Unit 6: Polynomials Review

Name Key

Sketch the graph of each function. Solve for critical points (y-int, x-ints, and vertex)

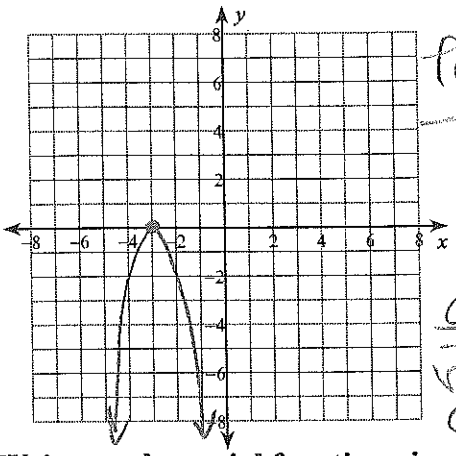
1) $f(x) = -2x^2 - 12x - 18$

$f(x) = -2(x^2 + 6x + 9)$

3 | 9 / 6 | 3

$f(x) = -2(x+3)(x+3)$

$f(x) = -2(x+3)^2$



off the graph

x-ints ($y=0$) / vertex

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

$\frac{0}{-2} = \frac{-2(x+3)^2}{-2}$

$0 = (x+3)^2$

$0 = x+3$

$x = -3$

$(-3, 0)$

y-int ($x=0$) $(0, -18)$

$f(0) = -2(0+3)^2$

$f(0) = -2 \cdot 9$

$f(0) = -18$

Write a polynomial function given x-intercepts (a=1).

$y = a(x - r_1)(x - r_2)(x - r_3)$

2) 4, –4, –3

$f(x) = (x-4)(x+4)(x+3)$

$f(x) = (x^2 - 16)(x+3)$

$f(x) = x^3 + 3x^2 - 16 - 48$

3) –5, –1, 0

$f(x) = (x--5)(x--1)(x-0)$

$f(x) = x(x+5)(x+1)$

$f(x) = x(x^2 + 6x + 5)$

$f(x) = x^3 + 6x^2 + 5x$

Find each product (expand).

4) $5n^2(6n+5) = 30n^3 + 25n^2$

5) $(7n+1)(2n+2) = 14n^2 + 14n + 2n + 2$

$14n^2 + 16n + 2$

6) $(4x-7)^2 = (4x-7)(4x-7)$

$16x^2 - 28x - 28x + 49$

$16x^2 - 56x + 49$

7) $(8+x)^2 = (8+x)(8+x)$

$64 + 16x + x^2$

$x^2 + 16x + 64$

8) $(n+1)(n-1)$

$n^2 + 1n - 1n - 1$

$n^2 - 1$

9) $(4x^4 - 3)^2$

$(4x^4 - 3)(4x^4 - 3)$

$16x^8 - 24x^4 + 9$

10) $(5x-2)(4x^2 + 6x - 6)$

$20x^3 + 30x^2 - 30x - 8x^2 - 12x + 12$

$20x^3 + 24x^2 - 42x + 12$

11) $(7n+2)(3n^2 + 8n + 5)$

Factor each completely.

12) $m^2 - 5m - 50$

5 | -5 / -10 | -5

$(m-10)(m+5)$

13) $x^3 + 9x^2 + 14x$

2 | 14 / 9 | 7

$x(x^2 + 9x + 14)$

$x(x+2)(x+7)$

14) $x^2 - 9x$

$x(x-9)$

15) $v^3 + 6v^2 - 16v$

$v(v+6v-16)$

$v(v+8)(v-2)$

16) $v^2 + 2v - 24$

$(v+6)(v-4)$

17) $x^2 + 2x - 35$

$(x+7)(x-5)$

18) $2v^2 - 12v + 16$ $= 2(v^2 - 6v + 8)$ $2(v-2)(v-4)$

19) $p^3 + 4p^2$ ← 9A common factors $p^2(p+4)$

Solve

20) $x^3 + 3x^2 - 4x = 0$ $x(x^2+3x-4)$ $x(x+4)(x-1)$ $x=0, x=-4, x=1$

21) $x^3 + 2x^2 - 8x = 0$ $x(x^2+2x-8)$ $x(x+6)(x-4)$ $x=0, x=-6, x=4$

Solve each equation.

22) $\frac{8n^2}{8} = \frac{-32}{8}$ $\sqrt{n^2} = \sqrt{-4}$ $n = \pm 2i$

23) $\frac{3m^2}{3} = \frac{-9}{3}$ $\sqrt{m^2} = \sqrt{-3}$ $m = \pm i\sqrt{3}$

24) $b^2 - 8b = 0$ $b(b-8) = 0$ $b = 0$ $b - 8 = 0$ $b = 8$

25) $n^2 - 36 = 0$ $+36 \quad +36$ $\sqrt{n^2} = \sqrt{36}$ $n = \pm 6$ OR $(n-6)(n+6) = 0$

26) $x^2 + 6x + 9 = 0$ $(x+3)^2 = \sqrt{0}$ $x + 3 = 0$ $x = -3$

27) $k^2 - 6k - 16 = 0$ $(k-8)(k+2) = 0$ $k = 8, -2$

28) $n^2 + 12n + 11 = 0$ $(n+11)(n+1) = 0$ $n = -11, -1$

29) $x^2 - 4x - 14 = 0$ $x^2 - 4x = 14$ $+4 \quad +4$ $\sqrt{(x-2)^2} = \sqrt{18}$ $\sqrt{9}\sqrt{2}$ $x - 2 = \pm 3\sqrt{2}$ $x = 2 \pm 3\sqrt{2}$

30) $r^2 - 12r + 24 = 0$ $r^2 - 12r = -24$ $r^2 - 12r + 36 = -24 + 36$ $\sqrt{(r-6)^2} = \sqrt{12}$ $r - 6 = \pm 2\sqrt{3}$ $r = 6 \pm 2\sqrt{3}$

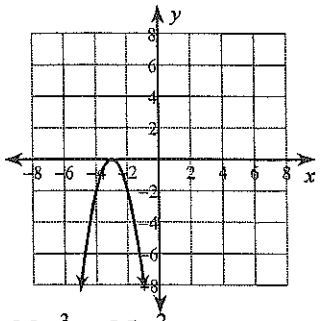
31) $p^2 - 14p - 95 = 0$ $p^2 - 14p + 49 = 95 + 49$ $\sqrt{(p-7)^2} = \sqrt{144}$ $p - 7 = \pm 12$ $p = 19, -5$

32) $x^3 - 16x = 0$ $x(x^2 - 16) = 0$ $x(x+4)(x-4) = 0$ $x = 0 \quad x = -4 \quad x = 4$

33) $x^3 + 5x^2 + 4x = 0$ $x(x^2 + 5x + 4) = 0$ $x(x+4)(x+1) = 0$ $x = 0$, $x + 4 = 0$, $x + 1 = 0$ $x = -4$ $x = -1$

Answers to Unit 6: Polynomials Review

1)



2) $f(x) = x^3 + 3x^2 - 16x - 48$

3) $f(x) = x^3 + 6x^2 + 5x$

4) $30n^3 + 25n^2$

5) $14n^2 + 16n + 2$

6) $16x^2 - 56x + 49$

7) $64 + 16x + x^2$

8) $n^2 - 1$

9) $16x^8 - 24x^4 + 9$

10) $20x^3 + 22x^2 - 42x + 12$

11) $21n^3 + 62n^2 + 51n + 10$

12) $(m-10)(m+5)$

13) $x(x+7)(x+2)$

14) $x(x-9)$

15) $v(v+8)(v-2)$

16) $(v+6)(v-4)$

17) $(x-5)(x+7)$

18) $2(v-4)(v-2)$

19) $p^2(p+4)$

20) $x(x+4)(x-1) = 0$

21) $x(x-2)(x+4) = 0$

22) $\{2i, -2i\}$

23) $\{i\sqrt{3}, -i\sqrt{3}\}$

24) $\{8, 0\}$

25) $\{-6, 6\}$

26) $\{-3\}$

27) $\{8, -2\}$

28) $\{-1, -11\}$

29) $\{2 + 3\sqrt{2}, 2 - 3\sqrt{2}\}$

30) $\{6 + 2\sqrt{3}, 6 - 2\sqrt{3}\}$

31) $\{19, -5\}$