Name: _____ Hour: _____ **Algebra 2 Semester 2 Review**

Part 1: Polynomials

1. Sketch a linear function	2. Sketch a quadratic function	3. Sketch a cubic function	4. Sketch a quartic function

5. Identify the end behavior for the following functions.

a) $4x^3 + 2x^2 - 1$

$as\ x \to +\infty, f(x) \to$ ____

$as\ x \to -\infty, f(x) \to$ ____

b) $-5x^2 + 6x - 7$

$as\ x \to +\infty, f(x) \to$ ____

$as\ x \to -\infty, f(x) \to$ ____

c) $3x^4 - 7x + 8$

$as\ x \to +\infty, f(x) \to$ ____

$as\ x \to -\infty, f(x) \to$ ____

d) $-2x^5 + 5x^3 - x7$

$as\ x \to +\infty, f(x) \to$ ____

$as\ x \to -\infty, f(x) \to$ ____

Simplify the following expressions:

6. $(2x^4 - 7x^3 + 4x - 7) + (2x^2 - 4x + 8)$

7. $(-4x^3 + 7x - 6) - (7x^4 + 3x^3 - 2x - 4)$

8. $(3x^3 + 2x + 7)(x^2 - 4)$

9. $(x + 2)(2x^2 + 5x + 3)$

10. $8x^4 - 3x^2(2x^3 - 5x)$

11. $2x^2 - 5x^3(3x^4 + 4x)$

Find the quotient and explain whether the divisor is a factor of the dividend.

12. $(x^4 - 4x^3 - 3x^2 + 14x - 8) \div (x - 3)$

13. $(x^3 - 4x^2 + 3x + 2) \div (x + 2)$

Completely factor AND solve the following polynomials.

14. $x^2 + 6x + 8 = 0$

15. $6x^2 + x - 2 = 0$

16. $x^4 - 12x^2 + 27 = 0$

17. $x^4 + 4x^2 + 3 = 0$

Simplify the following expressions.

18. $(x + 5)^2$

19. $(2x - 3)^2$

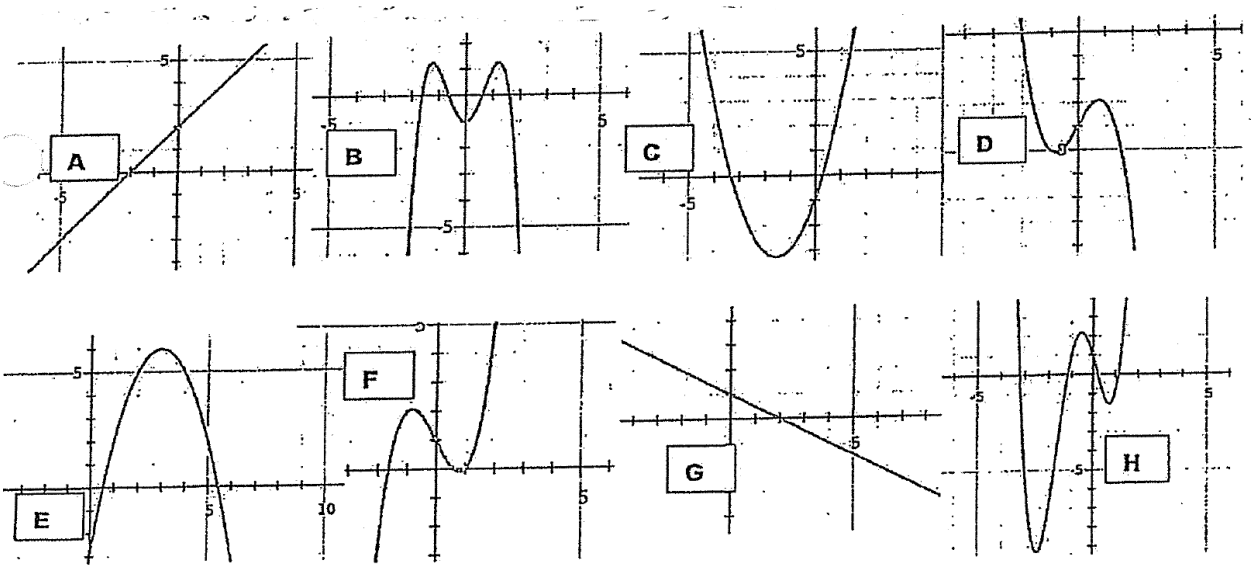
Classify each polynomial by degree and by number of terms.

20. $2x^3+3x - 4x^5 + 5x^2$

21. $5x^3 -2x^2 + 4x^2-3x + 2x^4$

22. $6x^2 - 5x^3$

Write the letter of the graphs that have the same *END BEHAVIOR* as the following functions.



23. $f(x) = 3x^5 + 4x^4 - 3x + 1$

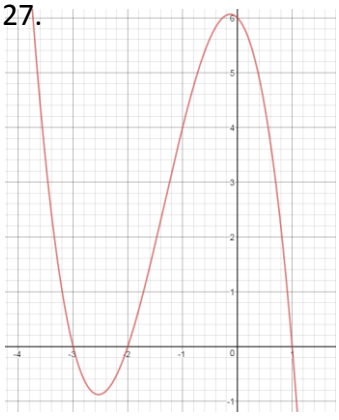
24. $f(x) = -x^3 + 2x - 1$

25. $f(x) = -5x^4 - 3x^2 + 4x - 5$

26. $f(x) = x^6 + 5x^4 - 3x^2 + 7$

Write an equation in factored form for the following graphs.

27.



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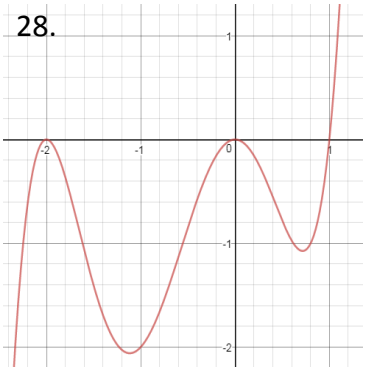

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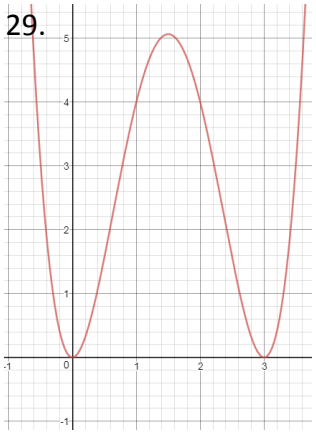

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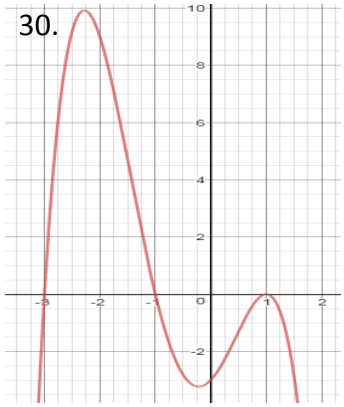


Part 2: Trig

1) Convert

a) the angle $\frac{3\pi}{5}$ from radians to degrees

b) the angle $310°$ to radians.

2) Graph one cycle of the function $f(x) = 7\sin\left(\frac{4\pi}{3}\theta\right)$. State the period & the amplitude, and make a table.

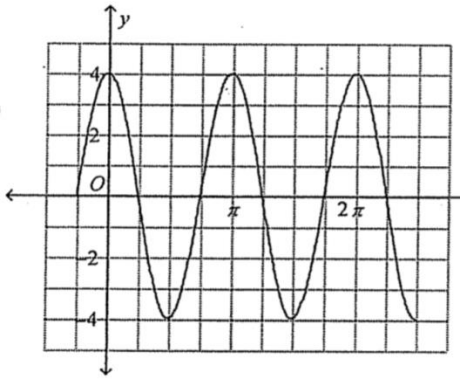
3) Graph one cycle of the function $f(x) = 2\cos(\pi\theta)$. State the period & the amplitude, and make a table.

4) Graph one cycle of the function $f(x) = -3\sin(4\theta)$. State the period & the amplitude, and make a table.

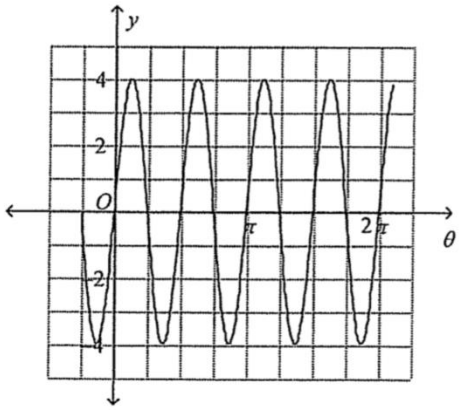
5) Graph one cycle of the function $f(x) = -4\cos\left(\frac{1}{2}\theta\right)$. State the period & the amplitude, and make a table.

Write an equation that satisfies the given periodic graph.

16)



17)



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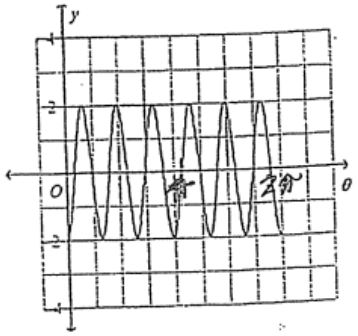
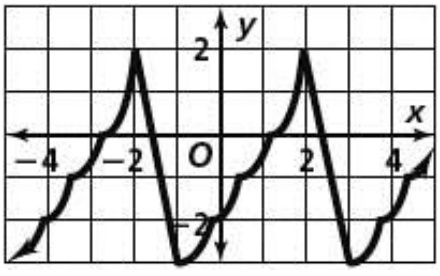


Write an equation that matches the given description.

13) A positive cosine function with amplitude of 3 and period of 4π.

14) A negative sine function with amplitude of 4 and period of 3.

15) A positive sine function with amplitude of 10 and period of π.



16. Determine the period and amplitude of the graph on the left.

Find *at least* two angles that are coterminal to the given angle.

17) $100°$ 18) $480°$ 19) $-220°$ 20) $-500°$

Find the reference angle of the given angle.

21) $225°$ 22) $120°$ 23) $330°$ 24) $60°$

25) If $cos\theta = -\frac{3}{5}$ and sine is positive, find the other two trig ratios.

26) If $tan\theta = -\frac{7}{8}$ what are all the possible values of *sine* and *cosine?*

Find the exact value of the following:

27) $sin\frac{11\pi}{6}$ 28) $cos\frac{5\pi}{6}$ 29) $tan\frac{5\pi}{4}$

Part 3: Probability and Statistics

The two-way table below shows how different citizens feel about an issue on an upcoming ballot proposal. Use it to answer questions 1-4.

	Agree	Disagree	No-opinion	Total
Male	80	30	10	120
Female	60	105	15	180
Total	140	135	25	300

1) Find the probability of randomly selecting a person that is a female or disagrees with the ballot proposal.

2) Find the probability of randomly selecting a person that is a male and has no opinion about the ballot proposal.

3) Find the probability of randomly selecting a person that agrees with the ballot proposal given that they are a male.

4) Find the probability of randomly selecting a female given that they have no opinion about the ballot proposal.

Use the histogram to the left for questions 5-8.

5) Find the mean of the data.

6) Find the median of the data.

7) Find the mode of the data.

8) Describe the shape of the data distribution.

Part 4: Rational Equations

Solve.

1) $\frac{9}{3x} = \frac{4}{x+2}$	2) $\frac{6}{3x-1} = \frac{3}{2x}$
3) $\frac{8}{3x-2} = \frac{2}{x-1}$	4) $\frac{7}{x-3} = \frac{4}{x}$
5) $\frac{1}{6x} = \frac{3}{2x} - \frac{1}{6}$	6) $\frac{1}{3} - \frac{1}{x} = 1$
7) $\frac{x+5}{4x} + \frac{11}{12} = \frac{2}{3x}$	8) $\frac{x}{2x+6} - \frac{1}{x+3} = 1$