

Exam ReviewName Key Hr. _____**Unit 8**

For Questions 1 and 2, find the sum of each arithmetic series.

1.
$$\sum_{n=5}^{10} (2n-5)$$

$$\begin{aligned} n &= 6 \\ a_1 &= 5 \\ a_n &= 15 \end{aligned}$$

$$S_n = \frac{6}{2}(5+15)$$

$$S_n = 60$$

2.
$$\sum_{n=6}^{40} (2+3n)$$

$$\begin{aligned} n &= 35 \\ a_1 &= 20 \\ a_n &= 122 \end{aligned}$$

$$S_n = \frac{35}{2}(142)$$

$$S_n = 2485$$

For Questions 3 - 6, find S_n for each arithmetic series described.

3. $a_1 = 3, a_n = 20, n = 6$

$$S_n = \frac{6}{2}(23)$$

$$S_n = 69$$

4. $6+11+16+21+\dots+131$

$$131 = 6 + (n-1)(5)$$

$$131 = 6 + 5n - 5$$

$$130 = 5n$$

$$n = 26$$

$$S_n = \frac{26}{2}(6+131)$$

$$S_n = 1781$$

5. Find the equation for the n^{th} term of the arithmetic sequence: 13, 8, 3, -2, ...

$$a_n = 13 + (n-1)(-5)$$

$$a_n = 13 - 5n + 5$$

$$a_n = -5n + 18$$

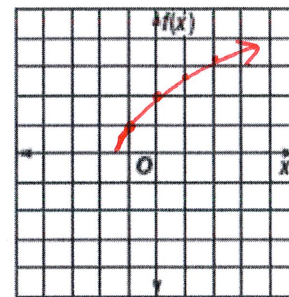
6. Find a_{21} for the arithmetic sequence: 152, 163, 174, ...

$$a_{21} = 152 + (21-1)(11)$$

$$a_{21} = 372$$

7) a) Graph $y = \sqrt{3x+4}$.

X	Y
-1	1
0	2
1	2.65
2	3.16



b) State the domain and range of this function.

$$\begin{aligned} D: & x > -\frac{4}{3} \\ R: & y >= 0 \end{aligned}$$

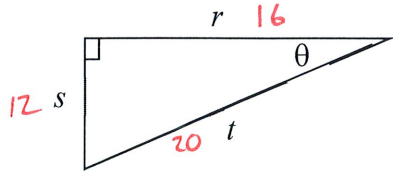
$$r^2 + 12^2 = 20^2$$

$$r^2 = 256$$

$$r = 16$$

Unit 9

8. Using the triangle at the right, find all six trigonometric ratios if $s = 12$ and $t = 20$. Write your answers in reduced (simplified) form.



$$\sin \theta = \frac{12}{20} = \frac{3}{5} \qquad \csc \theta = \frac{5}{3}$$

$$\cos \theta = \frac{16}{20} = \frac{4}{5} \qquad \sec \theta = \frac{5}{4}$$

$$\tan \theta = \frac{12}{16} = \frac{3}{4} \qquad \cot \theta = \frac{4}{3}$$

9. Write an equation involving **sin**, **cos**, or **tan** that can be used to find x . Then solve the equation. Round measures of sides to the nearest tenth and measures of angles to the nearest degree.

a) $\tan 22 = \frac{x}{10}$
 $x \approx 4.04$

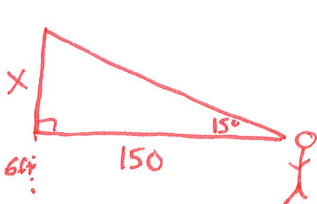
b) $\cos x = \frac{5}{8}$
 $x = \cos^{-1}(\frac{5}{8})$
 $x \approx 51^\circ$

c) $\tan x = \frac{4}{2}$
 $x = \tan^{-1}(\frac{4}{2})$
 $x \approx 63^\circ$

d) $\cos 60 = \frac{5}{x}$
 $x = \frac{5}{\cos 60}$
 $x \approx 10$

For Questions 10-12, draw a right triangle to represent the problem. Next, write an equation involving *sin*, *cos*, or *tan* that can be used to find x . Then solve the equation. Unless otherwise specified, round measures of sides to the nearest tenth and angles to the nearest degree.

10. A tree is observed on the opposite bank of a river. At that point, the river is known to be 150 feet wide. The angle of elevation from a point 6 feet off the ground to the top of the tree is 15° . Find the height of the tree to the nearest foot.



$$\tan 15 = \frac{x}{150}$$

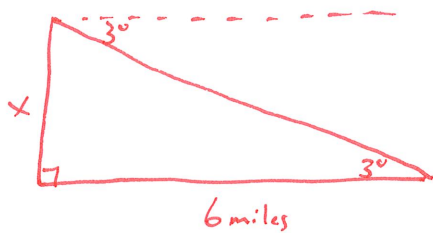
$$x = 39.2 \text{ ft.}$$

$$+ 6 \text{ ft}$$

$$\boxed{45.2 \text{ ft}}$$

Algebra 2B

11. When landing, a jet will average a 3° angle of descent. What is the altitude x , to the nearest foot, of a jet on final descent as it passes over an airport beacon 6 miles from the start of the runway?

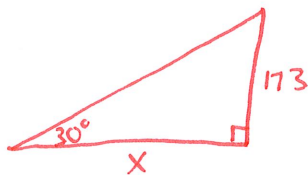


$$\tan 3 = \frac{x}{6}$$

$$x \approx .314 \text{ miles}$$

$$.314(5280) = \boxed{1657.92 \text{ ft.}}$$

12. In a sightseeing boat near the base of Horseshoe Falls at Niagara Falls, a passenger estimates the angle of elevation to the top of the falls to be 30° . If the Horseshoe Falls are 173 feet high, what is the distance from the boat to the base of the falls?



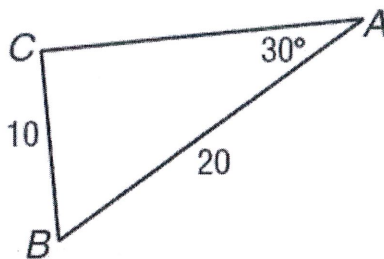
$$\tan 30 = \frac{173}{x}$$

$$x = \frac{173}{\tan 30}$$

$$x = \boxed{299.64 \text{ ft.}}$$

For Questions 13 and 14, solve each triangle. Round measures of the sides to the nearest tenth and measures of the angles to the nearest degree.

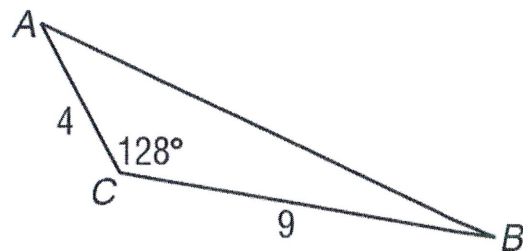
13.



$$\frac{\sin 30}{10} = \frac{\sin C}{20}$$

$$\boxed{\begin{array}{l} C = 90^\circ \\ B = 60^\circ \\ b = 17.3 \end{array}}$$

14.



$$c^2 = 4^2 + 9^2 - 2(4)(9)\cos 128$$

$$\boxed{\begin{array}{l} c = 11.9 \\ B = 15^\circ \\ A = 37^\circ \end{array}}$$

$$\frac{\sin 128}{11.9} = \frac{\sin B}{4}$$

Unit 10

15. Given a point P on the unit circle, find $\sin \theta$ and $\cos \theta$.

a) $P = (0, -1)$

$$\begin{array}{l} \sin \theta = -1 \\ \cos \theta = 0 \end{array}$$

b) $P = \left(-\frac{4}{5}, -\frac{3}{5}\right)$

$$\begin{array}{l} \sin \theta = -\frac{3}{5} \\ \cos \theta = -\frac{4}{5} \end{array}$$

16. Rewrite each degree measure in radians and each radian measure in degrees.

a) 80°

$$\frac{4\pi}{9}$$

b) 24°

$$\frac{2\pi}{15}$$

c) $-\frac{7\pi}{2}$

$$-595^\circ$$

d) $\frac{17\pi}{30}$

$$102^\circ$$

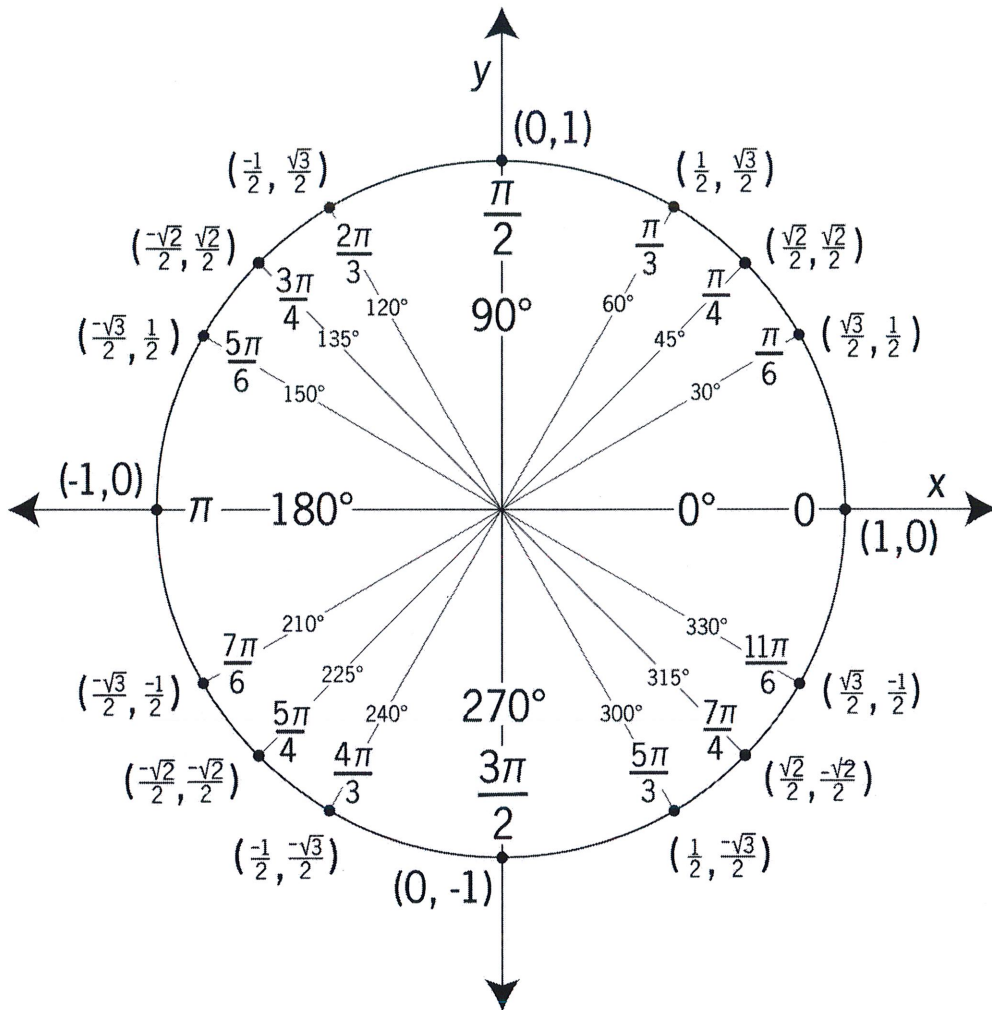
17. Find one angle with positive measure and one angle with negative measure coterminal with the given angle.

a) 50°

$$\begin{array}{l} 410^\circ \\ -310^\circ \end{array}$$

b) $\frac{2\pi}{3}$

$$\begin{array}{l} \frac{8\pi}{3} \\ -\frac{4\pi}{3} \end{array}$$



18. Find the **exact value** of each trigonometric function. Use your unit circle! Be aware that you will NOT be given a copy of the unit circle for the final exam. Write your answers in reduced (simplified) form.

a) $\csc(-240^\circ)$

$$\frac{1}{\frac{\sqrt{3}}{2}} = \frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

b) $\cos(2880^\circ)$

$$1$$

c) $\sin(-510^\circ)$

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

d) $\tan(495^\circ)$

$$\frac{\frac{\sqrt{2}}{2}}{-\frac{\sqrt{2}}{2}} = -1$$

e) $\cos\left(-\frac{5\pi}{2}\right)$

$$0$$

f) $\sin\left(\frac{5\pi}{3}\right)$

$$-\frac{\sqrt{3}}{2}$$

g) $\cos\left(\frac{11\pi}{4}\right)$

$$-\frac{\sqrt{2}}{2}$$

h) $\sec\left(-\frac{3\pi}{4}\right)$

$$\frac{-2}{\frac{\sqrt{2}}{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = -\sqrt{2}$$

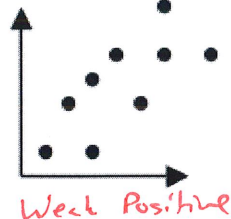
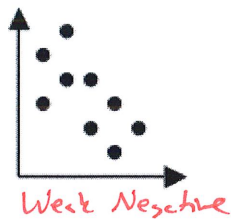
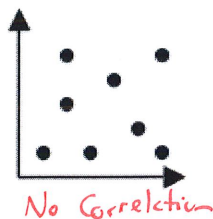
i) $\cot\left(\frac{23\pi}{6}\right)$

$$\frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \frac{\sqrt{3}}{2} \cdot \frac{-2}{1} = -\sqrt{3}$$

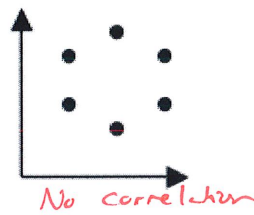
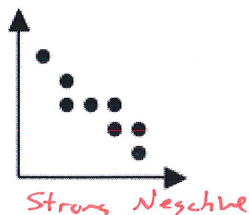
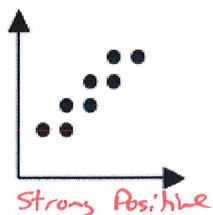
Unit 11

19.

Classify the scatter plots as having a positive, negative, or no correlation.



Indicate the **strength** of the correlation (strong vs very strong or weak vs very weak)



20. Identify the data sets as having a positive, a negative, or no correlation.

20a. The number of hours a person has driven and the number of miles driven
Positive

20b. The number of siblings a student has and the grade they have in math class
No Correlation

21. Use the following test scores to find the mean, median, mode, standard deviation, and variance.

Test Scores						
37	42	48	51	52	53	54
54	55					

Mean: ~~88~~ 49.55
 Median: ~~94.5~~ 52
 Mode: ~~93 and 94~~ 54
 Standard deviation: ~~9.289~~ 6.19
 Variance: ~~85.789~~ 38.32

22. Given a data set comprised of 5226 measurements was normally distributed with a mean of 503. It has a standard deviation of 26. What percentage of the data should lie between 451 and 555?

95%

22b. How many measurements would be between 477 and 529?

$$.68(5226) = \boxed{3554 \text{ measurements}}$$

23. Given a data set comprised of 4806 measurements was normally distributed with a mean of 514. If 95% of the data lies between 362 and 666 then what is the standard deviation?

$$666 - 514 = 152 \quad \frac{152}{2} = \boxed{76}$$

23b. How many measurements would be less than 438?

$$.16(4806) = \boxed{769 \text{ measurements}}$$

24a. **Daily High Temperatures in October**

Stem	Leaves
3	1 0
4	9 4 0 8
5	0 0 8 4 0 0
6	9 4 2 2 2 0 5 9 1
7	2

Skewed Left

24c. Weight of adult males.

Skewed right

24b.

	Math test scores
5	8 2
6	6 7 2 1
7	0 3 7 7 9
8	4 6 2 2 0 7
9	1 3 6
10	0

bell-shaped (normal)

For questions 25-26, Use the table to answer the following.

TABLE:

14	23	30	36	47	56
14	23	30	36	47	56
15	24	31	40	48	58
16	25	31	41	49	59
16	26	32	41	50	59
18	26	32	42	52	61
18	28	33	42	53	62
19	28	35	42	54	63
19	28	35	44	54	63
23	28	35	46	55	64

25. What is the percentile for 55? 83rd $\frac{50}{60}(100)$

26. What is the percentile for 15? 5th $\frac{3}{60}(100)$

27. What does it mean for a score to be in the 23rd percentile? 23% of the other values will be less than the value at the 23rd percentile.

28. Use the data to answer the following.

The table shows the total revenue from selling tickets for a number of different chamber music concerts. Represent these data on a scatterplot.

Number of tickets sold	400	200	450	350	250	300	500	400	350	250
Total revenue (\$)	8000	3600	8500	7700	5800	6000	11000	7500	6600	5600

28a. Identify the explanatory variable and the response variable.

of tickets sold Total revenue

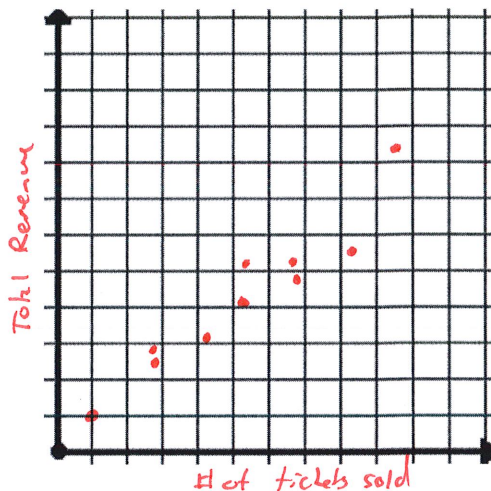
28b. Make a sketch of the data. **Label the axis.**

28c. Describe the direction of the relationship of the scatter plot.

Positive

28d. What does this mean in the context of the situation?

As the # of tickets sold increases, the total revenue increases.



28e. Find the value of the correlation coefficient (r) for the data above. 0.956

28f. Describe the strength of the correlation. strong

28g. Find the equation of the least-squares regression line (LSRL). Round values to 3 decimal places.

$y = 20.018x + 123.708$

28h. What is the slope? 20.018 Interpret the slope in context: Every ticket sold raises the revenue \$20.02.

28i. What is the y-intercept? 123.708 Interpret the y-int. in context. If zero tickets are sold, the revenue would be \$123.71,

28j. Use your LSRL equation to predict the total revenue for 575 tickets sold.

\$11634.06

Unit 12

For Questions 29-31, simplify completely.

$$29) \frac{x^2 + 4x - 12}{x^2 - 9} \cdot \frac{x^2 + 5x - 24}{x^2 + 6x - 16}$$

$$\frac{(x+6)\cancel{(x-2)}}{(x+3)\cancel{(x-3)}} \cdot \frac{\cancel{(x+8)}(x-3)}{\cancel{(x+8)}(x-2)} = \boxed{\frac{x+6}{x+3}}$$

$$30) \frac{\frac{n^2 - 4n}{3n}}{\frac{24 - 6n}{5n^2}}$$

$$\frac{n(n-4)}{3n} \cdot \frac{5n^2}{-6(-4+n)}$$

$$\frac{n(n-4)}{3n} \cdot \frac{5n^2}{-6(n-4)} = \frac{5n^3}{-18n} = \boxed{\frac{5n^2}{-18}}$$

$$31) \frac{2}{x-2} - \frac{8}{x^2-4}$$

$$\frac{2(x+2)}{(x+2)(x-2)} - \frac{8}{(x+2)(x-2)}$$

$$\frac{2x+4}{(x+2)(x-2)} - \frac{8}{(x+2)(x-2)}$$

$$\frac{2x-4}{(x+2)(x-2)}$$

$$\frac{2(x-2)}{(x+2)(x-2)}$$

$$\boxed{\frac{2}{x+2}}$$

For Questions 32 and 33, solve the equation.

$$32) \frac{\overset{(w+3)(w+4)}{12w+19}}{\overset{(w+3)(w+4)}{w^2+7w+12}} - \frac{\overset{(w+3)(w+4)}{3}}{w+3} = \frac{\overset{(w+3)(w+4)}{5}}{w+4}$$

$$12w+19 - 3w-12 = 5w+15$$

$$9w+7 = 5w+15$$

$$4w = 8$$

$$w = 2$$

$$\text{Restriktion: } w \neq -3 \\ w \neq -4$$

$$33) \frac{\overset{(n+3)(n-3)}{8}}{\overset{(n+3)(n-3)}{n^2-9}} + \frac{\overset{(n+3)(n-3)}{4}}{n+3} = \frac{\overset{(n+3)(n-3)}{2}}{n-3}$$

$$8 + 4n - 12 = 2n + 6$$

$$2n - 4 = 6$$

$$2n = 10$$

$$n = 5$$

$$\text{Restriktion: } x \neq 3 \\ x \neq -3$$

Unit 13

- 34) Determine the equation(s) of any vertical asymptote(s) and the value(s) of x for any hole(s) in the graph of the following function.

$$f(x) = \frac{x^2 - 3x - 10}{x^2 - 8x + 15}$$

$$\frac{(x-5)(x+2)}{(x-5)(x-3)}$$

$$\text{V.A.: } x = 3$$

$$\text{Hole: } x = 5$$