11.5 Trigonometric Equations

NOTES

Write your questions here!

Ex 1: Find all exact solutions for $0 \le x \le 2\pi$.

$$8\sin x = 6\sin x - 1$$

Ex 2: Find all exact solutions for $0° \le x \le 360°$.

$$2\cos^2 x - 5\cos x = -2$$

Ex 3: Find all exact solutions for $0 \le x \le 2\pi$.

$$2\cos^2 x + \cos x = 0$$

Ex 4: Find all exact solutions for $0° \le x \le 360°$. (hint: use double angle identity)

$$\sin^2 x + \cos 2x - \cos x = 0$$

Ex 5: Approximate all solutions for $0° \leq x \leq 360°$.

$$3 \sin x - 2 = 7 \sin x - 3$$

Ex 6: Approximate all solutions for $0° \leq x \leq 360°$. (hint: use quadratic formula)

$$5 \cos^2 x - 3 = 4 \cos x$$

Ex 7: Find ALL exact solutions.

$$\cot^2 x - 3 = 0$$

Ex 8: Find ALL exact solutions.

$$4 \cos^2 x \tan^2 x = 3$$

Now, ummarize our notes here!

SUMMARY:

11.5 Trigonometric Equations

PRACTICE

Directions: Find all exact solutions for $0 \leq x \leq 2\pi$.

1) $3sec^2\, x - 4 = 0$

2) $4\, cos^2\, x - 2 = 0$

3) $2\, sin^2\, x + 5 \sin x = 3$

4) $4 = \frac{1+\sin x}{\cos x} + \frac{\cos x}{1+\sin x}$

Directions: Find all exact solutions for $0° \leq x \leq 360°$.

5) $cos^2\, x = 1 - \sin x$

6) $3\, cot^2\, x - 1 = 0$

7) $\sin x - 2 \sin x \cos x = 0$

8) $\tan x = -2 \sin x$

Directions: Approximate all solutions for $0° \leq x \leq 360°$.

9) $10 \cos x - 4 = 4 \cos x$

10) $5\ sin^2 x + 3 \sin x = 1$

11) $6\ sin^2\ x + 1 - cos^2\ x = 2$

12) $16\ tan^2\ x = 5$

Directions: Find all exact solutions.

13) $2\ cos^2\ x + \cos x = 0$

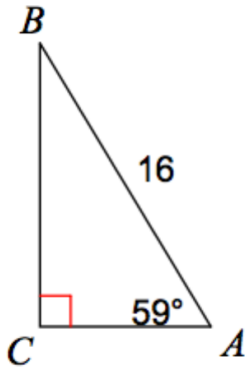
14) $3 \sin x = 2\ cos^2\ x$

15) $\cos 2x + 5 \cos x = 2$

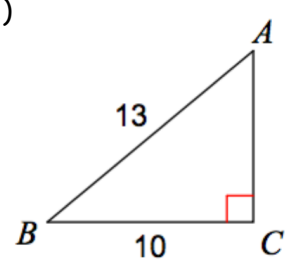
16) $\sqrt{3} \tan x + 1 = 0$

REVIEW SKILLZ: Directions: Solve the triangle.

1)



2)



11.5 Application and Extension

1) Find all exact solutions for $0° \leq x \leq 360°$.

$$\sqrt{3}\tan x + 1 = 0$$

2) Find all exact solutions.

$$2cos^2 x = \sin x + 1$$

3) Solve $\sqrt{2}\sin x - 1 = 0 \ for \ 0° \leq x \leq 360°$

Solve $\sqrt{2}\sin(BLOB) - 1 = 0 \ for \ BLOB \ for \ 0° \leq BLOB \leq 360°$

Solve $\sqrt{2}\sin(2x + 5) - 1 = 0$ (Hint: Pretend 2x+5 = BLOB. Once you solve for BLOB, make your answer = 2x+5

4) The tide (depth of the ocean near the shore) near Lake Erie, where Sully is from, can be modeled by $d = 35 - 28\cos\frac{\pi}{6.2}t$, where *d* is the water depth in feet and *t* is the time in hours (where t=0 represents 12:00 AM).

a) At what time(s) will the tide be 14 feet?

b) Use a graphing calculator (try www.desmos.com) and find what the low tide will be and at what time(s) it occurs.

5) Mr. Sullivan has a student he calls ROLLER COASTER. The reason is that he produces work in highs and lows. He develops a formula to predict ROLLER COASTER's work output which is: $m = 5\sin\left(\frac{4\pi}{365}d\right) + 5$, where *d* represents the day of the year (d=1 is January 1) and *m* represents the number of mastery checks passed on that day.

a) On what day(s) does ROLLER COASTER pass 3 mastery checks?

b) b) Use a graphing calculator (try www.desmos.com...seriously...its awesome) and find what the highest number of mastery checks ROLLER COASTER will pass on one day. What day(s) does that occur?