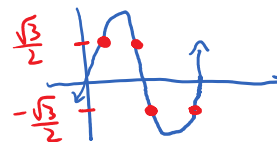
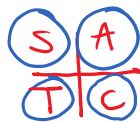
$$\sin^2\theta = \frac{3}{4}$$

$$\sin\theta = \pm\sqrt{\frac{3}{4}}$$

$$\sin\theta = \pm\frac{\sqrt{3}}{2}$$

$$\sin\theta = \pm\frac{\sqrt{3}}{2}$$

1) # of solutions?

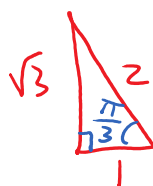


4 solutions

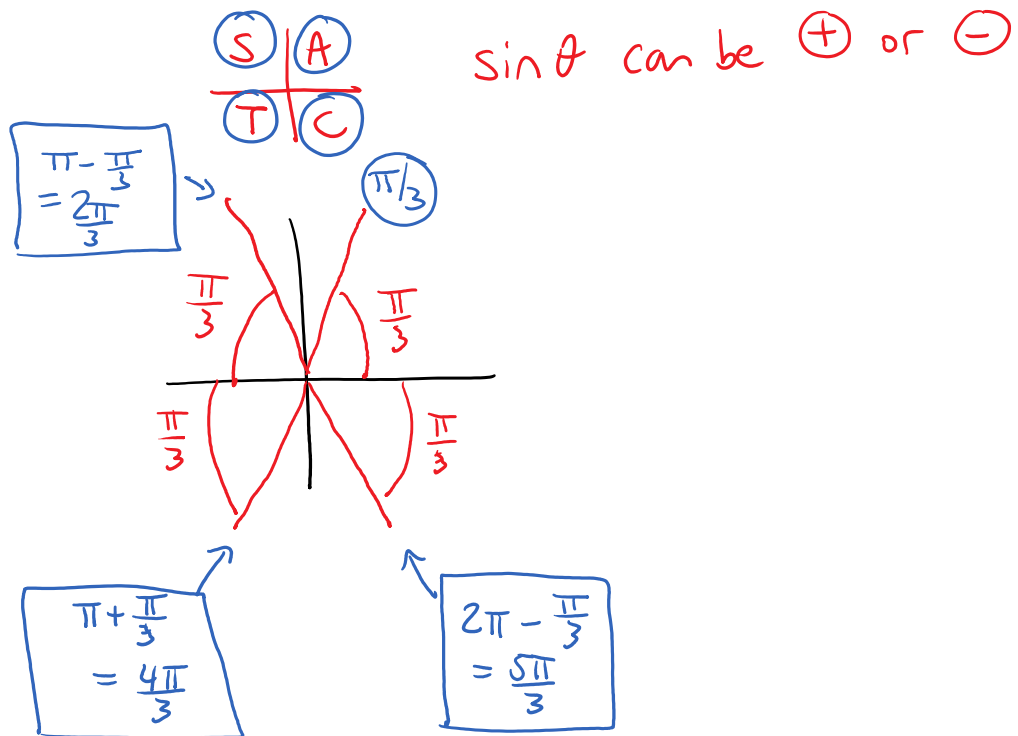
2) Reference Angle

$$\sin\theta = \frac{\sqrt{3}}{2}$$

$$\theta = \frac{\pi}{3}$$



3) CAST Rule



4) Period

$$\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$$