

1. $\frac{5x^2 - 10x}{2x^2 - 7x - 15} \cdot \frac{6x^2 + 7x - 3}{25x - 50}$

$\frac{5x(x-2)}{(2x+3)(x-5)} \cdot \frac{(2x+3)(3x-1)}{5(x-2)}$

$\frac{x(3x-1)}{5(x-5)}$

2. $\frac{2(x-2)(x+1)(x-3)}{x^2+3x-18} \cdot \frac{(x+1)(x-3)}{x^2+4x-12}$

$\frac{(x+6)(x-3)(x-2)(x-3)}{(x-2)(x+6)(x-2)(x-3)}$

$\frac{-x^2 + 4x - 1}{(x+6)(x-3)(x-2)}$

3. $\frac{x^3 - 1000}{x^2 - 100} \div \frac{x^2 + 10x + 100}{2x^2 + 21x + 10}$

$\frac{(x-10)(x^2+10x+100)}{(x-10)(x+10)} \cdot \frac{(2x+1)(x+10)}{(x^2+10x+100)}$

$2x+1$

4. $\frac{3x^2 + \frac{x+2}{5m} + \frac{3m^2}{7}}{\frac{7}{2}}$ $30m^2$

$30m^2$

$\frac{6m(3x^2) + 10(x+2)}{7(15m^2)} \rightarrow \frac{18x^2m + 10x + 20}{105m^2}$

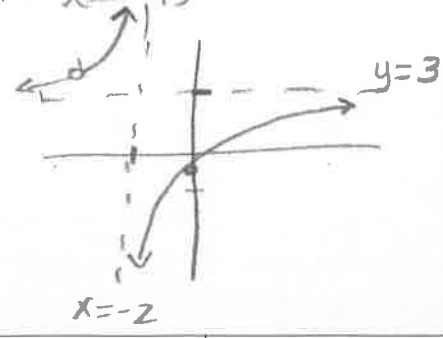
5. Sketch: $y = \frac{3x^2 - 11x - 4}{x^2 + 6x + 8}$

$y = \frac{(3x-1)(x+4)}{(x+2)(x+4)}$

Hole	$-4, \frac{13}{2}$
Vertical Asymptote	$x = -2$
Horizontal Asymptote	$y = 3$
Slant Asymptote	None

Extra Points

x	y
0	$-\frac{1}{2}$



6. Given: $y = \frac{4x^2 - 3}{x - 2}$

Hole	None
Vertical Asymptote	$x = 2$
Horizontal Asymptote	None
Slant Asymptote	$y = 4x + 8$

Do Not Sketch

$2 \overline{) 40-3}$
 $\underline{8} 16$
 $\underline{4} 13$

$y = 4x + 8$

7. Solve the system using algebra. Show work.

$\begin{cases} x + y + 3z = 6 & (1) \\ 2x + 4y - z = 15 & (2) \\ 3x - 3y + 2z = -19 & (3) \end{cases}$

A: $3(2) + (1)$
 B: $2(2) + (3)$

$6x + 12y - 3z = 45$
 $x + y + 3z = 6$
 $\hline 7x + 13y = 51 \quad (A)$

$4x + 8y - 2z = 30$
 $3x - 3y + 2z = -19$
 $\hline 7x + 5y = 11 \quad (B)$

$(A) - (B) \rightarrow 8y = 40$
 $y = 5$

$7x + 5(5) = 11$
 $7x = -14$
 $x = -2$

$x + y + 3z = 6$
 $-2 + 5 + 3z = 6$
 $3z = 3$
 $z = 1$

8. Write the equation of the parabola $y = ax^2 + bx + c$ passing through points (1,5), (2,10) and (-1,13).

$(1,5) \quad 5 = a + b + c \quad (1) \quad A: (2) - (1)$
 $(2,10) \quad 10 = 4a + 2b + c \quad (2) \quad B: (3) - (1)$
 $(-1,13) \quad 13 = a - b + c \quad (3)$

$(A) \quad 5 = 3a + b \rightarrow 5 = 3a - 4 \rightarrow 3a = 9 \rightarrow a = 3$
 $(B) \quad 8 = -2b \rightarrow b = -4$

$5 = 3 - 4 + c$
 $6 = c$

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

9. Given: $130 - 84.5 + 54.925 - 35.70125 + \dots$

Find the

a) sum of the first 12 terms.

$$r = -.65$$

$$S_{12} = \frac{130(1 - (-.65)^{12})}{1 - (-.65)} \approx \boxed{78.3397}$$

b) the infinite sum.

$$S_{\infty} = \frac{130}{1 + .65} \approx \boxed{78.78}$$

10. Find the first term algebraically for the arithmetic sequence if $a_3 = -7$ and $a_{19} = 105$.

$$\begin{aligned} a_{19} &= a_3 + 16d \\ 105 &= -7 + 16d \\ 112 &= 16d \\ d &= 7 \end{aligned} \quad \left\{ \begin{aligned} a_3 &= a_1 + 2d \\ -7 &= a_1 + 2(7) \\ -21 &= a_1 \end{aligned} \right.$$

11. Find the value of the sixth term of the binomial expansion of $(5x^4 - \frac{1}{x^2})^7$

$$\begin{aligned} & {}_7C_5 (5x^4)^2 \left(-\frac{1}{x^2}\right)^5 \\ & 21 (25x^8) \left(-\frac{1}{x^{10}}\right) \end{aligned}$$

$$\boxed{\frac{-525}{x^2}}$$

13. Divide $(2x^5 - 5x^3 + x - 8)$ by $(x + 3)$

$$\begin{array}{r} -3 \overline{) 20-501-8} \\ \underline{\downarrow -6 \quad 18 \quad -39 \quad 117 \quad -354} \\ 2 \quad -6 \quad 13 \quad -39 \quad 118 \quad -362 \end{array}$$

$$\boxed{2x^4 - 6x^3 + 13x^2 - 39x + 118 + \frac{-362}{x+3}}$$

12. Solve $\left(\frac{4}{x} - \frac{5}{x-2} = -3\right) \cdot x(x-2)$

$$\begin{aligned} 4(x-2) - 5(x) &= -3x(x-2) \\ 4x - 8 - 5x &= -3x^2 + 6x \\ 3x^2 - 7x - 8 &= 0 \\ x &= \frac{7 \pm \sqrt{49 - 4(3)(-8)}}{6} \end{aligned}$$

$$\boxed{x = \frac{7 \pm \sqrt{145}}{6}}$$

14. Write the equation in standard form given roots $x = -2$ and $x = 6 \pm 3i$.

$$\begin{aligned} (x+2)(x-6-3i)(x-6+3i) &= 0 \\ y &= (x+2)(x^2 - 12x + 36 + 9) = 0 \\ y &= x^3 - 10x^2 + 21x + 90 \end{aligned}$$

	x^2	$-12x$	45
\times	x^3	$-12x^2$	$45x$
$+2$	$2x^2$	$-24x$	90

15. Graph one cycle for each of the following and find the amplitude, vertical shift, period and phase shift.

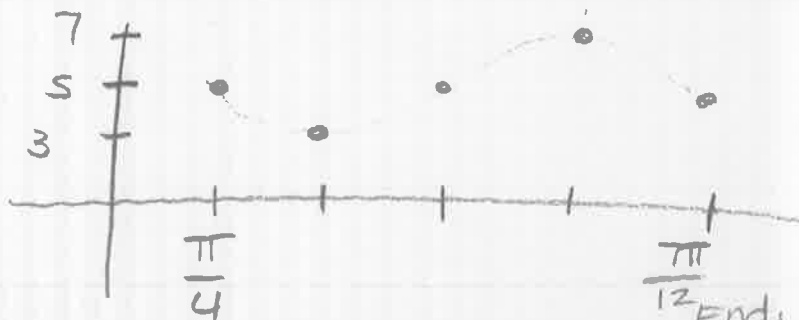
a. $y = -2 \sin\left(6\left(x - \frac{\pi}{4}\right) + 5\right)$

Amplitude: 2

Vertical Shift: 5

Period: $\frac{2\pi}{6}$ or $\frac{\pi}{3}$

Phase Shift: $\frac{\pi}{4}$



$$\begin{aligned} \frac{\pi}{12} \text{ ends} \\ 6\left(x - \frac{\pi}{4}\right) &= 2\pi \\ 6\left(x - \frac{\pi}{4}\right) &= \frac{\pi}{3} \end{aligned}$$