

You should complete all of your work neatly on a separate sheet of paper. Make sure to label each problem and box in your answers.

1. Find the line that passes through the point $(-1, 3)$ and the point of intersection of the lines $x + 3y = 1$ and $2x - y = -5$. Write your answer in point slope form $(y - y_1 = m(x - x_1))$.

2. Determine the slope, length and midpoint of the line segment with endpoints $(1, -2)$ and $(3, 2)$.

3. Simplify each of the following expressions.

a) $\left(\frac{2}{3}x^{-3}\right)(15x^7)$

b) $x^3(2yz^2)^3$

c) $\frac{(3x^3)(4x^5)}{(x^2)^3}$

d) $\frac{(2y^4)(3y^2)^2}{(y^3)^4}$

e) $(3a^{-2}b^3)^{-3}$

4. Simplify the following by removing all possible factors from the radical.

a) $\sqrt{9z^8b}$

b) $\sqrt{24a^4b^8}$

c) $\sqrt{\frac{75}{a^6}}$

5. Factor each of the following completely.

a) $6x^3y^2 + 15x^2y^5 - 30x^7y^4z$

b) $16y^2 - 9$

c) $4x^{16} - 9y^6$

d) $6x^2 + 7x - 20$

e) $3x^2 - 5x + 2$

f) $x^3 - x^2 + 3x - 3$

g) $3a^3 + 3a^2 - 27a - 27$

h) $x^2 + 4x + 4 - 9y^2$

6. For each function, evaluate $f(2)$, $f(a)$, and $f(2 + h)$.

a) $f(x) = x^2 - x + 1$

b) $f(x) = 5x - x^2$

7. Solve each equation.

a) $2(x + 5) - 7 = 3(x - 2)$

b) $y - 3(2y + 3) = 8 - 5y$

c) $6x^2 + 3x = 0$

d) $9x^2 - 1 = 0$

e) $x^2 + 10x + 25 = 0$

f) $3 + 5x - 2x^2 = 0$

You should know the Unit Circle, basic shapes of the sine, cosine, and tangent functions, their domains and ranges and the following trig identities:

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

$$\sin 2x = 2 \sin x \cos x$$

8. You **MUST** be able to evaluate the following **WITHOUT** a calculator. We always use radians, not degrees.

a) $\sin \pi$

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

c) $\tan \frac{5\pi}{4}$

d) $\sin \frac{4\pi}{3}$

e) $\cos \frac{7\pi}{4}$

f) $\sin \frac{2\pi}{3}$

g) $\tan \frac{5\pi}{6}$

h) $\sin \frac{11\pi}{6}$

9. Solve each of the following on the interval $[0, 2\pi)$.

a) $2 \sin x - \sqrt{3} = 0$

b) $\cos^2 x = 2 \sin x - 2$