

No Calc #1-8

$y = mx + b$

1. Write the equation of a linear function that satisfies the conditions: $f(3) = 8$ and $f(-1) = 14$.

$m = \frac{14-8}{-1-3} = \frac{6}{-4} = -\frac{3}{2}$ $8 = -\frac{3}{2}(3) + b$ $(3, 8)$ $(-1, 14)$

$12.5 = b$

$y = -\frac{3}{2}x + 12.5$

2. Find the vertex and the axis of symmetry for the graph of $f(x) = 2x^2 - 12x + 7$.

vertex: $h = \frac{-b}{2a} = \frac{12}{2(2)} = 3$

$k = c - ah^2 = 7 - 2(3)^2 = -11$

vertex $(3, -11)$ A.O.S. $x = 3$

3. What is vertex form of a quadratic equation? $y = a(x-h)^2 + k$

4. Write the equation of a parabola that passes through the point $(-2, 4)$ and has a vertex of $(-5, -8)$. use vertex form!

h, k
 $4 = a(-2+5)^2 - 8$
 $4 = a(9) - 8$
 $12 = a(9)$
 $a = \frac{12}{9} = \frac{4}{3}$

$y = \frac{4}{3}(x+5)^2 - 8$

5. Given the polynomial: $f(x) = -4x(x-2)^3(x+5)^2$ answer the following questions.

- a) What is the degree of the $f(x)$? 6

- b) What is the leading coefficient of $f(x)$? -4

- c) Determine the zeros and state their multiplicity.

$x = 0$ (1 time), 2 (3 times), -5 (2 times)

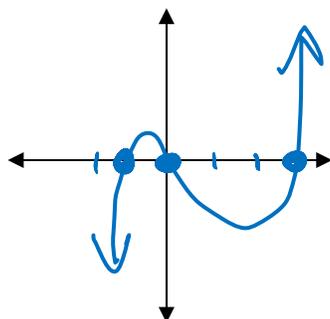
- d) Determine the y-intercept. $(0, 0)$

- e) Describe the end behavior.

even degree
neg L.C.

$\lim_{x \rightarrow -\infty} f(x) = -\infty$ $\lim_{x \rightarrow \infty} f(x) = -\infty$

6. Sketch a graph of the polynomial $p(x) = 2x^3 - 5x^2 - 3x$ by finding intercepts and end behavior.



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

$x = 0, -\frac{1}{2}, 3$

deg 3, L.C. positive

end behavior: $\lim_{x \rightarrow -\infty} f(x) = -\infty$

$\lim_{x \rightarrow \infty} f(x) = \infty$

7. Answer the following questions about the graph shown below.

a) Is the degree even or odd?

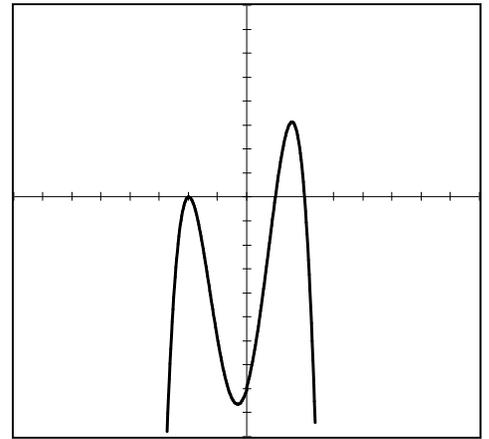
b) Is the leading coefficient positive or negative?

c) What are the zeros? $-2, 1, 2$

d) What is the multiplicity of each zero?
 \downarrow even \downarrow odd \downarrow odd

e) Describe the end behavior.

$$\lim_{x \rightarrow -\infty} f(x) = -\infty \quad \lim_{x \rightarrow \infty} f(x) = -\infty$$



8. If $f(x) = x^3 + 2x^2 - 10x + 7$ and $p(x) = x - 4$, determine $\frac{f(x)}{p(x)}$ and write in fraction form. *divide!*

$$\begin{array}{r} 4 \overline{) 1 \quad 2 \quad -10 \quad 7} \\ + \quad \quad 4 \quad 24 \quad 56 \\ \hline 1 \quad 6 \quad 14 \quad 63 \end{array}$$

$$x^2 + 6x + 14 + \frac{63}{x-4}$$

Calc

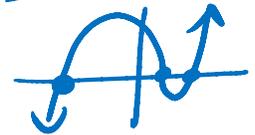
9. Find all zeros of the polynomial $p(x) = x^3 + x^2 - 10x + 8$ by using the factor theorem. Then verify your answers by graphing.

Possible zeros:

$$\frac{\pm 8}{\pm 1} = \pm 1, \pm 2, \pm 4, \pm 8$$

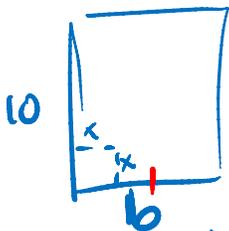
from calc, zeros are

$$x = -4, 1, 2$$



Calc

10. A box is being created by cutting corners out of a rectangle that measures 10in by 6 in. What size corners should be cut to make a box with volume that is at most 20 cubic inches.

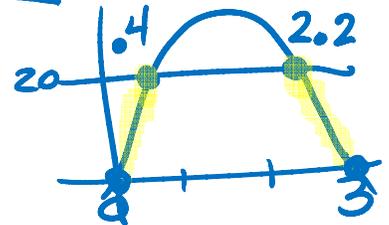


$$V = lwh$$

$$y: (6-2x)(10-2x)x \leq 20$$

$$[0, .4] \cup [2.2, 3]$$

biggest cut is 3!



Calc

11. Given the vertical motion equation $s(t) = -16t^2 + v_0 t + s_0$, what is the greatest height an arrow would reach if it is shot straight up with a velocity of 25ft/s and is released at a height of 5 ft.

$$s(t) = -16t^2 + 25t + 5$$

