College Prep Algebra
Quiz 3.1-3.3

Use <u>long division</u> to divide the polynomial.

1. $\frac{3x^3-2x^2+2x-5}{x+1}$

A. $3x^2+x+7+\frac{-6}{x+1}$
B. $3x^2-5x-3+\frac{-8}{x+1}$
C. $3x^2+x+3+\frac{-2}{x+1}$
D. $3x^2-5x+7+\frac{-12}{x+1}$

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

A. $2x^3-5x^2+3x-11+\frac{53}{2x-4}$
B. $2x^3+x^2+4x+7+\frac{27}{2x-4}$
C. $2x^3+3x^2-5x-2+\frac{43}{2x-4}$
D. $2x^3-7x^2-12x+23+\frac{91}{2x-4}$

Use <u>synthetic division</u> to divide the polynomial.

3. $\frac{x^3+6x^2-8}{x-1}$

A. $x^2+7x+7+\frac{1}{x-1}$
B. $x^2+5x-5+\frac{-13}{x+1}$
C. $x^2+7x+\frac{-1}{x+1}$
D. $x^2+5x+3+\frac{13}{x+1}$

4. $\frac{3x^3-2x^2+2x-5}{x+1}$

A. $3x^2+x+3+\frac{-2}{x+1}$
B. $3x^2-5x+7+\frac{-12}{x+1}$
C. $3x^2-5x+7+\frac{-12}{x+1}$
D. $3x^2-2x+9+\frac{4}{x+1}$

Use synthetic division to determine whether the first expression is a factor of the polynomial.

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

A. Yes
B. No

6. $P(x)=x^3-6x^2-4x-6;\ x-4$

A. Yes
B. No

7. $P(x)=2x^4+x^3-5x+2;\ x-\frac{1}{2}$

A. Yes
B. No

Examine the leading term to determine the far-left and far-right behavior of the graph of each polynomial function.

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

A. Up Left, Up Right
B. Down Left, Down Right
C. Up Left, Down Right
D. Down Left, Up Right

9. $P(x)=x^4+5x^2+3x-7$

A. Up Left, Up Right
B. Down Left, Down Right
C. Up Left, Down Right
D. Down Left, Up Right

Use the Rational Zero Theorem to list possible rational zeros for each polynomial function.

10. $P(x) = 2x^3 - 9x - 8$

A. $\pm 1, \pm 2, \pm 4, \pm 8, \pm \frac{1}{2}, \pm \frac{2}{2}, \pm \frac{4}{2}, \pm \frac{8}{2}$
B. $\pm 1, \pm 2, \pm 4, \pm 8, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{5}{2}$
C. $\pm 1, \pm 2, \pm 4, \pm 8$
D. $\pm 1, \pm 2, \pm 4, \pm 8, \pm \frac{1}{2}$

11. $P(x) = 2x^4 + 3x^3 - 5x^2 - x + 12$

A. $\pm 1, \pm 2, \pm 3, \pm 6$
B. $\pm 1, \pm 2, \pm 3, \pm 6, \pm \frac{1}{2}, \pm \frac{1}{3}, \pm \frac{1}{6}$
C. $\pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12 \pm \frac{1}{6}, \pm \frac{2}{3}, \pm \frac{3}{2}$
D. $\pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12, \pm \frac{1}{2}, \pm \frac{3}{2}$

Find the smallest positive integer that is the upper bound and the largest negative integer that is a lower bound of the real zeros of each polynomial.

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

A. Upper Bound: -2, Lower Bound: 3
B. Upper Bound: 2, Lower Bound: -3
C. Upper Bound: 3, Lower Bound: -1
D. Upper Bound: -3, Lower Bound: 1

13. $P(x) = 2x^3 + 7x^2 - 4x - 14$

A. Upper Bound: 2, Lower Bound: -4
B. Upper Bound: -2, Lower Bound: 4
C. Upper Bound: 3, Lower Bound: -3
D. Upper Bound: -3, Lower Bound: 3

Use Descartes' Rule of Signs to state the number of possible positive and negative real zeros of each polynomial function.

14. $P(x) = 3x^4 - 5x^3 - 7x^2 + x - 7$

A. 2+, 2-, $0i$; 0+, 0-, $4i$
B. 2+, 1-, $1i$; 0+, 0-, $4i$
C. 3+, 1-, $0i$; 1+, 1-, $2i$
D. 3+, 1-, $0i$; 1+, 2-, $1i$

15. $P(x) = 2x^3 + x^2 - 25x + 12$

A. 1+, 0-, $2i$; 0+, 0-, $3i$
B. 1+, 2-, $0i$; 0+, 0-, $3i$
C. 2+, 1-, $0i$; 0+, 1-, $2i$
D. 2+, 1-, $0i$; 0+, 2-, $1i$

Find the zeros of each polynomial function. If a zero is a multiple zero, state it a multiplicity.

16. $P(x) = 3x^3 + 11x^2 - 6x - 8$

A. -2,3,$-\frac{2}{3}$
B. 2,-3,$-\frac{2}{3}$
C. -1,4,$\frac{2}{3}$
D. 1,-4,$-\frac{2}{3}$

17. $P(x) = 6x^4 + 23x^3 + 19x^2 - 8x - 4$

A. 2 (mult of 2),1, $-\frac{1}{2}$
B. -2 (mult of 2),$-\frac{1}{3}, \frac{1}{2}$
C. -3 (mult of 2),1, $\frac{1}{2}$
D. 3 (mult of 2),$-1, -\frac{1}{2}$