p10
1.1

Precalculus 6th edition
Selected answers

(1) a) $1,295,014$

b) 0

c) $-\frac{1}{2}$

d) π

(2) a) $ab = ba$ commutative property of multiplication

b) $a+(b+c) = (a+b)+c$
Associative Property for Addition

c) $a(b+c) = ab+bc$
Distributive Property for Multiplication

(3) $\{x \mid 2 < x < 7\}$
$(2, 7)$

(4) $|x|$, Absolute Value
Positive

(5) a) $\{50\}$

b) $\{0, -10, 50\}$

c) $\{0, -10, 50, \frac{22}{7}, 0.538, 1.2\overline{3}, -\frac{1}{3}\}$

d) $\{\sqrt{7}, \sqrt[3]{2}\}$

(6) a) $\{11, \sqrt{16}, \frac{15}{3}\}$

b) $\{-11, 11, \sqrt{16}, \frac{15}{3}\}$

c) $\{1.001, 0.333\ldots, -11, 11, \frac{13}{15}, \sqrt{16}, 3.14, \frac{15}{3}\}$

d) $\{-\pi\}$

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(7) Communative Property for Addition

(8) Communatitive Property for Multiplication

(9) Associative Property for Addition

(10) Distributive Property for Multiplication

(11) Distributive Property for Multiplication

(12) Distributive Property for Multiplication

(13) Communitive Property for Multiplication

(14) Distributive Property for Multiplication

(15) $x + 3 = 3 + x$

(16) $7(3x) = (7 \cdot 3)x$

(17) $4(A + B) = 4A + 4B$

(18) $5x + 5y = 5(x + y)$

(19) $3(x + y) = 3x + 3y$

(20) $(a - b)8 = 8a - 8b$

(21) $4(2m) = 8m$

(22) $\frac{4}{3}(-6y) = -8y$

(23) $-\frac{5}{2}(2x - 4y)$

$= -5x + 10y$

(24) $(3a)(b + c - 2d)$

$= 3ab + 3ac - 6ad$

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(25) a) $\frac{3}{10} + \frac{4}{15}$

$= \left(\frac{3}{3}\right)\left(\frac{3}{2 \cdot 5}\right) + \left(\frac{2}{2}\right)\left(\frac{4}{3 \cdot 5}\right)$

$= \frac{17}{30}$

b) 1/4 + 1/5

$= \frac{5}{5}\left(\frac{1}{4}\right) + \frac{4}{4}\left(\frac{1}{5}\right)$

$=$ 9/20

(26) a) $\frac{2}{3} - \frac{3}{5}$

$= \left(\frac{5}{5}\right)\left(\frac{2}{3}\right) - \frac{3}{3}\left(\frac{3}{5}\right)$

$= \frac{1}{15}$

b) $1 + \frac{5}{8} - \frac{1}{6}$

$= \frac{8}{8} + \frac{5}{8} - \frac{1}{6}$

$= \frac{13}{2 \cdot 4} - \frac{1}{2 \cdot 3}$

$= \frac{3}{3}\left(\frac{13}{2 \cdot 4}\right) - \frac{4}{4}\left(\frac{1}{2 \cdot 3}\right)$

$= \frac{25}{24}$

(27) a) $\frac{2}{3}\left(6 - \frac{3}{2}\right)$

$= \frac{2}{3}(6) - \frac{2}{3}\left(\frac{3}{2}\right)$

$= 4 - 1$

$= 3$

b) $0.25\left(\frac{8}{9} + \frac{1}{2}\right)$

$= \frac{1}{4}\left(\frac{8}{9}\right) + \frac{1}{4}\left(\frac{1}{2}\right)$

$= \frac{2}{9} + \frac{1}{8}$

$= \frac{2 \cdot 4}{2 \cdot 4}\left(\frac{2}{3 \cdot 3}\right) + \frac{3 \cdot 3}{3 \cdot 3}\left(\frac{1}{2 \cdot 4}\right)$

$= \frac{25}{72}$

page 1.1 cont

(28) a) $\left(3+\frac{1}{4}\right)\left(1-\frac{4}{5}\right)$

$= \left[\frac{4}{4}\left(\frac{3}{1}\right)+\frac{1}{4}\right]\left[\frac{5}{5}\left(\frac{1}{1}\right)-\frac{4}{5}\right]$

$= \left(\frac{13}{4}\right)\left(\frac{1}{5}\right)$

$= \frac{13}{20}$

b) $\left(\frac{1}{2}-\frac{1}{3}\right)\left(\frac{1}{2}+\frac{1}{3}\right)$

$= \left(\frac{1}{2}\right)\left(\frac{1}{2}\right) + \frac{1}{2}\left(\frac{1}{3}\right) - \frac{1}{3}\left(\frac{1}{2}\right) - \frac{1}{3}\left(\frac{1}{3}\right)$

$\frac{1}{2}\left(\frac{1}{3}\right) - \frac{1}{3}\left(\frac{1}{2}\right) = 0$

$= \frac{1}{4} - \frac{1}{9}$

$= \frac{3\cdot3}{3\cdot3}\left(\frac{1}{2\cdot2}\right) - \frac{2\cdot2}{2\cdot2}\left(\frac{1}{3\cdot3}\right)$

$= \frac{9-4}{36}$

$= \frac{5}{36}$

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OR

(28) a) $\left(3+\frac{1}{4}\right)\left(1-\frac{4}{5}\right)$

$= 3(1) - 3\left(\frac{4}{5}\right) + \frac{1}{4}(1) - \frac{1}{4}\left(\frac{4}{5}\right)$

$= 3 - \frac{12}{5} + \frac{1}{4} - \frac{1}{5}$

$= -\frac{12}{5} - \frac{1}{5} + 3 + \frac{1}{4}$

$= -\frac{13}{5} + \frac{3}{1}\left(\frac{4}{4}\right) + \frac{1}{4}$

$= -\frac{13}{5} + \frac{13}{4}$

$= \frac{2 \cdot 2}{2 \cdot 2}\left(-\frac{13}{5}\right) + \frac{5}{5}\left(\frac{13}{4}\right)$

$= \frac{-52+65}{20}$

$= \boxed{\frac{13}{20}}$

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(29) a) $\dfrac{2}{\frac{2}{3}} - \dfrac{\frac{2}{3}}{2}$

$= 2\left(\frac{3}{2}\right) - \frac{2}{3}\left(\frac{1}{2}\right)$

$= 3 - \frac{1}{3}$

$= \frac{9}{3} - \frac{1}{3}$

$= \frac{8}{3}$

b) $\dfrac{\frac{1}{12}}{\frac{1}{8} - \frac{1}{9}}$

$= \frac{72}{72}\left(\dfrac{\frac{1}{12}}{\frac{1}{8} - \frac{1}{9}}\right)$

$= \dfrac{72\left(\frac{1}{12}\right)}{72\left(\frac{1}{8}\right) - 72\left(\frac{1}{9}\right)}$

$= \dfrac{6}{9 - 8}$

$= \dfrac{6}{1}$

$= 6$

OR

$\dfrac{\frac{1}{12}}{\frac{1}{8} - \frac{1}{9}} = \dfrac{\frac{1}{3 \cdot 4}}{\frac{1}{2 \cdot 4} - \frac{1}{3 \cdot 3}}$

$= \dfrac{2 \cdot 3 \cdot 3 \cdot 4}{2 \cdot 3 \cdot 3 \cdot 4}\left(\dfrac{\frac{1}{3 \cdot 4}}{\frac{1}{2 \cdot 4} - \frac{1}{3 \cdot 3}}\right)$

$= \dfrac{2 \cdot 3}{3 \cdot 3 - 2 \cdot 4}$

$= \dfrac{2 \cdot 3}{3 \cdot 3 - 2(3+1)}$

$= \dfrac{2 \cdot 3}{3 \cdot 3 - 2 \cdot 3 - 2 \cdot 1}$

$= \dfrac{2 \cdot 3}{1 \cdot 3 - 2 \cdot 1}$

$= \dfrac{2 \cdot 3}{3 \cdot 1 - 2 \cdot 1}$

$= \dfrac{2 \cdot 3}{1 \cdot 1} = \dfrac{6}{1}$

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(30) a) $\dfrac{2-\frac{3}{4}}{\frac{1}{2}-\frac{1}{3}}$

$= \dfrac{12}{12}\left(\dfrac{2-\frac{3}{4}}{\frac{1}{2}-\frac{1}{3}}\right)$

$= \dfrac{12(2)-12\left(\frac{3}{4}\right)}{12\left(\frac{1}{2}\right)-12\left(\frac{1}{3}\right)}$

$= \dfrac{24-9}{6-4}$

$= \dfrac{15}{2}$

b) $\dfrac{\frac{2}{5}+\frac{1}{2}}{\frac{1}{10}+\frac{3}{15}}$ → or Reduce to $\frac{1}{5}$

$= \dfrac{30}{30}\left(\dfrac{\frac{2}{5}+\frac{1}{2}}{\frac{1}{10}+\frac{3}{15}}\right)$

$= \dfrac{30\left(\frac{2}{5}\right)+30\left(\frac{1}{2}\right)}{30\left(\frac{1}{10}\right)+30\left(\frac{3}{15}\right)}$

$= \dfrac{12+15}{3+6}$

$= \dfrac{27}{9}$

$= 3$

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(31) a) $3 = 1 + 1 + 1$

$= \frac{2}{2} + \frac{2}{2} + \frac{2}{2}$

$= \left(\frac{1}{2} + \frac{1}{2}\right) + \left(\frac{1}{2} + \frac{1}{2}\right) + \left(\frac{1}{2} + \frac{1}{2}\right)$

$= \frac{6}{2}$. Since $3 = \frac{6}{2}$ then

$\frac{6}{2} < \frac{7}{2}$ $\boxed{3 < \frac{7}{2}}$

b) $-3 = (-1) + (-1) + (-1)$

$= \left(-\frac{2}{2}\right) + \left(-\frac{2}{2}\right) + \left(-\frac{2}{2}\right)$

$= \left[\left(-\frac{1}{2}\right) + \left(-\frac{1}{2}\right)\right] + \left[\left(-\frac{1}{2}\right) + \left(-\frac{1}{2}\right)\right] + \left[\left(-\frac{1}{2}\right) + \left(-\frac{1}{2}\right)\right]$

$= -\frac{6}{2}$. Since $-3 = -\frac{6}{2}$

$-\frac{6}{2} > \frac{-7}{2}$ $\boxed{-3 > -\frac{7}{2}}$

c) $\boxed{3.5 = \frac{7}{2}}$

(32) a) $\boxed{\frac{2}{3} < 0.67}$ b) $\boxed{\frac{2}{3} > -0.67}$

c) $\boxed{|0.67| = |-0.67|}$

(33) a) False b) True

(34) a) True b) False

1.1 cont

(35) a) False b) True

(36) a) False b) True

(37) a) $x > 0$ b) $t < 4$ c) $a \geq \pi$

d) $-5 < x < \frac{1}{3}$ e) $|p-3| \leq 5$

(38) a) $y < 0$ b) $z > 1$ c) $b \leq 8$

d) $0 < w \leq 7$ e) $|y-\pi| \geq 2$

(39) a) $A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8\}$

b) $A \cap B = \{2, 4, 6\}$

(40) a) $B \cup C = \{2, 4, 6, 7, 8, 9, 10\}$

b) $B \cap C = \{8\}$

(41) a) $A \cup C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

b) $A \cap C = \{7\}$

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(42) a) $A \cup B \cup C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

b) $A \cap B \cap C = \{\}$ or $\emptyset$

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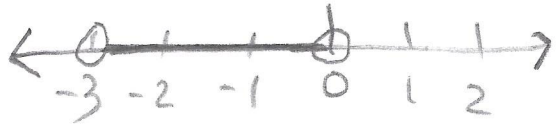
(43) a) $B \cup C = \{x \mid x \leq 5\}$

b) $B \cap C = \{x \mid -1 < x < 4\}$

(44) a) $A \cap C = \{x \mid -1 \leq x \leq 5\}$

b) $A \cap B = \{x \mid -2 \leq x < 4\}$

(45) $-3 < x < 0$

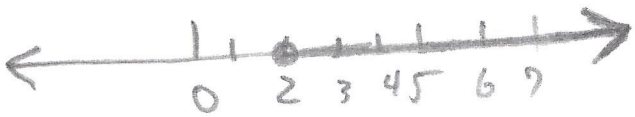


(46) $2 < x \leq 8$

(47) $2 \leq x < 8$

(48) $-6 \leq x \leq -2$

(49) $x \geq 2$



(50) $(-\infty, 1)$

$\boxed{x < 1}$

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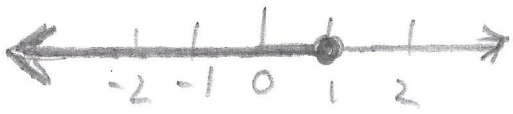
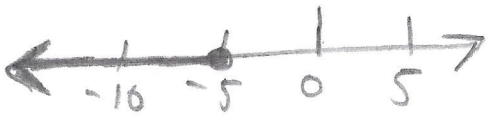
(51) $x \leq 1 \Rightarrow (-\infty, 1]$



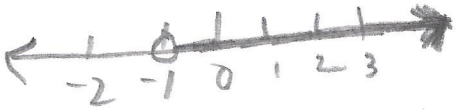
(52) $1 \leq x \leq 2 \Rightarrow [1, 2]$

(53) $-2 < x \leq 1 \Rightarrow (-2, 1]$

(54) $x \geq -5 \Rightarrow [-\infty, -5]$

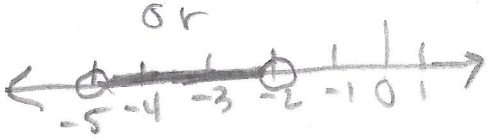


(55) $x > -1 \Rightarrow (-1, \infty)$



(56) $-5 < x < -2 \Rightarrow (-5, -2)$

or



(57) a)

$-3 \leq x \leq 5$

b)

$-3 < x \leq 5$

(58) a)

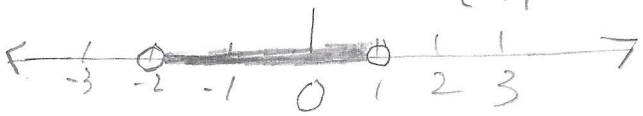
$0 \leq x < 2$

b)

$-2 < x \leq 2$

(59) $(-2, 0) \cup (-1, 1) \Rightarrow \{x \mid -2 < x < 0 \text{ or } -1 < x < 1\}$

$\Rightarrow \{x \mid -2 < x < 1\}$



(60) $(-2,0) \cap (-1,1) = \{x \mid -2 < x < 0 \text{ and } -1 < x < 1\}$

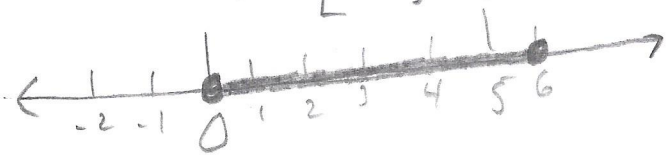
$= \{x \mid -1 < x < 0\}$

$= (-1,0)$

(61) $[-4,6] \cap [0,8] = \{x \mid -4 \le x \le 6 \text{ and } 0 \le x \le 8\}$

$= \{x \mid 0 \le x \le 6\}$

$= [0,6]$

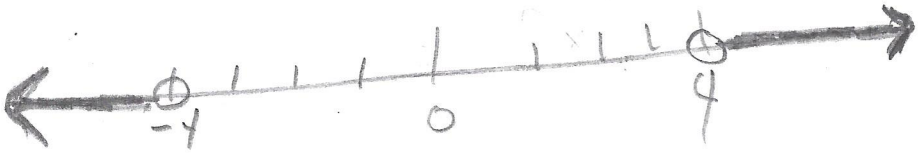


(62) $[-4,6] \cup [0,8) = \{x \mid -4 \le x \le 6 \text{ or } 0 \le x < 8\}$

$= \{x \mid -4 \le x < 8\}$

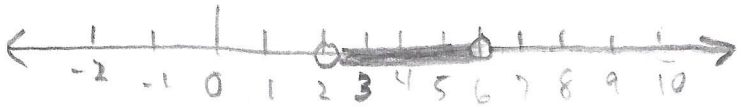
$= [-4,8)$

(63) $(-\infty,-4) \cup (4,\infty) = \{x \mid x < -4 \text{ or } x > 4\}$



(64) $(-\infty, 6] \cap (2, 10) = \{x \mid x < 6 \text{ and } 2 < x < 10\}$

$= \{x \mid 2 < x < 6\}$



(65) a) $|100| = 100$ b) $|-73| = 73$

(66) a) $|\sqrt{5} - 5| = -(\sqrt{5} - 5)$

$= -\sqrt{5} + 5$

$= \boxed{5 - \sqrt{5}}$

b) $|10 - \pi| = \boxed{10 - \pi}$

(67) a) $||1-6| - |-4|| = |6 - 4|$

$= \boxed{2}$

b) $\frac{-1}{|-1|} = \frac{-1}{1}$

$= \boxed{-1}$

(68) a) $|2 - |-12|| = |2 - 12|$

$= -(2 - 12)$

$= -2 + 12$

$= 12 - 2$

$= \boxed{10}$

b) $-1 - |1 - |-1|| =$

$= -1 - |1 - 1|$

$= -1 - 0$

$= \boxed{-1}$

(69) a) $|(-2) \cdot 6| = |-12|$

$= \boxed{12}$

b) $\left|\left(-\frac{1}{3}\right)(-15)\right| = |5|$

$= \boxed{5}$

(70) a) $\left|-\frac{6}{24}\right| = \frac{|-6|}{|24|}$

$= \frac{6}{24}$

$= \boxed{\frac{1}{4}}$

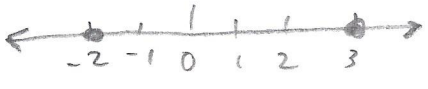
b) $\left|\frac{7-12}{12-7}\right| = \frac{|7-12|}{|12-7|}$

$= \frac{-(7-12)}{(12-7)}$

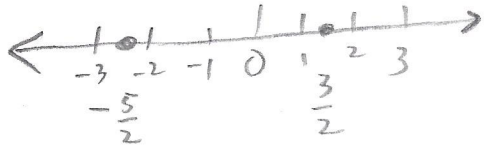
$= \frac{-7+12}{5}$

$= \frac{5}{5}$

$= \boxed{1}$

(71) 

$d(-2,3) = |3-(-2)|$
$= |3+2|$
$= |5|$
$= \boxed{5}$

(72) 

$d\left(-\frac{5}{2}, \frac{3}{2}\right) = \left|\frac{3}{2} - \left(-\frac{5}{2}\right)\right|$
$= \left|\frac{3}{2} + \frac{5}{2}\right|$
$= \left|\frac{8}{2}\right|$
$= \boxed{4}$

(73) a) $d(2,17) = |17-2|$
$= \boxed{15}$

b) $d(-3,21) = |21-(-3)|$
$= \boxed{24}$

c) $d\left(\frac{11}{8}, -\frac{3}{10}\right) = \left|-\frac{3}{10} - \frac{11}{8}\right|$

$= \left|-\frac{3}{2 \cdot 5} - \frac{11}{2 \cdot 4}\right|$

$= \left|-\frac{3(4)}{2(4)(5)} - \frac{5(11)}{2(4)(5)}\right|$

$= \left|\frac{-12-55}{(2)(4)(5)}\right|$

$= \left|\frac{-67}{40}\right|$

$= \boxed{\frac{67}{40}}$

(74) a) $d\left(\frac{7}{15}, -\frac{1}{21}\right) = \left|-\frac{1}{21} - \frac{7}{15}\right|$

$= \left|-\frac{1}{3(7)} - \frac{7}{3(5)}\right|$

$= \left|-\frac{5(1)}{3(5)(7)} - \frac{7(7)}{3(5)(7)}\right|$

$= \left|\frac{-5-49}{3(5)(7)}\right|$

$= \left|\frac{-54}{3(5)(7)}\right|$

$= \frac{27(2)}{3(5)(7)}$

$= \frac{3(9)(2)}{3(5)(7)}$

$= \boxed{\frac{18}{35}}$

b) $d(-38, -57)$

$= |-57 - (-38)|$

$= |-57 + 38|$

$= |-19|$

$= \boxed{19}$

c) $d(-2.6, -1.8)$

$= |-1.8 - (-2.6)|$

$= |-1.8 + 2.6|$

$= |0.8|$

$= \boxed{0.8}$

(75) a) $0.\overline{7} = x$

$100x = 77.\overline{7}$

$-10x = -7.\overline{7}$

$90x = 70$

$\frac{90x}{90} = \frac{70}{90}$

$\boxed{x = \frac{7}{9}}$ $\therefore \frac{7}{9} = 0.\overline{7}$

b) $0.2\overline{8} = x$

$100x = 28.\overline{8}$

$-10x = -2.\overline{8}$

$90x = 26$

$x = \frac{26}{90}$

$\boxed{x = \frac{13}{45}}$

c) $0.5\overline{7} = x$

$10000x = 5757.\overline{57}$

$-100x = -57.\overline{57}$

$9900x = 5700$

$x = \frac{5700}{9900}$

$\boxed{x = \frac{57}{99}}$

(76) a) $5.\overline{23} = x$

$10000x = 52323.\overline{23}$
$-100x = -523.\overline{23}$

$\frac{9900x}{9900} = \frac{5180}{9900}$

$\boxed{x = \frac{518}{99}}$

b) $1.3\overline{7} = x$

$100x = 137.\overline{7}$
$-10x = -13.\overline{7}$

$90x = 124$

$x = \frac{124}{90}$

$\boxed{x = \frac{62}{45}}$

c) $2.1\overline{35} = x$

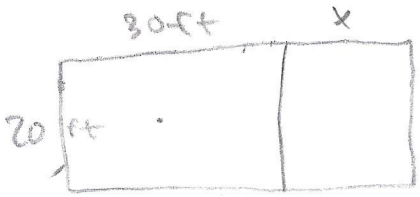
$1000x = 2135.\overline{35}$
$-10x = -21.\overline{35}$

$990x = 2114$

$x = \frac{2114}{990}$

$\boxed{x = \frac{1057}{495}}$

(77)



$A = 20(30+x)$

$= 600x + 20x$

By Distributive Property of Multiplication

(78)

Sun

$T_O - T_G = 68 - 77$

$= -9$

$|T_O - T_G| = |68 - 77|$

$= |-9|$

$= 9$

Mon

$T_O - T_G = 72 - 75$

$= -3$

$|T_O - T_G| = |72 - 75|$

$= |-3|$

$= 3$

Tue

$T_O - T_G = 73 - 73$

$= 0$

$|T_O - T_G| = |73 - 73|$

$= 0$

Wed