

1. Divide.

$$(3x^3 - 4x^2 - 3x - 11) \div (x - 2)$$

$$\begin{array}{r} x-2 \overline{) 3x^3 - 4x^2 - 3x - 11} \\ \underline{3x^3 - 6x^2 + 12x - 22} \\ 0 + 2x^2 - 3x + 11 \\ \underline{- 2x^2 + 4x} \\ 0 - 11 \\ \underline{- x + 1} \\ - 10 \end{array}$$

$$3x^2 + 2x + 1 \quad r: -10$$

2. Find the polynomial function with rational coefficients that has roots of -3 and $-1 + \sqrt{2}$ and whose graph passes through the point $(-1, -20)$. Leave your answer in factored form.

$$(x+3)^2 (x-(1+\sqrt{2})) (x-(1-\sqrt{2}))$$

$$y = (x+3)^2 (x^2 - 2x - 1)$$

$$x^2 - 2x - 1 = (x-1)^2 - 2$$

$$\begin{aligned} -20 &= a(x-3)(x-(1+\sqrt{2}))(x-(1-\sqrt{2})) \\ -20 &= a(-1+3)(-1-(1+\sqrt{2}))(-1-(1-\sqrt{2})) \\ -20 &= a(-2) \end{aligned}$$

3. Suppose a and b are two real numbers so that the graph of the function $y = -\frac{5}{x-a} + b$ has horizontal asymptote $y = 5$ and a vertical asymptote $x = -4$.

a. Write the full equation for this function given the information about asymptotes.

b. Find the domain and range of the graph.

Domain:

Range:

Name: _____

7. Suppose that y varies directly with x and inversely with the square root of z . If $x = 48$ when $y = 8$ and $z = 9$, find the value of x when $y = 12$ and $z = 16$.

$$y = \frac{kx}{\sqrt{z}}$$

$$y = \frac{x}{2\sqrt{z}}$$

$$8 = \frac{k(48)}{\sqrt{9}}$$

$$12 = \frac{x}{2\sqrt{16}}$$

$$8 = \frac{48k}{3}$$

$$12 = \frac{x}{2(4)}$$

$$8 = 16k$$

$$12 = \frac{x}{8}$$

$$k = \frac{1}{2}$$

$$x = 96$$

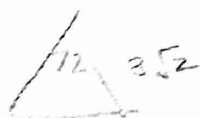
8. Here is some exciting data.

X	-3	-2	-1	0	1	2	3	5
Y	3	-8	-7	0	7	8	-3	-9

- a. Determine a model of best fit and write down that equation.

- b. Use your model to determine which x value to expect with your model when y is -2.

9. The angle between two radii of a circle is 72° . If the circumference of the circle is 18π cm, what is the area of the triangle formed by the center of the circle and the endpoints of the two radii?



$$18\pi = 2\pi r^2$$

$$18 = r^2$$

$$r = 3\sqrt{2}$$

$$\cos(36) = \frac{x}{3.52}$$

$$x = 3.432$$

$$2(2.494)(3.432)$$

2

$$8.56$$