for Introductory Physics

Answers

1. CHOICE D: We are given x - 1 = 2. To solve for x, add 1 to both sides of the equation:

x – 1 = 2
+ 1 = + 1
----
x = 3

so x + 1 = (3 + 1) = 4

2. CHOICE B: volume = ″ R^2 h = (3)(2 cm)^2 (5 cm) = 60 cm^3

3. CHOICE C: If x = 3 then x^2 + 3 = 3^2 + 3 = 9 + 3 = 12

4. CHOICE C: The area is 8 entire squares plus 0.8 + 0.4 + 0.9 + 0.1 + 0.5 squares which is 10.7 squares. Each square has an area of so the total area is about 53.5.

5. CHOICE A: (-2)(-6) 12
--------- = --------- =

$(2xy^3)^3 = 2^3x^3(y^3)^3 = 8x^3y^9$

7. CHOICE A: (2x – 1) (4x + 1) = 2x (4x + 1) + (- 1)(4x + 1)

= 8x^2 + 2x – 4x – 1

= 8x^2 - 2x – 1

8. CHOICE A: $\frac{4\text{"}\ 10^{\#15}}{\quad}$ #15+12 #3 #4

9. CHOICE D: A common [illegible] is nec[illegible]

$\frac{x^2}{y} + \frac{x}{y^2}$ multiply the first term by $\frac{y}{y}$ to get:

$\frac{x^2y}{y^2} + \frac{x}{y^2} = \frac{x^2y + x}{y^2}$

10. CHOICE C: This is the difference between two squares.

$x^2 - 100 = (x - 10)(x + 10)$

11. CHOICE A: $(5\times10^8)(4\times10^{-12}) = 20\times10^{8-12} = 20\times10^{-4} = 2\times10^{-3}$

12. CHOICE A: $(2x + 3) - (x - 2) = 2x + 3 - x + 2 = x + 5$

13. CHOICE C: $A^2 + B^2$ [illegible]

14. CHOICE C: Let x be the number. "Of" means multiply, "is" means equals.

1
-- (x) = 8
3

Multiply both sides by three: $x = 24$

One fourth of 24 is

1
-- (24) = 6
4

15. CHOICE A: $x^3y = (-2)^3 5 = (-8)(5) = -40$

16. CHOICE D: 25 m = (25 m) (3 feet/m) = 75 feet.

17. CHOICE C: $(x^2 - 3x + 2) - (3x^2 - 5x - 1)$

$= x^2 - 3x + 2 - 3x^2 + 5x + 1$

$= -2x^2 + 2x + 3$

18. CHOICE D: $\frac{2x}{3y}\cdot\frac{9y}{4x^2} = \frac{2\cancel{x}}{3\cancel{y}}\cdot\frac{9\cancel{y}}{4x^{\cancel{2}}} = \frac{3}{2x}$

29. CHOICE D: 10 (- 2) (- 3) (- 1) = - 60 = - 12
---- ----
5 5

30. CHOICE A: The graphs of $x - 2y = 6$ and $x + y = -3$ intersect at the values of x and y that satisfy both equations. To get these, solve the two equations [illegible] simultaneously by solving the first eq[illegible] 6. Substitute into the second equation:

$(2y + 6) + y = -3$

$= 3y + 6 = -3$

Subtract 6 from both sides:

$3y + 6 = -3$
- 6 - 6

$3y = -9$

Divide both sides by three:

$3y = -9$
-- --
3 3

$y = -3$

31. CHOICE [illegible]: $8^{-1/3}9^{1/2}$ = 1
-- x 3 = [illegible]
2 2

32. CHOICE B: $\sqrt[3]{-27} = -3$ because (-3)(-3)(-3) = -27. [illegible] roots can be negative.

33. CHOICE A: As x becomes very large and positive, y becomes very large because the term in x^2 increases much faster than that in x. The same is true as x becomes very negative. Also recall an equation of the form $ax^2 + bx + c$ is a parabola.

34. CHOICE D: Recall that [illegible] means [illegible].

$\log_3(x + 1) = 2$ means...

---   -----

```
= 6w + 6 = 90
      - 6   - 6
------------------
6w  =  84
---     ---
6        6

w  =  14
```

56. CHOICE A: $4\,(s + 2) = (4 \text{ x } s) + (4 \text{ x } 2) = 4s + 8$

57. CHOICE A: $3/4 \text{"}\ 1/7 = \frac{3}{4} \text{"} \frac{1}{7} = \frac{21 \text{"}\ 4}{28} = \frac{17}{28}$

58. CHOICE B: Subtract one from both sides:

```
1 – 5x  <  3
- 1          - 1
---------------
- 5x  <  2
```

Divide both sides by -5, and remember to switch the sign of the inequality because we are dividing by a negative number:

```
- 5x  <  2
-----     ---
- 5        - 5

x > - 2 / 5
```

59. CHOICE B: The function has an absolute minimum at $x = 1$, the lowest point on the graph between 0 and 4. The other low point at $x = 3$ is a "local minimum.”

60. CHOICE A: $3^2 + 4^2 = D^2 = 25$ so $D = 5$.

61. CHOICE B: $\left(2\sqrt{3}\right)\left(3\sqrt{6}\right) = 6\sqrt{18} = 6\sqrt{(2)(9)} =$

$6\sqrt{9}\sqrt{2} = (6)(3)\sqrt{2} = 18\sqrt{2}$

62. CHOICE B: $1 – \sin^2\# = \cos^2\#$ (a trigonometric identity).

63. CHOICE A: $f(x) = \cos(3x)$, then $f(! / 6) = \cos(! / 2) = 0$.

64. CHOICE A: The circumference of a circle is 2″R.

65. CHOICE E: The sine curve has a y-intercept at zero, increases as x increases to $/2 and decreases as x decreases to - $/2.

66. CHOICE E: csc# = 1/sin# and tan # = sin #/cos #, so
sin # tan # $\csc^2$ # = sin # (sin #/cos #) (1/$\sin^2$ #) = 1/cos # = sec #.

67. CHOICE B: tan # = sin #/cos #, and cos (- $/2) is zero. A zero in the denominator renders the expression undefined.

68. CHOICE E: The area of a circle is ″R^2

69. CHOICE B: the sum of the angles in a triangle add up to 180 degrees.

70. CHOICE C: Taking the slope between x = 0 and x = 5, we see that:

```
                change in y        20 – 5        15
slope    =      -------------  =   -------   =   ---   =   3
                change in x        5 – 0         5
```

71. CHOICE E:

$$\left(\frac{100\,\text{km}}{\text{minute}}\right) = \left(\frac{100\,\text{km}}{\text{minute}}\right)\left(\frac{5\text{ miles}}{8\text{ km}}\right)\left(\frac{1\text{ minute}}{60\text{ seconds}}\right)$$

$$= \frac{500\,\text{miles}}{480\,\text{seconds}} = 1\frac{\text{mile}}{\text{second}}$$