

Work on as many problems as you can together with your group members. Towards the end of lecture your group will be asked to present a problem correctly to receive classwork points.

Section P.1

- Evaluate the algebraic expression for the given values of the variables:
 - $8x - y$ for $x = 4$ and $y = 5$
 - $\frac{2(x+2)}{6x-36}$ for $x = 7$
- A football is kicked vertically upward from a height of 7 feet with an initial speed of 50 feet per second. The formula $h = 7 + 50t - 16t^2$ describes the ball's height above the ground, h , in feet, t seconds after it was kicked. Use this formula to find the ball's height 3 seconds after it was kicked.
- Find the intersection or union of the following sets:
 - $\{3, 6, 10\} \cap \{3, 7, 8\}$
 - $\{b, d, c, a\} \cap \emptyset$
 - $\{1, 7, 12, 14\} \cup \{7, 14, 15\}$
 - $\{k, h, g, u, c\} \cup \emptyset$
- Rewrite the expression without absolute value bars
 - $|-10| - |-12|$
 - $|x| + |y|$ for $x = 1$ and $y = -7$
 - $\frac{y}{|y|}$
- Express the distance between 11 and 17 using absolute value. Then find the distance by evaluating the absolute value expression.
- Simplify the algebraic expression
 - $5(5x + 5) - 3$
 - $4(9y - 9) - (9y + 5)$
 - $3 - 6[-2(7 - 4) - 4(2 - 3)]$

Section P.2

1. Evaluate the following expression:

(a) $7^2 \cdot 2$

(b) -1^2

(c) $(-3)^0$

2. Simplify the given exponential expression:

(a) $x^5 \cdot x^8$

(b) $5x^7 \cdot 4x^8$

(c) $\left(\frac{x^2y^5z^3}{x^{-2}y^{-5}z^{-3}}\right)^{-4}$

Section P.3

1. Evaluate the expression:

(a) $\sqrt{16+9}$

(b) $\sqrt{144} - \sqrt{100}$

(c) $\sqrt{(-3)^2}$

2. Simplify the expression. Assume all variables are nonnegative real numbers:

(a) $\sqrt{50}$

(b) $\sqrt{4x} \cdot \sqrt{2x}$

(c) $\sqrt{\frac{1}{100}}$

3. Perform the indicated operation. Simplify if possible:

(a) $2\sqrt{15x} - 8\sqrt{15x}$

(b) $\sqrt{75} + 2\sqrt{3}$

(c) $\sqrt{50x} - \sqrt{8x}$

4. Rationalize the denominator. Simplify if possible:

(a) $\frac{1}{\sqrt{10}}$

(b) $\frac{\sqrt{2}}{\sqrt{3}}$

(c) $\frac{8}{\sqrt{5} + \sqrt{2}}$

5. Evaluate the roots:

- (a) $\sqrt[3]{64}$
- (b) $\sqrt[3]{-125}$
- (c) $\sqrt[4]{(-5)^4}$

6. Simplify or evaluate:

- (a) $\sqrt[3]{24}$
- (b) $32^{1/5}$
- (c) $27^{-2/3}$
- (d) $(6x^{1/4})(2x^{1/3})$
- (e) $\frac{(2y^{1/3})^2}{y^{1/6}}$

Section P.4

1. Find the degree of the polynomial:

- (a) $2x^3 + 2x^2 + 4$
- (b) $x^2 - 2x^3 + 7x + 3x^7 + 7$

2. Perform the indicated operation:

- (a) $(-10x^3 + 5x^2 - 10x + 8) + (5x^3 + 2x^2 - 3x - 5)$
- (b) $(5x^3 - 2x^2 + 2x - 2) - (4x^3 - 2x^2 - 9x + 4)$
- (c) $(x - 11)(x + 3)$
- (d) $(3x^2 - 4)(5x^2 - 4)$
- (e) $(x - 5)(x + 5)$
- (f) $(x^3 + 11xy + 5y^2) - (10x^3 + 6xy + 11y^2)$

Section P.5

1. Factor the polynomial:

- (a) $18x + 30$
- (b) $x(x + 11) - 2(x + 11)$
- (c) $x^3 - 5x^2 + 2x - 10$
- (d) $x^2 + 9x + 14$
- (e) $3a^2 - 4a - 20$
- (f) $x^2 - 100$
- (g) $y^2 + 10y + 25$
- (h) $7x^3 - 7x$
- (i) $x^3 - 5x^2 - 4x + 20$

Section P.6

1. Find all numbers for which the rational expression is undefined

(a) $\frac{y+5}{y^2-25}$

(b) $\frac{x-2}{x^2+6x+5}$

2. Perform the indicated operation. Simplify and find all numbers that must be excluded from the domain of the simplified expression in order to be equivalent to the original

(a) $\frac{x-6}{3x+21} \cdot \frac{2x+14}{2x-12}$

(b) $\frac{x^2-4}{x-2} \div \frac{x+2}{4x-8}$

(c) $\frac{3x-16}{x-7} - \frac{x-2}{x-7}$

(d) $\frac{6}{x-4} + \frac{5}{x+3}$

3. Simplify the complex rational expression:

(a) $\frac{\frac{x}{7}-1}{x-7}$

(b) $\frac{\frac{2}{x} + \frac{5}{y}}{5x+2y}$ (You don't need to write the excluded domain values for this)

Answers

Section P.1

- (a) 27
(b) 3
- 13 feet
- (a) {3}
(b) \emptyset
(c) {1, 7, 12, 14, 15}
(d) { k, h, g, u, c }
- (a) 2
(b) 8
(c) -1
- $|17 - 11|$ or $|11 - 17|$, 6
- (a) $25x + 22$
(b) $27y - 41$
(c) 15

Section P.2

- (a) 98
(b) -1
(c) 1
- (a) x^{13}
(b) $20x^{15}$
(c) $\frac{1}{x^{16}y^{40}z^{24}}$

Section P.3

- (a) 5
(b) 2
(c) 3
- (a) $5\sqrt{2}$
(b) $2x\sqrt{2}$
(c) $\frac{1}{10}$

- (a) $-6\sqrt{15x}$
(b) $7\sqrt{3}$
(c) $3\sqrt{2x}$
- (a) $\frac{\sqrt{10}}{10}$
(b) $\frac{\sqrt{6}}{3}$
(c) $\frac{8\sqrt{5} - 8\sqrt{2}}{3}$
- (a) 4
(b) -5
(c) 5
- (a) $2\sqrt[3]{3}$
(b) 2
(c) $\frac{1}{9}$
(d) $12x^{7/12}$
(e) $4y^{1/2}$

Section P.4

- (a) 3
(b) 7
- (a) $-5x^3 + 7x^2 - 13x + 3$
(b) $x^3 + 11x - 6$
(c) $x^2 - 8x - 33$
(d) $15x^4 - 32x^2 + 16$
(e) $x^2 - 25$
(f) $-9x^3 + 5xy - 6y^2$

Section P.5

- (a) $6(3x + 5)$
(b) $(x - 2)(x + 11)$
(c) $(x - 5)(x^2 + 2)$
(d) $(x + 2)(x + 7)$
(e) $(3a - 10)(a + 2)$
(f) $(x - 10)(x + 10)$
(g) $(y + 5)^2$
(h) $7x(x + 1)(x - 1)$
(i) $(x - 5)(x + 2)(x - 2)$

Section P.6

1. (a) 5, -5
(b) -1, -5

2. (a) $\frac{1}{3}$, $x \neq 6, -7$
(b) $4(x - 2)$, $x \neq -2, 2$

(c) 2, $x \neq 7$

(d) $\frac{11x - 2}{(x - 4)(x + 3)}$, $x \neq -3, 4$

3. (a) $\frac{1}{7}$
(b) $\frac{1}{xy}$