Acc Precalculus

Review 3.1 to 3.4

NO CALCULATOR

Name Key Per.____

Given P(x), rewrite in Vertex form, Identity the Vertex, X and Y intercepts, Domain and Range and sketch the graph.

1. $P(x) = -2(x+1)^2 + 6$

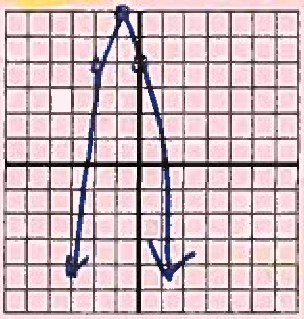
$3 = (x+1)^2$

$\pm\sqrt{3} = x+1$

$V: (-1, 6) \downarrow$

$x = -1 \pm \sqrt{3}$

$y = 4$ $D: (-\infty, \infty)$ $R: (-\infty, 6]$



2. $P(x) = 3x^2 - 18x + 25$

$3(x^2 - 6x + \underline{9}) + 25 \underline{-27}$

$y = 3(x-3)^2 - 2 \uparrow$

$\frac{2}{3} = (x-3)^2$

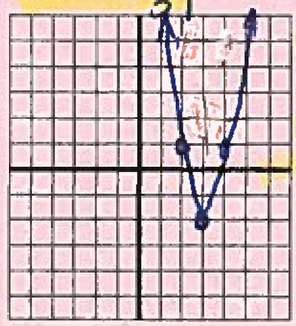
$V: (3, -2)$ $y = 25$

$x = 3 \pm \frac{\sqrt{6}}{3}$

$\pm\frac{\sqrt{6}}{3} = x - 3$

$D: (-\infty, \infty)$

$R: [-2, \infty)$



$\frac{5}{2} = (x+1)^2$

$\pm\frac{\sqrt{10}}{2} = x+1$

3. $P(x) = 2x^2 + 4x - 3$

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

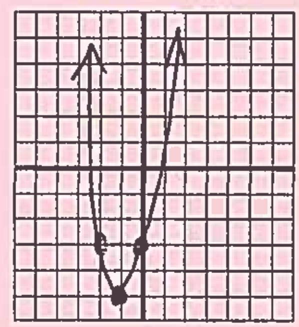
$y = 2(x+1)^2 - 5$ yint: -3

$V: (-1, -5)$

$x = -1 \pm \frac{\sqrt{10}}{2}$

$D: (-\infty, \infty)$

$R: [-5, \infty)$



4. If a ball is thrown upward with a velocity of 64 ft/s, its height (in feet) after t seconds is given by $y = 64t - 16t^2$ **. What is the maximum height attained by the ball? When does the ball reach its maximum height?**

option 1

$y = -16t^2 + 64t$

$y = -16(t^2 - 4t + \underline{4}) + \underline{64}$

$y = -16(t-2)^2 + 64$

$V: (2, 64)$

Max @64

after 2 seconds

5. Find the maximum or minimum point. (State whether it is a max or min) $P(x) = -2x^2 + 4x - 3$ $\downarrow$

option 2

$x = \frac{-b}{2a} \rightarrow x = \frac{-4}{-4} = 1$ $y = -2 + 4 - 3 = -1$

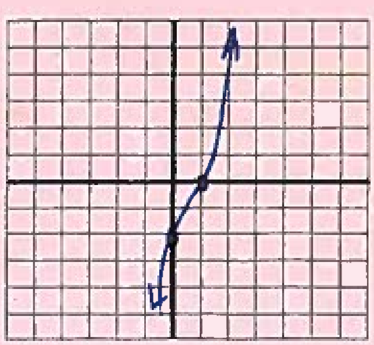
Max @ 1

Graph the function using all intercepts making sure it exhibits the proper end behavior.

6. $P(x) = 2(x-1)^3$

deg: 3 lc: + $x = 1$ (3) bends

rt $\uparrow$, left $\downarrow$ yint: -2



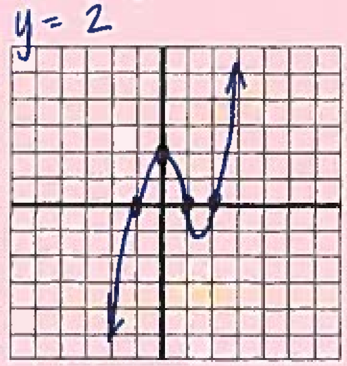
7. $P(x) = (x-1)(x+1)(x-2)$

deg: 3 lc: +

rt $\uparrow$, left $\downarrow$

$x = 1, -1, 2$

$y = 2$



8. $P(x) = x^4 - 3x^3 + 2x^2$

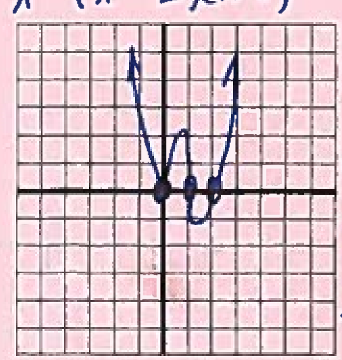
deg: 4 lc: + rt $\uparrow$, left $\uparrow$

$x^2(x^2 - 3x + 2)$ $x = 0$ (dr

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

$y = 0$

bounce @ 0



Determine the end behavior of P(x).

9. $P(x) = -4x^4+5x^3-2x^2+10$

deg: 4 lc: −1 so rt↓ + left↓ $x \to +\infty, y \to -\infty$

$x \to -\infty, y \to -\infty$

CALCULATORS ALLOWED

Find the quotient and remainder using long division.

10. $\dfrac{x^6+x^4+x^2+1}{x^2+1}$

0x

$$\boxed{x^4+1}$$

$$\begin{array}{r} x^4 \quad +1 \\ x^2+0x+1 \,\big)\, x^6+0x^5+x^4+0x^3+x^2+0x+1 \\ -x^6 \mp 0x^5 \mp x^4 \\ \hline 0 \quad x^2+0x+1 \\ -x^2 + 0x \mp 1 \\ \hline 0 \end{array}$$

Find the quotient and remainder using synthetic division.

11. $\dfrac{x^3-x^2-2x+6}{x-2}$

$$\begin{array}{r|rrrr} 2 & 1 & -1 & -2 & 6 \\ & & 2 & 2 & 0 \\ \hline & 1 & 1 & 0 & 6 \end{array}$$

$$\boxed{x^2+x+\frac{6}{x-2}}$$

(12 and 13) Write the polynomial with specified degree that has the given zeros.

12. degree 3 with zeros -1, 1, 3.

$(x+1)(x-1)(x-3)$

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

13. degree 4 with double roots of -2 and 3.

$(x+2)^2(x-3)^2 = (x^2+4x+4)(x^2-6x+9) = x^4-6x^3+9x^2$ $4x^3-24x^2+36$ $4x^2-24x+36$

$\boxed{x^4-2x^3-11x^2+12x+36}$

14. List the possible rational zeros of $P(x) = 2x^5+3x^3+4x^2-8$

$\dfrac{\pm 1,2,4,8}{1,2} = \boxed{\pm 1,2,4,8,\tfrac{1}{2},\tfrac{3}{2}}$

Find all the real zeros of the polynomial.

15. $P(x) = x^3-3x^2-4x+12$

$\pm 1,2,3,4,6,12$

$$\begin{array}{r|rrrr} -2 & 1 & -3 & -4 & 12 \\ & & -2 & 10 & -12 \\ \hline & 1 & -5 & 6 & 0 \end{array}$$

x^2-5x+6

$(x-3)(x-2)$

$\boxed{x=3,2,-2}$

16. $P(x) = -x^4+10x^2+8x-8$

$\pm 1,2,4,8$

$$\begin{array}{r|rrrrr} -2 & -1 & 0 & 10 & 8 & -8 \\ & & 2 & -4 & [illegible] & 8 \\ \hline & -1 & 2 & 6 & -4 & 0 \end{array}$$

x^3+2x^2+6x-4

$$\begin{array}{r|rrrr} -2 & -1 & 2 & 6 & -4 \\ & & 2 & -8 & 4 \\ \hline & -1 & 4 & -2 & 0 \end{array}$$

$-x^2+4x-2=0$

$x^2-4x+2=0$ → quad formula

$\dfrac{4\pm\sqrt{16-4\cdot 1\cdot 2}}{2}$

$\dfrac{4\pm\sqrt{8}}{2} = \dfrac{4\pm [illegible]}{2}$

$=2\pm\sqrt{2}$

$\boxed{x=-2(dr), 2\pm\sqrt{2}}$

17. Use Descartes Rule of Signs to determine how many positive and how many negative real zeros $P(x)=2x^4-7x^3+x^2-18x+3$ **has.**

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There can be 4, 2, or 0 positive real answers

$p(-x) = +\ +\ +\ +\ +$

There are 0 negative real answers