

Sample Practice math 115 B Answers

1. A
2. A
3. D
4. D
5. B
6. B
7. C
8. C
9. A
- 10.B
- 11.A
- 12.C
- 13.B
- 14.D
- 15.C
16. D
17. B
18. C
19. D
20. D
21. B
- 22.C
23. B
- 24.B
25. B
26. C
- 27.B
28. C
29. D
- 30.B
- 31.A
- 32.A
- 33.D
- 34.B
- 35.C
- 36.C
- 37.B
- 38.A
39. D
40. A

$$1) \quad 3^2(2)^3(-4) = (9)(8)(-4) = -288 \quad \textcircled{A}$$

$\text{or } 9 \times 8 = 72, \quad 72 \times 4 = (70+2) \times 4$
 $= 280 + 8 = 288$

$$2) \quad 35 \div (11 - 4^2) - 2^3$$

PEMDAS

$$= 35 \div (11 - 16) - 8$$

$$= 35 \div (-5) - 8$$

$$= -7 - 8 = -15 \quad \checkmark \quad \textcircled{A}$$

$$3) \quad (a+b)^2 - 3ac, \quad a = -2, \quad b = -4, \quad c = 5$$

$$= (-2 + (-4))^2 - 3(-2)(5) = (-2 - 4)^2 + 3(2)(5)$$

$$= (-6)^2 + 30$$

$$= 36 + 30 = 66 \quad \checkmark \quad \textcircled{D}$$

$$4) \quad -3b^2 \div (ac) - cb$$

$$= -3(4)^2 \div (-2 \cdot -3) - (-3)(4)$$

$$= -3(16) \div 6 + 12 = -48 \div 6 + 12 = -8 + 12 = 4 \quad \checkmark \quad \textcircled{D}$$

$$5) \quad -4x + 6y - (-2x) - 5y$$

$$= -4x + 6y + 2x - 5y = -4x + 2x + 6y - 5y$$

$$= -2x + y \quad \checkmark \quad \textcircled{B}$$

6) "five more than a number" = $n + 5$
 "the difference between the number and twelve" = $n - 12$
 so adding these gives

$$n + 5 + n - 12 = 2n - 7 \quad \checkmark \quad \textcircled{B}$$

$$7) -3x + 4[-x - (3x - 2)] + 5x$$

PEMDAS

$$= -3x + 4[-2x + 2] + 5x$$

$$= -3x - 8x + 8 + 5x = -11x + 5x + 8$$

$$= -6x + 8 \quad \checkmark$$

(C)

8) Solution 1

$$\text{percent} = \frac{\text{part}}{\text{whole}} = \frac{36}{45} = 0.80 = 80\% \quad (C)$$

$$\text{blc } 45 \overline{) 36.0} \quad \begin{array}{r} 80 \\ 45 \end{array}$$

and

$$8(45) = 8(40 + 5) = 320 + 40 = 360$$

$$9) 3x - 10(x - 1) = 2(3x + 4) - 11$$

$$= 3x - 10x + 10 = 6x + 8 - 11$$

$$= -7x + 10 = 6x - 3$$

$$\Rightarrow -13x = -13 \quad \text{so } x = 1$$

(A)

$$10) 2(x - 6) < 3(x - 2)$$

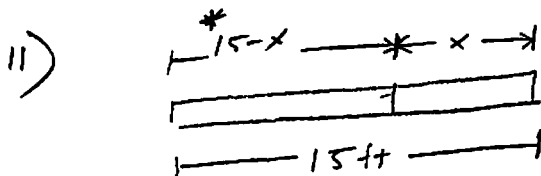
- simplify

- isolate x

$$2x - 12 < 3x - 6$$

$$-6 < x \quad \text{Same as } x > -6$$

(B)



good idea to sketch it.

* blc shorter piece	longer piece
1	15 - 1 = 14
2	15 - 2 = 13
5	15 - 5 = 10
x	15 - x

Now translating:

"three times the length of the shorter piece"

$$3x$$

is

=

"5 ft more than twice the longer"

$$2(15 - x) + 5$$

$$\text{so } 3x = 2(15 - x) + 5$$

Continue $\rightarrow$

$$3x = 2(15 - x) + 5$$

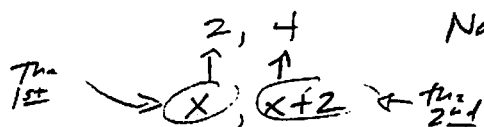
$$3x = 30 - 2x + 5$$

$$3x = 35 - 2x$$

$$5x = 35 \quad \therefore \quad x = \frac{35}{5} = 7 \quad \checkmark$$

(A)

12) One example of two consecutive even integers is:



Note: When numbers are consecutive even or odd, there is always a difference of 2 between them.

So, in our case

"five times the first" = $5x$

"ten more than three times the second" = $3(x+2) + 10$

Therefore

$$5x = 3(x+2) + 10$$

$$5x = 3x + 6 + 10$$

$$5x = 3x + 16$$

$$2x = 16 \Rightarrow x = \frac{16}{2} = 8 \Rightarrow x+2 = 10$$

$\therefore$ the numbers are 8 and 10 (C)

13) Simple Interest: Use: $Pr = I$, $P = \text{principal} = \text{money invested}$, $r = \text{rate}$, $I = \text{interest}$

	P	r	=	I
1 st account	$8000 - x$	.09	=	$.09(8000 - x)$
2 nd account	x	.07	=	$.07x$
Total	8000	.085	=	680

Warning
9% = .09 NOT .9
b/c .9 = 90%

Note: We are looking for the principal in the 7% account, so let it be x

$$.09(8000 - x) + .07x = 680$$

$$720 - .09x + .07x = 680$$

$$-0.02x = -40 \quad \therefore \quad x = \frac{-40}{-.02} = 2000$$

$\therefore$ 2000 needs to be invested in the 7% account (B)

14) Find: grams of pure acid to be added = x
 $\uparrow$ "pure" indicates a concentration of 100%

$$\text{Amount (g)} \cdot \text{Concentration (\%)} = \text{quantity (g)}$$

Pure Acid	x	1.0	x
20% Solution	60	.20	12
50% solution	$x+60$	.50	$x+12 = .50(x+60) \Rightarrow$

$$\begin{array}{rcl} x+12 & = & .50(x+60) = .50x + 30 \\ - .50x & -12 & \quad \quad - .50x \quad -12 \end{array}$$

$$.50x = 18 \Rightarrow x = \frac{18}{.50} = 36 \text{ grams} \quad \textcircled{D}$$

15) Find: length of rectangle = l

Given: Perimeter = $P = 44\text{m}$ and

$$l = \underline{3w-2}$$

"2m less than three times the width"

We know

$$P = 2l + 2w \text{ for rectangle so}$$

$$P = 2(3w-2) + 2w$$

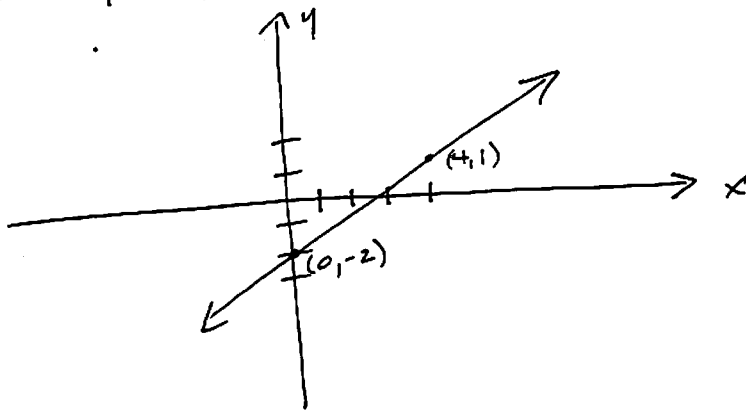
$$P = 6w - 4 + 2w = 8w - 4$$

$$44 = 8w - 4 \text{ so } 48 = 8w \Rightarrow w = \frac{48}{8} = 6 \Rightarrow$$

$$l = 3(6) - 2 = 18 - 2 = 16\text{m} = l \quad \checkmark \quad \textcircled{C}$$

$$16) y = \frac{3}{4}x - 2$$

$$\text{slope} = \frac{3}{4} = \frac{\text{rise}}{\text{run}}, \quad y\text{-intercept} = (0, -2)$$



$\textcircled{D}$

17) Given points $P_1(0, -3)$ and $P_2(4, 3)$,

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - (-3)}{4 - 0} = \frac{6}{4} = \frac{3}{2} \quad \textcircled{B}$$

18) Given point $(1, -5)$ and slope 3, use

$$y - y_1 = m(x - x_1)$$

$$y - (-5) = 3(x - 1)$$

$$= y + 5 = 3x - 3 \Rightarrow y = 3x - 8 \quad \textcircled{C}$$

19) $3x + 2y > 2$

First isolate y

$$2y > -3x + 2$$

$$y > -\frac{3}{2}x + 1$$

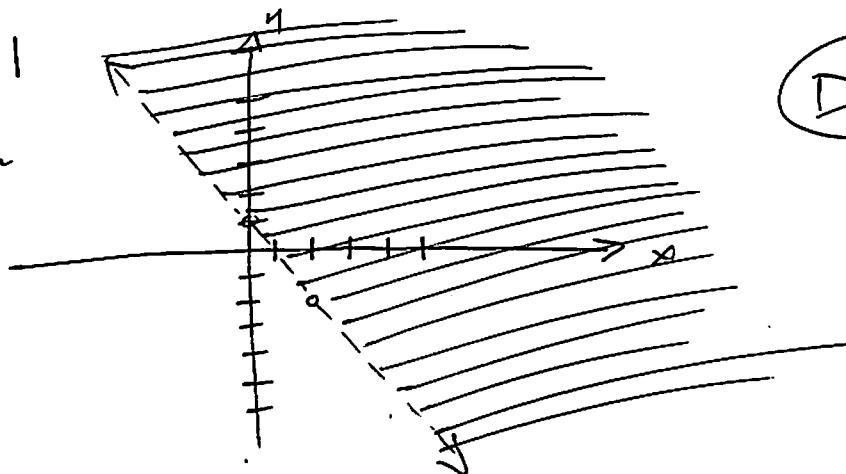
* Using a dotted line,
graph as if it were
 $y = -\frac{3}{2}x + 1$.

Then test a point
like $(0, 0)$

$$3(0) + 2(0) > 2?$$

$$0 + 0 > 2?$$

$0 > 2$? No... So $(0, 0)$ is not in the solution set. We shade the other side.



$\textcircled{D}$

20) $3x - 4y = -10$
 $2x + 2y = -2$

Solving by Elimination:

$$\begin{array}{r} 3x - 4y = -10 \\ 4x + 4y = -4 \\ \hline 7x = -14 \\ x = \frac{-14}{7} = -2 \end{array}$$

← We multiplied the 2nd equation by 2.

$$\text{Since } x = -2 \text{ and } 2x + 2y = -2 \Rightarrow y = \frac{-2 - 2x}{2} = \frac{-2 - 2(-2)}{2} = \frac{2}{2} = 1$$

$\therefore (-2, 1) \quad \textcircled{D}$

21) $4x - 3y = -2$ ← multiply by 2 and add to 2nd equation
 $-3x + 6y = -6$

So

$$\begin{array}{r} 8x - 6y = -4 \\ -3x + 6y = -6 \\ \hline 5x = -10 \end{array}$$

so $x = \frac{-10}{5} = -2$ Now,

Since $4x - 3y = -2$, it follows that $y = \frac{-2 - 4x}{-3}$
 $= \frac{-2 - 4(-2)}{-3}$
 $y = -2$

∴ $(-2, -2)$ (B)

22) $(-2x^2 + 3x - 6) - (x^2 - 5x + 2)$
 $= -2x^2 + 3x - 6 - x^2 + 5x - 2$
 $= -3x^2 + 8x - 8$ (C)

23) $(-3a)(a^2b)^3 = (-3a)(a^6b^3)$
 $= -3a^7b^3$ (B)
 Also:
 $a \cdot a^6 = a^{1+6} = a^7$

24) $x^3(2x^2 + 3x + 1)$
 $= 2x^5 + 3x^4 + x^3$ (B)

25) $(5x^{-3}y^3)(2x^{-4}y^4)$
 $= 10x^{(-3+(-4))}y^{3+4} = 10x^{-7}y^7 = \frac{10y^7}{x^7}$ (B)

26)

$$\begin{array}{r}
 a-2 + \frac{20}{a+5} \\
 a+5 \overline{) a^2+3a+10} \\
 \underline{-(a^2+5a)} \downarrow \\
 -2a+10 \\
 \underline{-(-2a-10)} \\
 20
 \end{array}$$

(C)

27) $(y-b)(y+1) = -12$

$$y^2 - by + y - b = -12$$

$$\Rightarrow y^2 - 5y + 6 = 0$$

$$= (y-3)(y-2) = 0 \Rightarrow y-3=0, y-2=0$$

$$y=3, y=2$$

(B)

28)

"the length of a rectangle is 3 in. more than the width."
 means $l = w + 3$

$$A = 180 \text{ in}^2 = lw \quad \text{Find: length} = l$$

$$\begin{aligned}
 \text{so } 180 &= lw \\
 &= (w+3)w = w^2 + 3w \quad \text{so}
 \end{aligned}$$

$$w^2 + 3w - 180 = 0$$

$$(w+15)(w-12) = 0 \quad \text{so } w+15=0, \Rightarrow w=-15 \text{ Ignore!}$$

$$w-12=0$$

$$\underline{w=12}$$

$$w=12 \text{ so } l = w+3 = 12+3 = 15 \text{ in. } \checkmark$$

(C)

29)

$$\begin{aligned}
 \frac{x^2-3x-10}{x^2-5x} \cdot \frac{x+2}{x^2-4} &= \frac{\cancel{(x-5)}(x+2)}{x\cancel{(x-5)}} \cdot \frac{\cancel{(x+2)}}{\cancel{(x+2)}(x-2)} \\
 &= \frac{x+2}{x(x-2)}
 \end{aligned}$$

(D)

30)

$$\frac{x^2 - 5x - 14}{x^2 - 9x + 14} \div \frac{x^2 + 6x + 8}{x^2 + 2x - 8}$$

$$\frac{(x-7)(x+2)}{(x-7)(x-2)} \cdot \frac{(x+4)(x-2)}{(x+4)(x-2)}$$

$$= 1$$

Everything cancels!

Factor everything
+ flipCancel what
you can.

(B)

31)

$$\frac{3a+12}{a^2+a-12} - \frac{2}{a-3}$$

Find LCD:

$$\text{Since } a^2+a-12 = (a+4)(a-3)$$

$$\text{LCD} = (a+4)(a-3)$$

$$\text{So } \frac{3a+12}{(a+4)(a-3)} - \frac{2}{a-3} \cdot \frac{a+4}{a+4}$$

$$= \frac{3a+12-2a-8}{(a+4)(a-3)} = \frac{a+4}{(a+4)(a-3)} = \frac{1}{a-3} \quad (A)$$

32)

$$\frac{1 + \frac{4}{y}}{1 - \frac{16}{y^2}} \cdot \frac{y^2}{y^2} = \frac{y^2 + 4y}{y^2 - 16}$$

$$= \frac{y(y+4)}{(y+4)(y-4)} = \frac{y}{y-4} \quad (A)$$

33)

$$\frac{4}{5x-4} = -2 + \frac{6}{5x-4}$$

$$\text{So } 2 = \frac{6}{5x-4} - \frac{4}{5x-4} = \frac{2}{5x-4} = 2$$

$$\Rightarrow 2(5x-4) = 2$$

$$10x - 8 = 2$$

$$10x = 10 \Rightarrow x = \frac{10}{10} = 1 \quad (D)$$

34) Find: time it would take for both pipes working to fill the tank = x

Given: rate of 1st pipe = $\frac{1}{10}$

rate of 2nd pipe = $\frac{1}{15}$ so

	Rate	time	= Work
1 st	$\frac{1}{10}$	x	$\frac{x}{10}$
2 nd	$\frac{1}{15}$	x	$\frac{x}{15}$

1 ← Note: work problems always add up to 1.

$$\text{so } \left(\frac{x}{10} + \frac{x}{15} = 1 \right) \begin{matrix} 30 \\ \uparrow \text{LCD of 10 and 15} \end{matrix}$$

$$= 3x + 2x = 30$$

$$5x = 30 \Rightarrow x = \frac{30}{5} = 6 \text{ min.}$$

(B)

$$\begin{aligned} 35) & \sqrt[3]{27x^4y^{12}} \\ &= 3\sqrt[3]{9 \cdot 3 \cdot x^4 \cdot y^{12}} \\ &= 9x^2y^4\sqrt{3} \quad (C) \end{aligned}$$

Note:

$$y^{12} = (y^4)^3$$

$$\sqrt[3]{y^{12}} = \sqrt[3]{(y^4)^3} = y^4$$

$$\begin{aligned} 36) & \sqrt{2x^2y^4} + xy\sqrt{18y^2} - y\sqrt{50x^2y^2} \\ &= xy^2\sqrt{2} + 3xy^2\sqrt{2} - 5xy^2\sqrt{2} \\ &= -xy^2\sqrt{2} \quad (C) \end{aligned}$$

$$37) \frac{\sqrt{x}}{\sqrt{x} + \sqrt{y}} \cdot \frac{\sqrt{x} - \sqrt{y}}{\sqrt{x} - \sqrt{y}} = \frac{x - \sqrt{x} \sqrt{y}}{x - y} \quad (B)$$

↑

$$\begin{aligned} & \text{b/c } (\sqrt{x} + \sqrt{y})(\sqrt{x} - \sqrt{y}) \text{ is a difference of squares} \\ & = (\sqrt{x})^2 - (\sqrt{y})^2 \\ & = x - y \end{aligned}$$

$$38) \sqrt{3x+1} - 10 = 0$$

$$\Rightarrow \sqrt{3x+1} = 10$$

$$3x+1 = 100$$

$$\Rightarrow 3x = 99 \Rightarrow x = \frac{99}{3} = 33 \quad (A)$$

$$39) 2y^2 + 5y + 1 = 0$$

$$a=2, b=5, c=1 \quad \text{so}$$

$$\begin{aligned} x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-5 \pm \sqrt{(5)^2 - 4(2)(1)}}{2(2)} \\ &= \frac{-5 \pm \sqrt{17}}{4} \quad (D) \end{aligned}$$

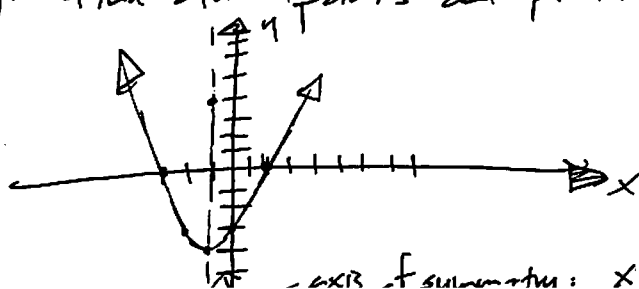
$$40) y = x^2 + 2x - 3$$

Vertex is at $(-\frac{b}{2a}, f(-\frac{b}{2a}))$. Here $a=1$
 $b=2$
 $c=-3$ so

$$-\frac{b}{2a} = \frac{-2}{2(1)} = -1 \quad \text{and} \quad f(-1) = (-1)^2 + (2)(-1) - 3 = -4$$

so vertex is at $(-1, -4)$. Find other points and plot. $y=0 = x^2 + 2x - 3 = (x+3)(x-2)$ so $x=-3, x=2$

x	y	
0	-3	y-intercept
2	0	x-intercepts
-3	0	
-1	-4	vertex



axis of symmetry: $x = -1$

(A)