

Name _____

Review Packet for Incoming Pre-Calculus Honors

SHOW ALL WORK!

Find the degree and leading coefficient of the polynomial.

1. $-x + 2x^2 + 1$

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

3. 5

Perform the indicated operations. Write the resulting polynomial in standard form.

1. $-(5x^2 - 1) - (-3x^2 + 5)$

2. $(x - 3 + y)(x - 3 - y)$

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

Factor each expression completely.

1. $2x^3 - 6x$

2. $(x - 1)^2 - 4$

3. $9x^2 - 12x + 4$

4. $4x^2 - 23x - 6$

5. $9x^2 - 3x + 2$

6. $5x^2 + 26x + 5$

7. $9x^2 - 36$

8. $16 + 6x - x^2$

9. $2x^3 - x^2 - 6x + 3$

Given $f(x) = -x^2 + 3$ $g(x) = 3x - 2$ Find and simplify each of the following:

1. $f + g$

2. $f - g$

3. $f \cdot g$

4. $f \circ g$

5. $g \circ f$

6. $f^{-1}(x)$

7. $g^{-1}(x)$

8. $f(g(2))$

9. $g(f(-3))$

10. f/g

Solve each quadratic equation **Three** ways:

(a) by factoring (when possible)

(b) by quadratic formula

(c) by completing the square

1. $x^2 + 6x - 16 = 0$

2. $2x^2 + 6x + 7 = 0$

3. $0 = 3x - 2x^2 + 2$

Simplify each expression. Express each answer in standard radical form.

1. $\sqrt{(54xy^4)}$

2. $\sqrt[3]{(16x^5)}$

3. $5\sqrt{x} - 3\sqrt{x} + 6\sqrt{y}$

4. $2\sqrt{50} + 12\sqrt{8}$

5. $(5 + 2\sqrt{3})(5 - 2\sqrt{3})$

6. $(2 - \sqrt{3})(3 - \sqrt{6})$

Rationalize the denominator.

1. $\frac{1}{2 + \sqrt{3}}$

2. $\frac{5}{(2\sqrt{10}) - 5}$

3. $\frac{2}{\sqrt{6}}$

Simplify each expression:

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

2. $\frac{2}{x+2} - \frac{6}{x-2}$

3. $\frac{4x^2 + 20x}{9 - 6x - 3x^2} \div \frac{x+5}{x^2 - 9}$

4. $\frac{6x}{3x-1} - \frac{4x}{2x+5}$

5. $\frac{1}{1 + (1/a)} + \frac{1}{1 - (1/a)}$

Simplify each expression. Express all answers with positive exponents.

1. $25x^8 / 10x^4$

2. $(4/y)^3 (3/y)^2$

3. $(4x)^{-2} (8x^4)$

4. $(2x^5)^0$

5. $(x^2 \cdot x^n) / (x^3 \cdot x^n)$

6. $\frac{(64y^7)^{1/3}}{\sqrt[3]{(8y^2)}}$

7. $(\sqrt[3]{162a^7b^3c^5})(54abc)^{-1/3}$

8. $((2a^2b^4)/(3a^3b))^{-3}$

9. $(25x^2y^4)^{-1/2}$

Solve each equation.

1. $\frac{x-4}{x+2} + \frac{2}{x-2} = \frac{17}{x^2-4}$

2. $\frac{x+3}{2x} = \frac{5}{8}$

3. $\frac{x+2}{2x-3} + \frac{x-2}{x+1} = \frac{21}{2x^2-x-3}$

4. $\frac{5}{x+2} + \frac{x}{2} = \frac{4}{3}$

5. $3 + \sqrt{(x+1)} = 2x$

6. $\sqrt{(2x-3)} + x = 3$

7. $4\sqrt{(x-3)} = 8$

Simplify each expression.

1. $(2 + 3i) - (-4 - 2i)$

2. $(2 + 3i)(-4 - 2i)$

3. i^{101}

4. $\frac{2+i}{-3i+1}$

Solve each System of equations **Three** ways:

(a) by Graphing

(b) by Substitution

(c) by Elimination

1. $y = 8 - x$
 $\frac{1}{2}y - x = \frac{5}{2}$

2. $2x - 3y = 3$
 $4x + 2y = 14$

Graph each equation. Identify the domain & range.

1. $f(x) = \lfloor x \rfloor - 1$

2. $f(x) = |x - 2|$

3. $f(x) = \sqrt{-x}$

4. $y = -3x^2 + 6x - 9$

5. $f(x) = x + 3$ and $f^{-1}(x)$

6. $f(x) = \begin{cases} -2 & x < 0 \\ x + 1 & 0 \leq x \leq 10 \\ -\frac{1}{2}x + 16 & x > 10 \end{cases}$

Graph $y \leq 2x - 3$ on the coordinate plane.

Graph the solution to the system of inequalities:

$$y \leq -\frac{1}{3}x + 1$$

$$y \geq 0$$

$$x > 4$$

Determine the **EXACT** values of the six trigonometric functions of each angle **WITHOUT** the use of a calculator:

1. $\frac{3\pi}{2}$

2. 135°

3. $-\frac{\pi}{6}$

4. $\frac{2\pi}{3}$

5. $\frac{5\pi}{3}$

6. π

7. $\frac{7\pi}{6}$

8. $\frac{5\pi}{4}$

If $0 \leq \theta < 2\pi$, determine the **EXACT** values of θ , in radians, that make each statement true **WITHOUT** using a calculator:

1. $\cos \theta = -\frac{1}{2}$

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

3. $\tan \theta = \frac{\sqrt{3}}{3}$

4. $\cot \theta = -1$

5. $\sec \theta = \sqrt{2}$

6. $\csc \theta = -2$

7. $\tan \theta = 0$

8. \sec is undefined

Determine the **EXACT** value of each expression **WITHOUT** using a calculator:

1. $\csc^{-1} 1$

2. $\operatorname{Arcsec}\left(\frac{2\sqrt{3}}{3}\right)$

3. $\tan^{-1}(-1)$

4. $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$

5. $\operatorname{Arcsin}\left(-\frac{1}{2}\right)$

6. $\cot^{-1}\left(\cot \frac{\pi}{3}\right)$

7. $\sec\left(\sin^{-1}\left(-\frac{7}{25}\right)\right)$

8. $\tan\left(\cos^{-1}\frac{3}{4}\right)$

Use a calculator to evaluate each expression:
Round answers to the nearest ten-thousandth.

1. $\sin \frac{5\pi}{7}$
2. $\cos 2$
3. $\tan 303^\circ$
4. $\sec 42^\circ$
5. $\csc \left(-\frac{5\pi}{7}\right)$
6. $\cot (1.3)$

Use a calculator to evaluate each expression:
Round answers to the nearest hundredth of a radian.

1. $\cos^{-1} 0.3325$
2. $\operatorname{Arccot} 1.792$
3. $\csc^{-1} (-0.2383)$
4. $\sec^{-1} 3$

Solve for the **EXACT** values of x where $0 \leq x \leq 2\pi$:

1. $2 \cos^2 x + 3 \cos x - 2 = 0$
2. $2 \cos^2 x = 2 \cos x$
3. $2 \cos^2 x - 3 \sin x - 3 = 0$
4. $\sqrt{3} \tan 2x + 1 = 0$

Solve: $2 \sin^2 x = 1 + 2 \sin x$ for the values of x where $0 \leq x \leq 2\pi$.
Round answers to the nearest hundredth of a radian.

Graph each equation. Label x and y -intercepts and all important points on each graph.

1. $f(x) = 2 \sin x$
2. $f(x) = \tan x + 1$
3. $f(x) = \cos \frac{1}{2} x$
4. $f(x) = \sec x$
5. $f(x) = \csc x - 3$
6. $f(x) = -\cos x$
7. $f(x) = \cot 2x$